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(54) **DISPOSABLE COATED PAPER STRAW**

(57) The invention provides a disposable coated paper straw, wherein the disposable coated paper straw is rolled into a tube from a thin sheet. The thin film is a coated paper strip made from coated papers. The coated paper includes a paper base layer (11) and a coating layer. In the straw, the coated layer is at least on the outside of the paper base layer (11). The straw has an interface edge (15), and the interface edge (15) is formed by joining overlapping portions of the two longitudinal sides of the coated paper strip. The straw provided by the present invention is not only degradable, which is environmentally friendly, but also it can maintain the strength of the straw over a long period of time.

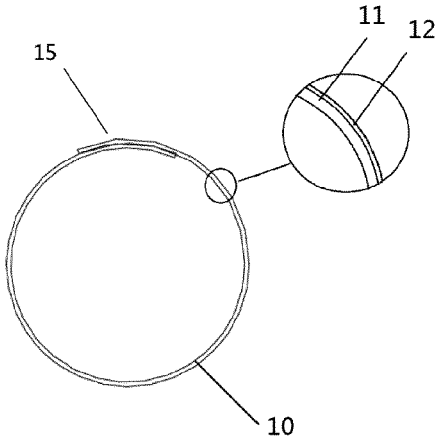

Fig.2

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Description

FIELD OF INVENTION

[0001] The present invention relates to the field of beverage products, and in particular to a disposable coated paper straw.

BACKGROUND OF INVENTION

[0002] Current drinking straws are typically plastic straws. Although the plastic straw is convenient to use, the straw discarded after use is difficult to degrade in the natural environment, which is not environmentally friendly.

[0003] With the development of the society, environmental protection has been paid more and more attention. The industry has proposed more straw technologies which are environmentally friendly.

[0004] For example, the Chinese patent for utility model CN204363641U proposes a paper straw, which is characterized in that a main body of the straw is formed by paper, and a plurality of loops are pressed at one end of the straw so that one end of the straw can be appropriately bent. Due to the use of a paper body, the straw is degradable and reduces environmental stress.

[0005] The Chinese patent for utility model CN202262782U also discloses a paper straw which adopts a paper tube body, and the tube body is flat in a folded manner to realize very small occupied space, and is unfolded and rounded from the folded manner at the time of use.

[0006] The above conventional art use paper tube body for the straw. However, the paper tube body leads to a quick damage to the strength of the tube body during operation due to immersion of the straw in the beverage, which causes inconvenience to the user.

[0007] The industry therefore requires a new straw that not only has a certain degree of degradability in the natural environment, but also maintains the strength of the straw over a long period of time.

SUMMARY OF INVENTION

[0008] The embodiment of the invention provides a disposable coated paper straw, so that the straw does not only possess degradability, but also maintains the strength of the straw for a long period of time.

[0009] According to an aspect of an embodiment of the present invention, a disposable coated paper straw is provided. The disposable coated paper straw is made by rolling a sheet into a tubular shape. The sheet is a coated paper stripe made of a coated paper which contains a paper-base layer and a coating layer. In the straw, the coating layer exists at least at the exterior side of the paper-base layer. The straw has an interface edge which is joined by overlapping portions of two sides of the coated paper strip along the longitudinal direction.

[0010] Optionally, the coated paper is a single-sided coated paper. The coating layer contains a first coating layer on a first side of the paper-base layer. In the straw, the first coating layer is located at an exterior side of the paper-base layer.

[0011] Optionally, the coated paper is a double-sided coated paper. The coating later includes a first coating layer on a first side of the paper-base layer and a second coating layer on a second side of the paper-base layer. In the straw, the first coating layer is located at an exterior side of the paper-base layer, and the second coating layer is located at an interior side of the paper-base layer.

[0012] In one embodiment, the coating layer may be made of a biodegradable coated resin.

[0013] In one embodiment, the biodegradable coated resin is a petroleum-based coated resin or a bio-based coated resin.

[0014] In one embodiment, the end surface of the straw is a cut surface, and the paper-base layer is exposed on the end surface.

[0015] In one embodiment, the coated paper includes a printed pattern layer which is located on an outer surface of the coating layer or between the coating layer and the paper-based layer.

[0016] In one embodiment, the straw has a cylindrical cross section.

[0017] In one embodiment, the interface edge extends along a longitudinal axis of the straw.

[0018] In one embodiment, one end of the straw forms an angular portion or a spoon portion.

[0019] In one embodiment, the spoon portion contains one of the followings: a straw end face and a spoon bevel connected to each other; or a straw end face, a spoon step plane and a spoon step end face connected to each other.

[0020] Since the straw is made of coated paper which can slow the contact and soaking of the paper-base layer with the beverage during use, the paper-base layer does not soften prematurely. As a result, the straw is able to maintain sufficient use strength for a certain period of time. At the same time, since the coated paper is mainly made of paper, the straw has good degradability and is environmentally friendly.

BRIEF DESCRIPTION OF THE DRAWINGS

[0021] Accompanying drawings are for providing further understanding of embodiments of the disclosure which form a part of the disclosure and are for illustrating the principle of the embodiments of the disclosure along with the literal description. Apparently, the drawings in the description below are merely some embodiments of the disclosure, a person skilled in the art can obtain other drawings according to these drawings without creative efforts. In the figures:

Fig. 1 is a perspective view showing a structure of a disposable coated paper straw according to the

present invention;

Fig. 2 is a schematic view showing the end face structure of a first embodiment of the straw according to Fig. 1.

Fig. 3 is a schematic view showing the end face structure of a second embodiment of the straw according to Fig. 1.

Fig. 4 is a schematic view showing the end face structure of a third embodiment of the straw according to Fig. 1.

Figs. 5A and 5B are respectively a schematic perspective view and a front view of a fourth embodiment of the straw according to Fig. 1.

Figs. 6A and 6B are respectively a schematic perspective view and a front view of a fifth embodiment of the straw according to Fig. 1.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0022] In order to make the technical solution of the present invention better understandable by a person skilled in the art, technical solutions in the embodiments of the present invention are clearly and integrally described in the following with reference to the accompanying drawings in the embodiments of the present invention. Apparently, the described embodiments are merely part of the embodiments of the present invention, but not all of the embodiments. All other embodiments obtained by a person skilled in the art based on the embodiments of the present invention without departing from the inventive scope should fall within the scope of the present invention.

[0023] It should be noted that the terms "first", "second", and the like in the description, claims, and figures of the present invention are used to distinguish similar objects, and are not necessarily used to describe a particular order or precedence order. It is to be understood that the materials so used here are interchangeable where appropriate, so that the embodiments of the invention described herein can be implemented in a sequence other than those illustrated or described herein. Moreover, the terms "comprises" and "comprising" and any variations thereof are intended to cover a non-exclusive inclusion.

[0024] Fig. 1 is a perspective view showing the structure of a disposable coated paper straw according to the present invention. Referring to Fig. 1, the straw **10** is rolled from a coated paper strip (sheet) made of coated paper, and the straw **10** has an interface edge **15.**

[0025] The coated paper is a paper-based substrate forming a paper-base layer, and at the same time, a coating layer is formed on one side or both layers of the paper-base layer, that is, a single-sided coated paper or a double-sided coated paper. Since the coating layer can be effectively waterproof, the straw can be prevented from softening and collapsing in the beverage for a short time, and the taste of the straw can be maintained, thereby facilitating the use and acceptance by the consumer.

[0026] Fig. 2 is a schematic view showing the end face structure according to the first embodiment of the straw shown in Fig.1. It can be seen that in this embodiment, the coated paper is a single-sided coated paper containing a paper-base layer **11** and a first coating layer **12** at an exterior side of the paper-base layer **11.** Since the straw is made of coated paper, the coating layer can slow the contact and soak of the paper-base layer with the beverage during use, so that the paper-base layer does not soften prematurely, so that the straw can maintain sufficient use strength for a certain period of time. At the same time, since the coated paper is mainly made of paper, the straw has good degradability and is environmentally friendly.

[0027] Fig. 3 is a schematic view showing the end face structure according to a second embodiment of the straw shown in Fig. 1. It can be seen that in this embodiment, the coated paper is a double-sided coated paper, and the coating layer includes a first coating layer **12** at an exterior side of the paper-base layer **11** and a second coating layer **13** at an interior side of the paper-base layer **11.** The straw **10** made of double-coated paper has better use strength than that in the first embodiment.

[0028] According to an embodiment of the invention, the coating layer is made of a biodegradable coated resin. The coating process of the approved biodegradable resin coated on the paper (paper-base layer) can be made reference to a general coated paper production process. The paper can be single-sided coated or double-sided coated. The coated resin that can be used includes the following two types:

1. petroleum-based coated resin: PE/PP containing photo-oxygen biodegradable additives. The photo-biodegradation additive (such as Reverte BD93835) is mixed into PE/PP to form a petroleum-based coated resin, which can be used for paper coating.
2. bio-based coated resin: it can be for example PLA, PHA, PBS or the like, these bio-based coated resin can be directly coated on the paper.

[0029] According to a further embodiment of the invention, the end face of the straw **10** is a cut surface and the paper-base layer **11** is exposed on the end face. Since the two ends of the straw **10** are cut at the time of production, the cut portion does not have protection from the coating, and the water will slowly invade the body of the straw **10** from the cutting portions at both ends. As a result, the ends of the straw **10** are softened after a period of use which is just beneficial to be blunt and soft after the discarded straw **10** is thrown into the water, so that it can not harm the creatures inside the water, and is beneficial to the protection of the natural ecological environment such as the ocean.

[0030] According to a further embodiment of the invention, the coated paper may contain a printed pattern layer (not shown) which can be located at an exterior surface

of the coating layer. As an alternative embodiment, the printed pattern layer may also be located between the coating layer and the paper-based layer.

[0031] According to a further embodiment of the invention, the straw **10** may have a cylindrical cross section. This cylindrical design can effectively resist the pressure of the "+" type anti-leakage opening of the disposable cup cover, preventing the straw being flattened during use and impeding normal drinking. The cylindrical straw can also be used to conveniently enjoy drinks with large particles (such as pearl milk tea and sand ice).

[0032] The length of the straw **10** can be cut according to different requirements, and can also be cut into an angular shape or a spoon shape to meet different requirements.

[0033] For example, Fig. 4 is a front perspective view of a third embodiment of the straw according to Fig. 1, in which one end of the straw **10** is shown to form an acute angle portion **18.**

[0034] Figs. 5A and 5B are a schematic perspective view and a front view showing a fourth embodiment of the straw according to Fig. 1, wherein the spoon portion **19** includes a straw end face **19a,** a spoon step plane **19b** and a spoon step end face **19c** which are connected to each other. As a preferred embodiment, the end face **19a** of the straw is perpendicular to a longitudinal axis of the straw. As another preferred embodiment, the straw end face **19a** is located in the lower half of the straw relative to the longitudinal axis of the straw. The spoon step plane **19b** is located in the plane of the longitudinal axis of the straw, and the spoon step end face **19c** is located in the upper half of the straw relative to the longitudinal axis of the straw. As another preferred embodiment, a transitional rounded angle is formed between the straw end face 19a and the spoon step plane **19b,** and a transitional rounded angle is formed between the spoon step plane **19b** and the spoon step end face **19c.** As a further preferred embodiment, the radius of the arc of the aforementioned transitional round angle is 3-5 mm, preferably 4 mm.

[0035] Figs. 6A and 6B are respectively a schematic perspective view and a front view of a fifth embodiment of the straw according to Fig. 1, in which the spoon portion **19** includes a straw end face **19a** and a spoon bevel **19d** which are connected to each other. As a preferred embodiment, the straw end face **19a** is perpendicular to the longitudinal axis of the straw. As a preferred embodiment, the straw end face **19a** is located in the lower half of the straw relative to the longitudinal axis of the straw, and the spoon bevel **19d** is located in the upper half of the straw relative to the longitudinal axis of the straw.

[0036] According to various embodiments of the invention, an interface side **15** may extend in the direction of extension of the longitudinal axis of the straw **10,** i.e., in parallel with respect to the longitudinal axis (no matter if the longitudinal axis of the straw is straight or curved), or may extend in a spiral shape in the direction of extension of the longitudinal axis of the straw. This depends on the rolling equipment and the rolling process.

[0037] The interface side **15** is joined by overlapping portions of the two sides of the coated paper strip in the longitudinal direction. The width of the overlapping portion can be set to 2-7 mm, preferably 3-5 mm. After determining the width of the overlapping portion of the coated paper strip according to the diameter of the straw, the total width of the coated paper strip can be determined. Take a straw with a diameter of 7 mm and a length of 200 mm as an example, the width of the coated stripe can be set to be about 26 mm.

[0038] In summary, the technical effects of the embodiments of the present invention are summarized as follows:

1. The straw according to an embodiment of the present invention can be produced based on the appearance of a general conventional cylindrical plastic straw, and is replaced by a biodegradable single-sided coated paper or double-sided coated paper as the basic material.
2. Since each straw is made of a piece of paper by crimping, different patterns can be printed with food-grade ink before the crimp molding.
3. A cylindrical structure maintains the best geometric stability during use, and also facilitates the user drinking beverages containing large particles such as pearl milk tea.
4. Biodegradable coated paper is used as the material. After the straw is discarded, in addition to being able to be recycled, the glue film (coating layer) can also be biodegraded together with the paper in case the straw is not recycled. The environmental pollution can be greatly reduced.
5. Moreover, the coated paper is waterproof for a certain period of time, so that the straw can maintain its shape within a few hours without obvious softening, which effectively maintains the texture of use. However, after several hours of soaking, the two ends of the straw as well as other cutting portions, because of the lack of glue film for protection, will become soft and blunt, which is beneficial to the degradation of materials in the natural environment, and is also particularly beneficial to reduce the damage of the straw to aquatic organisms, thus contributing to ecological protection.

[0039] The above is only a preferred embodiment of the present invention, and it should be noted that several improvements and retouching can be made by a person skilled in the art without departing from the principles of the present invention. It should be considered to fall into the protection scope of the present invention.

Claims

1. A disposable coated paper straw formed by rolling

a sheet into a tubular shape, which is **characterized in that**:

the sheet is a coated paper strip made of a coated paper which comprises a paper-base layer (11) and a coating layer;
in the straw, the coating layer being located at least at an exterior side of the paper-base layer (11);
the straw comprising an interface edge (15) which is joined by a overlapping portion of two sides of the coated paper strip in the longitudinal direction.

2. The disposable coated paper straw of claim 1, which is **characterized in that**:
the coated paper is a single-sided coated paper which comprises a first coating layer (12) on a first side of the paper-base layer (11); in the straw, the first coating layer (12) being located at an exterior side of the paper-base layer (11).

3. The disposable coated paper straw of claim 1 which is **characterized in that**:

the coated paper is a double-sided coated paper which comprises a first coating layer (12) on a first side of the paper-base layer (11) and a second coating layer (13) on a second side of the paper-base layer (11);
in the straw, the first coating layer (12) being located at an exterior side of the paper-base layer (11), and the second coating layer (13) being located at an interior side of the paper-base layer (11).

4. The disposable coated paper straw of claim 1 which is **characterized in that**:
the coating layer is made of a biodegradable coated resin.

5. The disposable coated paper straw of claim 4, which is **characterized in that**: the biodegradable coated resin is a petroleum-based coated resin or a bio-based coated resin.

6. The disposable coated paper straw of claim 1, which is **characterized in that**: the end surface of the straw is a cut surface, and the paper-base layer (11) is exposed on the end surface.

7. The disposable coated paper straw of claim 1, which is **characterized in that**: the coated paper comprises a printed pattern layer which is located on an outer surface of the coating layer or between the coating layer and the paper-based layer.

8. The disposable coated paper straw of claim 1, which is **characterized in that**: the straw has a cylindrical cross section.

9. The disposable coated paper straw of claim 1, which is **characterized in that**: the interface edge extends along a longitudinal axis of the straw.

10. The disposable coated paper straw of claim 1, which is **characterized in that**: one end of the straw forms an angular portion (18) or a spoon portion (19).

11. The disposable coated paper straw according to claim 10, which is **characterized in that**: the spoon portion (19) comprises one of the following:

a straw end face (19a) and a spoon bevel (19d) connected to each other; or
a straw end face (19a), a spoon step plane (19b) and a spoon step end face (19c) connected to each other.

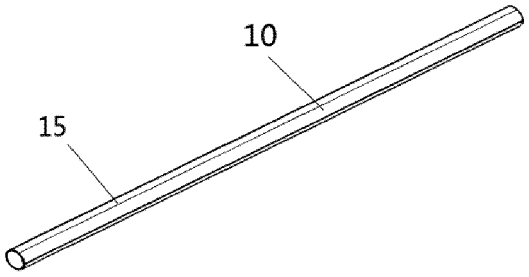

Fig.1

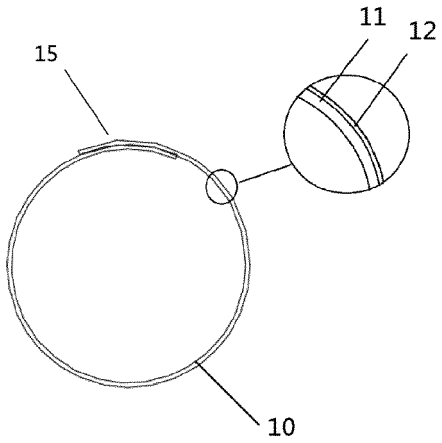

Fig.2

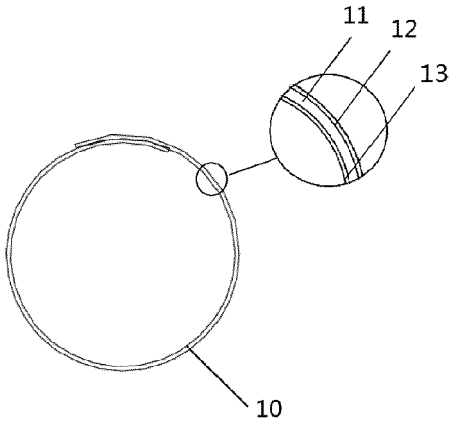

Fig.3

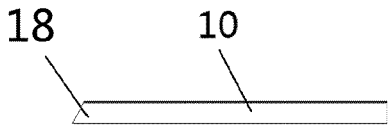

Fig.4

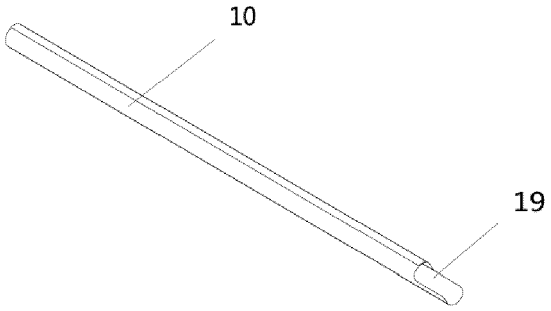

Fig.5A

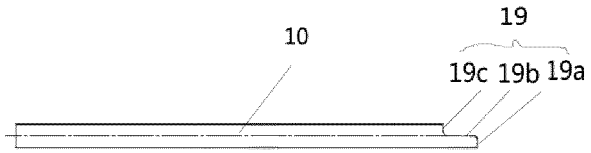

Fig.5B

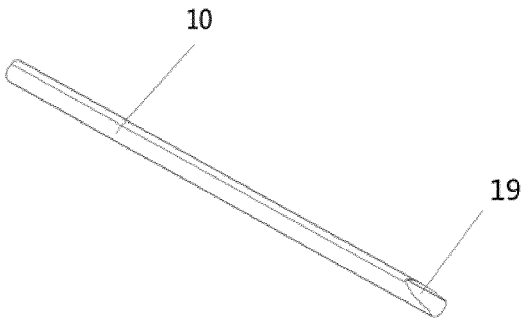

Fig.6A

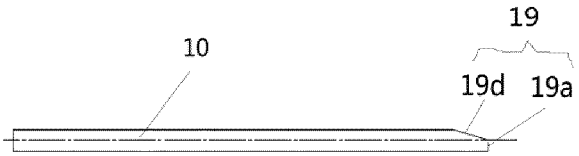

Fig.6B

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EUROPEAN SEARCH REPORT

Application Number
EP 18 18 5231

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 1 466 185 A (HUGO PICK) 28 August 1923 (1923-08-28) * claim 1 *	1	INV. A47G21/18
X	GB 1 418 909 A (POLLITT SON LTD J) 24 December 1975 (1975-12-24) * claim 1 *	1-11	
X	GB 661 398 A (RECKITT & COLMANN LTD; GEORGE KETT) 21 November 1951 (1951-11-21) * claim 2 *	1-11	
X	WO 2009/110825 A1 (TETRA LAVAL HOLDINGS & FINANCE [CH]; PERSSON AAKE [SE]; JONASSON KATAR) 11 September 2009 (2009-09-11) * claim 4 * * page 6, line 12 - line 17 *	1-11	
X	WO 01/49770 A1 (PROCTER & GAMBLE [US]; NODA ISAO [US]; SATKOWSKI MICHAEL MATTHEW [US]) 12 July 2001 (2001-07-12) * page 14, line 11 - line 18 *	1	TECHNICAL FIELDS SEARCHED (IPC) A47G

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	8 October 2018	Ponsaud, Philippe

CATEGORY OF CITED DOCUMENTS

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08-10-2018

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 1466185 A	28-08-1923	NONE	
GB 1418909 A	24-12-1975	NONE	
GB 661398 A	21-11-1951	NONE	
WO 2009110825 A1	11-09-2009	AR 070804 A1	05-05-2010
		AU 2009220251 A1	11-09-2009
		BR PI0909647 A2	22-09-2015
		CA 2717846 A1	11-09-2009
		CN 102015296 A	13-04-2011
		DK 2262642 T3	30-03-2015
		EP 2262642 A1	22-12-2010
		JP 5198585 B2	15-05-2013
		JP 2011513097 A	28-04-2011
		KR 20100125390 A	30-11-2010
		RU 2010140820 A	20-04-2012
		TW 200946345 A	16-11-2009
		UA 100879 C2	11-02-2013
		US 2011041981 A1	24-02-2011
		WO 2009110825 A1	11-09-2009
		ZA 201006446 B	28-05-2014
WO 0149770 A1	12-07-2001	AT 444324 T	15-10-2009
		AU 2284601 A	16-07-2001
		BR 0016877 A	08-10-2002
		CA 2393471 A1	12-07-2001
		CN 1413226 A	23-04-2003
		EP 1242497 A1	25-09-2002
		ES 2333403 T3	22-02-2010
		JP 2003518998 A	17-06-2003
		WO 0149770 A1	12-07-2001

EPO FORM P0459

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 204363641 U **[0004]**
- CN 202262782 U **[0005]**