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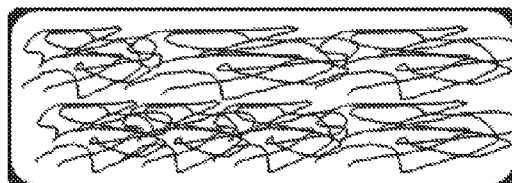


FIG. 1

(57) Abstract: The present disclosure provides a moisture absorption piece, comprising 20-90 wt.% of first fibers comprising at least one selected from the group consisting of sodium acrylate copolymer fibers, sheath-core structure modified polyacrylonitrile copolymer fibers, degreasing cotton, modified cellulose fibers, and modified poly vinyl alcohol fibers; 5-75 wt.% of second fibers comprising at least one selected from the group consisting of bamboo fibers, regenerated hemp fibers, cotton fibers, polylactic acid fibers, silk fibers, and soybean fibers; and 5-70 wt.% of third fibers comprising at least one selected from the group consisting of bi-component polyester fibers, polyethylene/polypropylene fibers, and bi-component polylactic acid fibers, based on the total weight of the moisture absorption piece. The moisture absorption piece according to the present disclosure has satisfactory water absorption and retention capabilities and softness.

MOISTURE ABSORPTION PIECE, MOISTURE ABSORPTION BAG, AND PREPARATION METHOD AND USE THEREOF

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Background

Doctors often place cotton rolls at a proper position between the teeth and the tongue (tongue side) or between the teeth and the lip (lip side) to absorb fluid such as saliva and water from the mouth of a patient during stomatological or dental examination or procedure. However, due to low water absorption and retention capabilities, cotton rolls usually need to be replaced multiple times during the examination or procedure. Furthermore, cotton rolls are hard in texture, which makes the patient feel uncomfortable in the mouth. In addition, the cotton rolls are not lint-free during use, thus causing inconvenience to the operation performed by doctors.

Chinese Patent Application CN1226814A discloses an absorption structure that can be used in diapers, sanitary napkins, pantliners, incontinence pads, bed sheet protection pieces, and the like. The absorption structure comprises an absorbent material layer of adhesive-free cellulosic fibers and at least one layer of air laid materials of adhesively bonded cellulosic fibers, wherein the air laid materials and the absorbent material layer are bonded by using the adhesive of the air laid materials.

PCT Patent Application WO 200620213A2 discloses a water absorption product, which comprises a water absorption core layer and bi-component fiber layers, wherein the water absorption core layer comprises super absorbent materials and cellulosic materials, the bi-component fiber layers cover the upper surface and the lower surface of the water absorption core layer, and the periphery of the water absorption core layer is not completely wrapped; relative to the total weight of the materials of the water absorption core layer, the super absorbent materials are acrylate copolymers of less than 70% by weight; and the bi-component fiber layers comprise 35% polypropylene and 50% polyethylene by weight.

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Summary

The present disclosure is intended to provide a novel moisture absorption piece, which at least has satisfactory water absorption and retention capabilities and softness.

According to certain aspects of the present disclosure, a moisture absorption piece is provided, and the moisture absorption piece comprises 20-90 wt.% of first fibers comprising at least one selected from the group consisting of sodium acrylate copolymer fibers, sheath-core structure modified polyacrylonitrile copolymer fibers, degreasing cotton, modified cellulose fibers, and modified poly vinyl alcohol fibers; 5-75 wt.% of second fibers comprising at least one selected from the group consisting of bamboo fibers, regenerated hemp fibers, cotton fibers, polylactic acid fibers, silk fibers, and soybean fibers; and 5-70 wt.% of third fibers comprising at least one selected from the group consisting of bi-component polyester fibers, polyethylene/polypropylene fibers, and bi-component polylactic acid fibers, based on the total weight of the moisture absorption piece.

According to certain aspects of the present disclosure, a moisture absorption bag is provided, and the moisture absorption bag comprises a packaging bag and the moisture absorption piece according to the present disclosure placed in the packaging bag, wherein the packaging bag comprises nonwoven fabric.

According to certain aspects of the present disclosure, a method for preparing a moisture absorption piece is provided, and the method comprises the step of mixing all components of the moisture absorption piece according to the present disclosure to obtain a moisture absorption piece.

According to certain aspects of the present disclosure, a method for preparing a moisture absorption bag is provided, and the method comprises the step of placing the moisture absorption piece according to the present disclosure in a packaging bag to obtain a moisture absorption bag, wherein the packaging bag comprises nonwoven fabric.

According to certain aspects of the present disclosure, uses of the moisture absorption piece according to the present disclosure for moisture absorption are provided.

According to certain aspects of the present disclosure, uses of the moisture absorption bag according to the present disclosure for moisture absorption are provided.

The moisture absorption piece and the moisture absorption bag according to the present disclosure have satisfactory water absorption and retention capabilities and softness.

Brief Description of the Drawings

The present disclosure is further described below in connection with the accompanying drawings and embodiments to make the above-mentioned and other purposes, features, and advantages of the present disclosure more obvious and understandable.

FIG. 1 is a schematic diagram of a moisture absorption piece according to certain embodiments of the present disclosure.

FIG. 2 is a microscopic schematic diagram of a moisture absorption piece according to certain embodiments of the present disclosure.

FIG. 3 is a schematic diagram of a moisture absorption bag according to certain embodiments of the present disclosure.

FIG. 4 (a-e) are certain cross-sections of sheath-core modified polyacrylonitrile copolymer fibers according to certain embodiments of the present disclosure.

In FIGS. 1 to 3, 100 is a moisture absorption piece, 111 is a first fiber, 112 is a second fiber, 113 is a third fiber, 114 is a fluid such as saliva or water, 200 is a moisture absorption bag, 210 is a packaging bag, and 220 is a dental floss.

Detailed Description

It shall be understood that one skilled in the art can contemplate other various embodiments and make modifications thereto according to the teachings of the description without departing from the scope or spirit of the present disclosure. Therefore, the following embodiments are not intended to be limiting in any sense.

Unless otherwise specified, it shall be understood that all numbers which are used in the description and claims to represent feature sizes, quantities and physicochemical characteristics are modified by the term “approximate” in all cases. Therefore, unless otherwise oppositely stated, numerical parameters which are listed in the description and claims attached thereto are approximate values. One skilled in the art can properly change these approximate values according to the teachings disclosed herein so as to obtain desired characteristics. Numerical ranges which are expressed by using end points shall

include all numbers and any range therein. For instance, the range 1-5 includes 1, 1.1, 1.3, 1.5, 2, 1.75, 3, 3.80, 4, and 5, etc.

Unless otherwise specified, it shall be understood that “softness of the moisture absorption piece”, which are used in the description and claims, is a feature of the moisture absorption piece, the lower of the value means the softer of the moisture absorption piece. The test method of softness, see the “Softness test” section of the description.

Unless otherwise specified, it shall be understood that “softness of the moisture absorption bag”, which are used in the description and claims, is a feature of the moisture absorption bag, the lower of the value means the softer of the moisture absorption bag. The test method of softness, see the “Softness test” section of the description.

Unless otherwise specified, materials used in the embodiments are commercially available industrial products.

Moisture absorption piece

According to certain aspects of the present disclosure, a moisture absorption piece is provided. As shown in FIGS. 1 and 2, the moisture absorption piece 100 comprises 20-90 wt.% of first fibers 111 comprising at least one selected from the group consisting of sodium acrylate copolymer fibers, sheath-core structure modified polyacrylonitrile copolymer fibers, degreasing cotton, modified cellulose fibers, and modified poly vinyl alcohol fibers; 5-75 wt.% of second fibers 112 comprising at least one selected from the group consisting of bamboo fibers, regenerated hemp fibers, cotton fibers, polylactic acid fibers, silk fibers, and soybean fibers; and 5-70 wt.% of third fibers 113 comprising at least one selected from the group consisting of bi-component polyester fibers, polyethylene/polypropylene fibers, and bi-component polylactic acid fibers, based on the total weight of the moisture absorption piece.

First fibers

The first fibers contribute to the satisfactory water absorption and retention capabilities of the moisture absorption piece.

According to certain embodiments, the first fibers can be at least one selected from the group consisting of sodium acrylate copolymer fibers, sheath-core structure modified polyacrylonitrile copolymer fibers, degreasing cotton, modified cellulose fibers, and modified poly vinyl alcohol fibers.

According to certain embodiments, the length of the first fibers can be 1-100 mm.

According to certain embodiments, the fineness of the first fibers can be 1-30 D (note: 1D=1g/9000m).

5 According to certain embodiments, the sodium acrylate copolymer fibers can be sodium acrylate copolymer fibers available from Technical Absorbents Ltd., Britain.

According to certain embodiments, as shown in Fig 4 (a-e), sheath-core structure modified polyacrylonitrile copolymer fibers are those fibers where one of the first components (core) is fully surrounded by the second component (sheath). In this structure, adhesion between sheath and core is not always essential for fiber integrity.
10 This structure can be employed when it is desirable for the surface to have the property of one of the polymers such as luster, dyeability or stability, while the core may contribute to strength, reduced cost and the like. A highly contoured interface between sheath and core can lead to mechanical interlocking that may be desirable in the absence of good adhesion between sheath and core. According to certain embodiments, the sheath-core structure modified polyacrylonitrile copolymer fibers can be Lanseal fibers available from TOYOB
15 Co., Ltd., Japan.

According to certain embodiments, degreasing cotton available from China Xinhua Aihua degreasing cotton company.

20 According to certain embodiments, modified cellulose fiber available from The Lenzing Group.

According to certain embodiments, modified poly vinyl alcohol fiber available from KURARAY CO., LTD.

The content of the first fibers is 20-90 wt.% based on the total weight of the moisture absorption piece. When the content of the first fibers is less than 20 wt.%, the
25 moisture absorption piece may not have adequate water absorption and retention capabilities. When the content of the first fibers is greater than 90 wt.%, the moisture absorption piece may not have adequate softness.

According to certain embodiments, when the content of the first fibers is 45-80 wt.% based on the total weight of the moisture absorption piece, the moisture absorption
30 piece has good water absorption and retention capabilities.

Second fibers

The second fibers contribute to the satisfactory softness of the moisture absorption piece.

According to certain embodiments, the second fibers can be at least one selected from the group consisting of bamboo fibers, regenerated hemp fibers, cotton fibers, 5 polylactic acid fibers, silk fibers, and soybean fibers.

According to certain embodiments, the length of the second fibers is 1-100 mm.

According to certain embodiments, the fineness of the second fibers is 1-30 D.

According to certain embodiments, the bamboo fibers available from Hebei Jigao Chemical Fiber Co., Ltd. can be used.

10 According to certain embodiments, the regenerated hemp fibers available from Hebei Jigao Chemical Fiber Co., Ltd. can be used.

According to certain embodiments, the cotton fibers from Shandong Guoguan Cotton Industry Co., Ltd. can be used.

15 According to certain embodiments, the polylactic acid fibers available from Haining Xinneng Fibers & Non-wovens Ltd. can be used.

According to certain embodiments, the silk fibers available from Huiyang Textile Co., Ltd. can be used.

According to certain embodiments, the soybean fibers available from Jiangsu Jianghe Velvet Soybean Fiber Co., Ltd. can be used.

20 The content of the second fibers is 5-75 wt.%, based on the total weight of the moisture absorption piece. When the content of the second fibers is less than 5 wt.%, the moisture absorption piece may not have adequate softness. When the content of the second fibers is greater than 75 wt.%, the moisture absorption piece may not have adequate water absorption or retention capability.

25 According to certain embodiments, when the content of the second fibers is 10-45 wt.%, based on the total weight of the moisture absorption piece, the moisture absorption piece has good softness.

Third fibers

30 The third fibers can be used for bonding the first fibers and the second fibers to enable the first fibers, the second fibers and the third fibers to form a three-dimensional reticular structure, so as to form voids suitable for holding water molecules, thus further improving the water absorption capability of the moisture absorption piece.

According to certain embodiments, the length of the third fibers is 1-100 mm.

According to certain embodiments, the fineness of the third fibers is 1-30 D.

According to certain embodiments, the third fibers have a melting point equal to or less than 130°C.

5 According to certain embodiments, the third fibers can be at least one selected from the group consisting of bi-component polyester fibers, polyethylene/polypropylene fibers, and bi-component polylactic acid fibers.

 According to certain embodiments, the bi-component polyester fibers available from Huvis Corporation, South Korea can be used.

10 According to certain embodiments, the polyethylene/polypropylene fibers available from Haining Xinneng Fibers & Non-wovens Ltd. can be used.

 According to certain embodiments, the bi-component polylactic acid fibers available from Haining Xinneng Fibers & Non-wovens Ltd. can be used.

 The content of the third fibers is 5-70 wt.% based on the total weight of the moisture absorption piece. When the content of the third fibers is less than 5 wt.%, the moisture absorption piece may not have adequate water retention capability. When the content of the third fibers is greater than 70 wt.%, the moisture absorption piece may not have adequate water absorption capability.

 According to certain embodiments, when the content of the third fibers is 10-35 wt.% based on the total weight of the moisture absorption piece, the moisture absorption bag has good water retention capability.

 According to certain embodiments, the moisture absorption piece has a basis weight of 10-600 g/m². According to certain embodiments, the moisture absorption piece has a basis weight of 100 g/m².

25 According to certain embodiments, the moisture absorption piece has an average length of 10-100 mm.

 According to certain embodiments, the moisture absorption piece has an average width of 10-100 mm.

 According to certain embodiments, the shape of the cross section of the moisture absorption piece can be triangle, oval, rectangular, or square.

Moisture absorption bag

According to certain aspects of the present disclosure, a moisture absorption bag is provided. As shown in FIG. 3, the moisture absorption bag 200 comprises a packaging bag 210 and the moisture absorption piece 100 provided according to certain aspects of the present disclosure, wherein the packaging bag 210 comprises nonwoven fabric. The packaging bag uses the nonwoven fabric because the nonwoven fabric generally has good softness, air permeability and water retention capability.

According to certain embodiments, the nonwoven fabric comprises at least one of the group consisting of polypropylene, polyethylene, polyester, and polylactic acid.

According to certain embodiments, the nonwoven fabric has a basis weight of 10-50 g/m².

According to certain embodiments, the nonwoven fabric has an air permeability of 50-10000 L/m²/s.

According to certain embodiments, the nonwoven fabric has an average pore diameter of 0.0004-0.4 mm.

According to certain embodiments, the nonwoven fabric has a softness less than or equal to that of the moisture absorption piece.

According to certain embodiments, the moisture absorption piece is placed in a packaging bag with a closed periphery. According to certain embodiments, as shown in FIG. 3, the moisture absorption bag 100 can further comprise at least one floss 220. During the stomatological or dental examination or procedure, the floss 220 can be wound around the teeth of a patient to ensure that the moisture absorption bag 100 is fixed at a proper position in the mouth to facilitate the operation of a dentist.

According to certain embodiments, the floss can be at least partially disposed on the outer surface of the moisture absorption bag. According to certain embodiments, at least part of the floss is affixed on the outer surface of the moisture absorption bag.

According to certain embodiments, the floss can at least partially pass through the moisture absorption bag. According to certain embodiments, at least part of the floss passes through the surface of the moisture absorption bag. According to certain embodiments, at least part of the floss not only passes through the surface of the moisture absorption bag, but also passes through the moisture absorption piece.

According to certain embodiments, the moisture absorption bag can comprise one floss on one side thereof. According to certain embodiments, the floss is affixed on one side of the outer surface of the moisture absorption bag.

According to certain embodiments, the moisture absorption bag can comprise one floss respectively on any two sides thereof. According to certain embodiments, the flosses are respectively affixed on two sides of the outer surface of the moisture absorption bag.

According to certain embodiments, the moisture absorption bag can comprise a plurality of flosses.

According to certain embodiments, the floss has a fineness of 5-10000 D.

According to certain embodiments, the shape of the cross section of the moisture absorption bag can be triangle, oval, rectangular, or square.

Method for preparing moisture absorption piece

According to certain aspects of the present disclosure, a method for preparing a moisture absorption piece is provided, and the method comprises the step of mixing 20-90 wt.% of the first fibers, 5-75 wt.% of the second fibers and 5-75 wt.% of the third fibers based on the total weight of the moisture absorption piece to obtain a moisture absorption piece, wherein the first fibers comprise at least one selected from the group consisting of sodium acrylate copolymer fibers, sheath-core structure modified polyacrylonitrile copolymer fibers, degreasing cotton, modified cellulose fibers, and modified poly vinyl alcohol fibers; the second fibers comprise at least one selected from the group consisting of bamboo fibers, regenerated hemp fibers, cotton fibers, polylactic acid fibers, silk fibers, and soybean fibers; and the third fibers comprise at least one selected from the group consisting of bi-component polyester fibers, polyethylene/polypropylene fibers, and bi-component polylactic acid fibers.

According to certain embodiments, the method for preparing the moisture absorption piece can comprise the following steps: mixing 20-90 wt.% of the first fibers, 5-75 wt.% of the second fibers and 5-75 wt.% of the third fibers based on the total weight of the moisture absorption piece to obtain a first fibrous web; and laying the first fibrous web to obtain a moisture absorption piece. In the embodiment, the laying step facilitates the preparation of a uniformly mixed fibrous web of high-gram-weight.

According to certain embodiments, the method can comprise the following steps: firstly laying the first fibrous web to obtain a second fibrous web, and then needling and reinforcing the second fibrous web to obtain a moisture absorption piece. In the embodiment, the laying step facilitates the preparation of a uniformly mixed fibrous web of high-gram-weight; the needling and reinforcing step facilitates the bonding of the third fibers to the first fibers and the second fibers so as to enable the first fibers, the second fibers and the third fibers to form a three-dimensional reticular structure, which facilitates the retention of water molecules therein to further improve the water absorption capability of the moisture absorption piece.

According to certain embodiments, the method can comprise the following steps: firstly laying the first fibrous web to obtain a second fibrous web, and then drying the second fibrous web to obtain a moisture absorption piece. In the embodiments, the laying step facilitates the preparation of a uniformly mixed fibrous web of high-gram-weight; and the drying step facilitates the bonding of the third fibers to the first fibers and the second fibers so as to enable the first fibers, the second fibers and the third fibers to form a three-dimensional reticular structure, which facilitates the retention of water molecules therein to further improve the water absorption capability of the moisture absorption piece.

According to certain embodiments, the method can comprise the following steps: firstly laying the first fibrous web to obtain a second fibrous web and then needling and reinforcing and drying the second fibrous web to obtain a moisture absorption piece. In the embodiments, the laying step facilitates the preparation of a uniformly mixed fibrous web of high-gram-weight; and the needling and reinforcing and drying step facilitates the bonding of the third fibers to the first fibers and the second fibers so as to enable the first fibers, the second fibers and the third fibers to form a three-dimensional reticular structure, which facilitates the retention of water molecules therein to further improve the water absorption capability of the moisture absorption piece.

According to certain embodiments, the drying is conducted at 120-150°C.

According to certain embodiments, the moisture absorption piece has a basis weight of 10-600 g/m².

According to certain embodiments, the moisture absorption piece has a basis weight of 100 g/m².

According to certain embodiments, the first fibrous web has a basis weight of 10-60 g/m².

According to certain embodiments, the first fibrous web has a basis weight of 20 g/m².

5 According to certain embodiments, the second fibrous web has a basis weight of 60-600 g/m².

According to certain embodiments, the second fibrous web has a basis weight of 100 g/m².

10 According to certain embodiments, at least one floss is disposed on the moisture absorption bag.

According to certain embodiments, the floss can be at least partially disposed on the outer surface of the moisture absorption bag.

According to certain embodiments, the floss can at least partially pass through the moisture absorption bag.

15 According to certain embodiments, the moisture absorption bag can comprise one floss on one side thereof.

According to certain embodiments, the moisture absorption bag can comprise one floss respectively on any two sides thereof.

20 According to certain embodiments, the moisture absorption bag can comprise a plurality of flosses.

According to certain embodiments, the floss has a fineness of 5-10000 D (Note: 1D = 1g/9000m).

For details on the first fibers, the second fibers, the third fibers, the packaging bag and the floss, see the "Moisture absorption piece" section of the description.

25 Method for preparing moisture absorption bag

According to certain aspects of the present disclosure, a method for preparing a moisture absorption bag is provided, and the method comprises the step of placing the moisture absorption piece according to certain aspects of the present disclosure in a packaging bag to obtain a moisture absorption bag, wherein the packaging bag comprises nonwoven fabric.

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According to certain embodiments, as shown in FIG. 3, the moisture absorption bag 200 can be prepared by the following steps: Placing the moisture absorption piece 100

between two pieces of nonwoven fabric; Sealing the peripheries of the two pieces of the nonwoven fabric by ultrasonic technologies or thermal bonding technologies known in the art.

According to certain embodiments, as shown in FIG. 3, the moisture absorption bag 200 can be prepared by the following steps: Placing the moisture absorption piece 100 in an open nonwoven fabric bag; Sealing the periphery of the opening of the nonwoven fabric bag by ultrasonic technologies or thermal bonding technologies known in the art.

For details on the moisture absorption piece, the packaging bag and the moisture absorption bag, see the “Moisture absorption piece” and “Moisture absorption bag” sections of the description.

Uses of moisture absorption piece and moisture absorption bag

According to certain aspects of the present disclosure, uses of the moisture absorption piece according to the present disclosure for moisture absorption are provided.

According to certain aspects of the present disclosure, uses of the moisture absorption bag according to the present disclosure for moisture absorption are provided.

According to certain embodiments, the moisture absorption piece or the moisture absorption bag of the present disclosure can be applied to stomatology or dentistry.

According to certain embodiments, the moisture absorption bag according to the present disclosure can be positioned at a proper position between the teeth and the tongue (tongue side) or between the teeth and the lip (lip side) of a patient to absorb fluid such as saliva and water from the mouth of the patient during the stomatological or dental examination or procedure, so as to facilitate the examination or procedure.

For details on the moisture absorption piece and the moisture absorption bag, see the “Moisture absorption piece” and “Moisture absorption bag” sections of the description.

The following embodiments are intended to describe the present disclosure in an illustrative sense rather than in a limiting sense.

Embodiment 1 is a moisture absorption piece, comprising 20-90 wt.% of the first fibers comprising at least one selected from the group consisting of sodium acrylate copolymer fibers, sheath-core structure modified polyacrylonitrile copolymer fibers, degreasing cotton, modified cellulose fiber, and modified poly vinyl alcohol fiber; 5-75 wt.% of the second fibers comprising at least one selected from the group consisting of

bamboo fibers, regenerated hemp fibers, cotton fibers, polylactic acid fibers, silk fibers, and soybean fibers; and 5-70 wt.% of the third fibers comprising at least one selected from the group consisting of bi-component polyester fibers, polyethylene/polypropylene fibers, and bi-component polylactic acid fibers, based on the total weight of the moisture absorption piece.

Embodiment 2 is the moisture absorption piece according to embodiment 1, wherein the moisture absorption piece comprises 45-80 wt.% of the first fibers, 10-45 wt.% of the second fibers, and 10-35 wt.% of the third fibers, based on the total weight of the moisture absorption piece.

Embodiment 3 is the moisture absorption piece according to embodiment 1 or 2, wherein the fibers have a melting point less than or equal to 130°C.

Embodiment 4 is the moisture absorption piece according to any one of embodiments 1-3, wherein the moisture absorption piece has a basis weight of 10-600 g/m².

Embodiment 5 is a moisture absorption bag, which comprises a packaging bag and the moisture absorption piece according to any one of embodiments 1-4 placed in the packaging bag, wherein the packaging bag comprises nonwoven fabric.

Embodiment 6 is the moisture absorption bag according to embodiment 5, wherein the nonwoven fabric comprises at least one of the group consisting of polypropylene, polyethylene, polyester, and polylactic acid.

Embodiment 7 is the moisture absorption bag according to embodiment 5 or 6, wherein the nonwoven fabric has a basis weight of 10-50 g/m², an air permeability of 50-10000 L/m²/s, an average pore diameter of 0.0004-0.4 mm, and a softness less than or equal to that of the moisture absorption piece.

Embodiment 8 is the moisture absorption bag according to any one of embodiments 5-7, wherein the moisture absorption piece is placed in a packaging bag with a closed periphery.

Embodiment 9 is the moisture absorption bag according to any one of embodiments 5-8, wherein the moisture absorption bag further comprises at least one floss which at least partially extends to the outside of the moisture absorption bag.

Embodiment 10 is a method for preparing a moisture absorption piece, and the method comprises the step of mixing all components of the moisture absorption piece according to any one of embodiments 1-4 to obtain a moisture absorption piece.

5 Embodiment 11 is a method according to embodiment 10, wherein the method comprises the following steps: mixing all components of the moisture absorption piece according to any one of embodiments 1-4 to obtain a first fibrous web; and laying the first fibrous web to obtain a moisture absorption piece.

10 Embodiment 12 is a method according to embodiment 11, wherein the method comprises the following steps: laying the first fibrous web to obtain a second fibrous web; and needling and reinforcing the second fibrous web to obtain a moisture absorption piece.

Embodiment 13 is a method according to embodiment 11, wherein the method comprises the following steps: laying the first fibrous web to obtain a second fibrous web; and drying the second fibrous web to obtain a moisture absorption piece.

15 Embodiment 14 is a method according to embodiment 11, wherein the method comprises the following steps: laying the first fibrous web to obtain a second fibrous web; and needling and reinforcing and drying the second fibrous web to obtain a moisture absorption piece.

Embodiment 15 is a method according to embodiment 13 or 14, wherein the drying is conducted at 120-150°C.

20 Embodiment 16 is a method according to any one of embodiments 11-14, wherein the first fibrous web has a basis weight of 10-60 g/m².

Embodiment 17 is a method according to any one of embodiments 12-14, wherein the second fibrous web has a basis weight of 60-600 g/m².

25 Embodiment 18 is a method according to any one of embodiments 10-17, wherein the moisture absorption piece has a basis weight of 10-600 g/m².

Embodiment 19 is a method for preparing a moisture absorption bag, and the method comprises the following steps: placing the moisture absorption piece according to any one of embodiments 1-4 in a packaging bag to obtain a moisture absorption bag, wherein the packaging bag comprises nonwoven fabric.

30 Embodiment 20 is a method according to embodiment 19, wherein at least one floss is disposed on the moisture absorption bag, and the floss at least partially extends to the outside of the moisture absorption bag.

Embodiment 21 is the use of the moisture absorption piece according to any one of embodiments 1-4 to moisture absorption.

Embodiment 22 is the use of the moisture absorption bag according to any one of embodiments 5-9 to moisture absorption.

5 Examples

Examples and comparative examples provided below are helpful for understanding the present disclosure and shall not be understood as limitations to the scope of the present disclosure. Unless otherwise specified, all parts and percentages are expressed in terms of by weight.

10 Raw materials adopted in the examples and comparative examples of the present disclosure are as shown in Table 1 below.

Table 1

Fiber	Component	Specification	Supplier
First fibers	Sodium acrylate copolymer fibers	10 D x 52 mm	Technical Absorbents Ltd., Britain
First fibers	Sheath-core structure modified polyacrylonitrile copolymer fibers	5 D x 50 mm	TOYOB Co., Ltd., Japan
Second fibers	Bamboo fibers	1.5 D x 38 mm	Hebei Jigao Chemical Fiber Co., Ltd.
Second fibers	Regenerated hemp fibers	1.5 D x 38 mm	Hebei Jigao Chemical Fiber Co., Ltd.
Second fibers	Soybean fibers	1.5 D x 38 mm	Jiangsu Jianghe Velvet Soybean Fiber Co., Ltd.
Third fibers	Bi-component polyester fibers	2 D x 51 mm Melting point: 130°C	Huvis Corporation, South Korea
Polyethylene/polypropylene thermal bonded nonwoven fabric	Nonwoven fabric	Basis weight: 20 g/m ² Air permeability: 2500 L/m ² /s Average pore diameter: 0.01 mm Softness: 15 g	FiberVisions Textile Products Ltd., Suzhou

Dental floss	Dental floss	50 m/box	Eucon Holding Ltd., Taiwan
Cotton roll	Cotton roll	Length: 38mm, Diameter: 10mm	A.R Medicom Inc. Healthcare (Shanghai) Ltd.

Note 1: D denotes the fineness of fiber (1 D=1 g/9000 m)

Preparation of moisture absorption piece

Moisture absorption pieces in the examples and comparative examples can be prepared through the following preparation methods.

Preparation method 1

Step 1: uniformly mixing fibers for preparing a moisture absorption piece; roughly opening the above-mentioned fibers by using a coarse opener (available from 3M company), wherein the frequency of the opening rollers is 50 Hz; and finely opening the roughly opened fibers by using a fine opener (available from 3M company) to obtain fiber bundles, wherein the frequency of the opening rollers is 50 Hz.

Step 2: feeding the obtained fiber bundles into a carding machine (a roller-type carding machine available from Qingdao Textile Machinery Co., Ltd.) after passing through a feeding hopper (a pneumatic feeding hopper available from Qingdao Textile Machinery Co., Ltd.); and enabling the fiber bundles which are carded in a single-fiber arrangement to form a uniform first fibrous web through a doffer, wherein the first fibrous web has a basis weight of 20 g/m².

Step 3: laying the obtained first fibrous web by using a cross-lapper (a servo control clamping-type cross-lapper available from Qingdao Textile Machinery Co., Ltd.) to obtain a uniform second fibrous web, wherein the second fibrous web has a basis weight of 100 g/m².

Step 4: needling and reinforcing the second fibrous web by using a needle machine (a pre-needle machine available from Qingdao Textile Machinery Co., Ltd.) at a needling frequency of 200 times/minute to obtain a moisture absorption piece.

Preparation method 2

Step 1: uniformly mixing fibers for preparing a moisture absorption piece; roughly opening the above-mentioned fibers by using a coarse opener (available from 3M

company), wherein the frequency of the opening rollers is 50 Hz; and finely opening the roughly opened fibers by using a fine opener (available from 3M company) to obtain fiber bundles, wherein the frequency of the opening rollers is 50 Hz.

Step 2: feeding the obtained fiber bundles into a carding machine (a roller-type carding machine available from Qingdao Textile Machinery Co., Ltd.) after passing through a feeding hopper (a pneumatic feeding hopper available from Qingdao Textile Machinery Co., Ltd.); and enabling the fiber bundles which are carded in a single-fiber arrangement to form a uniform first fibrous web through a doffer, wherein the first fibrous web has a basis weight of 20 g/m².

Step 3: laying the obtained first fibrous web by using a cross-lapper (a servo control clamping-type cross-lapper available from Qingdao Textile Machinery Co., Ltd.) to obtain a uniform second fibrous web, wherein the second fibrous web has a basis weight of 100 g/m².

Step 4: needling and reinforcing the second fibrous web by using a needle machine (a pre-needle machine available from Qingdao Textile Machinery Co., Ltd.) at a needling frequency of 200 times/minute.

Step 5: drying the second fibrous web after needling and reinforcing at 130°C to obtain a moisture absorption piece.

Preparation method 3

Step 1: uniformly mixing fibers for preparing a moisture absorption piece; roughly opening the obtained fibers by using a coarse opener (available from 3M company), wherein the frequency of the opening rollers is 50 Hz; and finely opening the roughly opened fibers by using a fine opener (available from 3M company) to obtain fiber bundles, wherein the frequency of the opening rollers is 50 Hz.

Step 2: feeding the obtained fiber bundles into a carding machine (a roller-type carding machine available from Qingdao Textile Machinery Co., Ltd.) after passing through a feeding hopper (a pneumatic feeding hopper available from Qingdao Textile Machinery Co., Ltd.); and enabling the fiber bundles which are carded in a single-fiber arrangement to form a uniform first fibrous web through a doffer, wherein the first fibrous web has a basis weight of 20 g/m².

Step 3: laying the obtained first fibrous web by using a cross-lapper (a servo control clamping-type cross-lapper available from Qingdao Textile Machinery Co., Ltd.) to obtain

a uniform second fibrous web, wherein the second fibrous web has a basis weight of 100 g/m².

Step 4: drying the second fibrous web at 130°C to obtain the moisture absorption piece.

5 Preparation of moisture absorption bag

The moisture absorption bag in the examples and comparative examples of the present disclosure are placed in a packaging bag (the packaging bag is made of nonwoven fabric), and the periphery of the packaging bag is closed to obtain a moisture absorption bag by ultrasonic technologies or thermal bonding technologies known in the art, wherein
10 the dimensions of the moisture absorption bag are 4 cm x 1.5 cm x 1.5 cm (approximate to the dimensions of a cotton roll commonly used in stomatology or dentistry).

Testing methods

The present disclosure evaluates the water absorption capability of the moisture absorption piece through a “water absorption test”, evaluates the water retention capability
15 of the moisture absorption piece through a “water retention test”, and evaluates the softness of the moisture absorption piece through a “softness test”.

Water absorption test

Step 1: preparing a solution in the following proportions: (1) 16.58 ± 0.25 g of sodium chloride, (2) 0.72 ± 0.25 g of calcium chloride, and (3) 2000.0 ± 1.0 g of deionized
20 water;

Step 2: setting a drying oven (a Heraeus drying oven available from Thermo Fisher Scientific (China) Co., Ltd.) to 37.0 ± 1.0 °C;

Step 3: keeping the obtained solution in the drying oven for 40 ± 10 minutes;

Step 4: cutting a test sample to 2 inches x 2 inches (approximately 5.08 cm x 5.08
25 cm);

Step 5: weighing the cut test sample to an accuracy of 0.0001g and recording the weight as weight A (unit: g);

Step 6: placing the obtained test sample in a petri dish, removing the solution from the drying oven and pouring the solution onto the culture surface of the petri dish to fully
30 submerge the test sample;

Step 7: putting the petri dish in a culture drying oven at 37°C and standing for 30 ± 5 minutes;

Step 8: removing the petri dish from the culture drying oven, clamping one corner of the test sample by using forceps and suspending in the air for 30 ± 2 seconds;

Step 9: weighing the suspended test sample to an accuracy of 0.0001g and recording the weight as weight B (unit: g);

5 Step 10: calculating the water absorption of the test sample according to the following formula:

$$\text{Water absorption } M = \frac{B-A}{A},$$

Step 11: evaluating the water absorption capability of the test sample according to the following standards:

Water absorption M	Water absorption capability
18-20	Acceptable
20-27	Good
>27	Excellent

10 Test completed.

Water retention test

Step 1: preparing a solution in the following proportions: (1) 16.58 ± 0.25 g of sodium chloride, (2) 0.72 ± 0.25 g of calcium chloride, and (3) 2000.0 ± 1.0 g of deionized water;

15 Step 2: setting a drying oven (a Heraeus drying oven available from Thermo Fisher Scientific (China) Co., Ltd.) to $37.0 \pm 1.0^\circ\text{C}$;

Step 3: keeping the obtained solution in the drying oven for 40 ± 10 minutes;

Step 4: cutting a test sample to 2 inches x 2 inches (approximately 5.08 cm x 5.08 cm);

20 Step 5: weighing the cut test sample to an accuracy of 0.0001g and recording the weight as weight A (unit: g);

Step 6: placing the above-mentioned test sample in a petri dish, removing the solution from the drying oven and pouring the solution onto a culture surface of the petri dish to fully submerge the test sample;

25 Step 7: putting the petri dish in a culture drying oven at 37°C and standing for 30 ± 5 minutes;

Step 8: removing the petri dish from the culture drying oven, clamping one corner of the test sample by using forceps and suspending in the air for 30 ± 2 seconds;

Step 9: putting the suspended test sample between four layers of wiping paper (wood pulp wiping paper available from Kimberly-Clark Co., Ltd.) (two layers respectively on each side of the test sample);

Step 10: pressing a 4.5 lb (approximately 2.04 kg) manual roller against the wiping paper on one side of the obtained test sample by virtue of dead weight, rolling the roller back and forth once, removing the test sample from the wiping paper, weighing the test sample to an accuracy of 0.0001g and recording the weight as weight C (unit: g);

Step 11: calculating the water retention of the test sample according to the following formula:

$$\text{Water retention } N = \frac{C-A}{A};$$

Step 12: valuating the water retention capability of the test sample according to the following standards:

Water retention N	Water retention capability
8-11	Acceptable
11-13.5	Good
>13.5	Excellent

Test completed.

Softness test

The softness of a test sample is tested on the basis of the ASTM D6828-02 test method published by American Society of Testing Materials, and the specific steps are as follows:

Step 1: cutting a test sample to 10 cm x 10 cm, and marking the longitudinal direction, transversal direction, first side and second side of the test sample;

Step 2: before testing with a hand tester (a handle-o-meter (“HOM”) type hand tester available from Thwing-Albert Instrument Company, West Berlin, NJ, USA), setting the test temperature to 20°C, setting test humidity to 65%, and setting the distance between a cutting edge of a test knife and a slit to 20 mm according to the ASTM D6828-02 test method;

Step 3: placing the first side of the test sample under the test knife of the sample stage of the hand tester, conducting testing and recording the maximum reading S_1 (unit: g);

Step 4: turning the test sample 90 degrees counter-clockwise, keeping the test sample under the test knife of the sample stage of the hand tester, conducting testing and recording the maximum reading S_2 (unit: g);

Step 5: removing the test sample, placing the second side of the test sample under the test knife of the sample stage of the hand tester, conducting testing and recording the maximum reading S_3 (unit: g);

Step 6: turning the test sample 90 degrees counter-clockwise, keeping the test sample under the test knife of the sample stage of the hand tester, conducting testing and recording the maximum reading S_4 (unit: g);

Step 7: calculating the S (unit: g) of the test sample according to the following formula:

$$S = S_1 + S_2 + S_3 + S_4;$$

Step 8: evaluating the softness of the test sample according to the following standard:

S	Softness
< 90 g	Acceptable
72-90 g	Good
< 72 g	Excellent

Test completed.

Examples 1-17 and Comparative Examples 1-5

Moisture absorption pieces are respectively prepared according to the methods described above based on the components and usage amounts thereof listed in Table 2 and Table 3.

According to the methods described above, the moisture absorption pieces are used as test samples to respectively conduct the water absorption test, the water retention test and the softness test. Test results are respectively listed in Table 3.

Table 2

	The first fibers	The second fibers	The third fibers	Material of packaging bag
Example 1	Sodium acrylate copolymer fibers	Bamboo fibers	Bi-component polyester fibers	Polyethylene/polypropylene thermal bonded nonwoven fabric
Example 2	Sodium acrylate copolymer fibers	Bamboo fibers	Bi-component polyester fibers	Polyethylene/polypropylene thermal bonded nonwoven fabric
Example 3	Sodium acrylate copolymer fibers	Bamboo fibers	Bi-component polyester fibers	Polyethylene/polypropylene thermal bonded nonwoven fabric
Example 4	Sodium acrylate copolymer fibers	Bamboo fibers	Bi-component polyester fibers	Polyethylene/polypropylene thermal bonded nonwoven fabric
Example 5	Sodium acrylate copolymer fibers	Soybean fibers	Bi-component polyester fibers	Polyethylene/polypropylene thermal bonded nonwoven fabric
Example 6	Sodium acrylate copolymer fibers	Regenerated hemp fiber	Bi-component polyester fibers	Polyethylene/polypropylene thermal bonded nonwoven fabric
Example 7	Sodium acrylate copolymer fibers	Bamboo fibers	Bi-component polyester fibers	Polyethylene/polypropylene thermal bonded nonwoven fabric
Example 8	Sodium acrylate copolymer fibers	Bamboo fibers	Bi-component polyester fibers	Polyethylene/polypropylene thermal bonded nonwoven fabric
Example 9	Sodium acrylate copolymer fibers	Bamboo fibers	Bi-component polyester fibers	Polyethylene/polypropylene thermal bonded nonwoven fabric
Example 10	Sodium acrylate copolymer fibers	Bamboo fibers	Bi-component polyester fibers	Polyethylene/polypropylene thermal bonded nonwoven fabric
Example 11	Sodium acrylate copolymer fibers	Bamboo fibers	Bi-component polyester fibers	Polyethylene/polypropylene thermal bonded nonwoven fabric
Example 12	Sodium acrylate copolymer fibers	Bamboo fibers	Bi-component polyester fibers	Polyethylene/polypropylene thermal bonded nonwoven fabric
Example 13	Sodium acrylate copolymer fibers	Bamboo fibers	Bi-component polyester fibers	Polyethylene/polypropylene thermal bonded nonwoven fabric
Example 14	Sodium acrylate copolymer fibers	Bamboo fibers	Bi-component polyester fibers	Polyethylene/polypropylene thermal bonded nonwoven fabric
Example 15	Sodium acrylate	Bamboo fibers	Bi-component polyester	Polyethylene/polypropylene thermal bonded nonwoven fabric

	copolymer fibers		fibers	
Example 16	Sodium acrylate copolymer fibers	Bamboo fibers	Bi-component polyester fibers	Polyethylene/polypropylene thermal bonded nonwoven fabric
Comparative Example 1	Sodium acrylate copolymer fibers	---	---	Polyethylene/polypropylene thermal bonded nonwoven fabric
Comparative Example 2	---	---	Bi-component polyester fibers	Polyethylene/polypropylene thermal bonded nonwoven fabric
Comparative Example 3	---	Bamboo fibers	Bi-component polyester fibers	Polyethylene/polypropylene thermal bonded nonwoven fabric
Comparative Example 4	Sodium acrylate copolymer fibers	Bamboo fibers	Bi-component polyester fibers	Polyethylene/polypropylene thermal bonded nonwoven fabric
Comparative Example 5	---	---	---	---

Note 2: cotton rolls (available from A.R. Medicom Inc. Healthcare (Shanghai) Ltd., with the specification of “length: 38mm, diameter: 10mm” are used in Comparative Example 5.

Table 3: Components, preparation methods and test results of moisture absorption pieces

	First fiber weight (kg)	First fiber weight percentage (%)	Second fiber weight (kg)	Second fiber weight percentage (%)	Third fiber weight (%)	Third fiber weight percentage (%)	Preparation method	Water absorption M	Water retention N	Softness S (g)
Example 1	2.0	20	4.0	40	4.0	40	1	25.93	12.38	64.22
Example 2	3.3	33	3.3	33	3.4	34	1	26.04	11.96	66.00
Example 3	6.6	66	1.7	17	1.7	17	1	30.76	17.45	73.00
Example 4	3.0	30	3.0	30	4.0	40	2	23.21	11.50	64.48
Example 5	3.3	33	3.3	33	3.4	34	3	22.94	11.43	66.00
Example 6	4.5	45	4.5	45	1.0	10	1	27.86	14.61	51.15
Example 7	8.0	80	1.0	10	1.0	10	1	31.63	20.0	70.52
Example 8	7.5	75	1.0	10	1.5	15	1	31.64	19.25	70.6
Example 9	4.0	40	4.5	45	1.5	15	1	27.63	13.8	52.57

Example 10	5.5	55	3.5	35	1.0	10	1	29.41	16.48	55.96
Example 11	4.5	45	2.0	20	3.5	35	1	30.2	14.14	67.56
Example 12	2.0	20	1.0	10	7.0	70	1	27.89	8.09	78.9
Example 13	9	90	0.5	5	0.5	5	1	31.75	21.36	74.62
Example 14	3.8	38	0.5	5	5.7	57	1	30.11	11.5	78.53
Example 15	2	20	7.5	75	0.5	5	1	22.21	9.11	40.11
Example 16	3.5	35	6.0	60	0.5	5	1	25.69	12.82	44.22
Comparative Example 1	0	0	10	100	0	0	1	16.03	3.56	37.3
Comparative Example 2	0	0	0	0	10	100	1	24.08	1.71	91.50
Comparative Example 3	0	0	5.0	50	5.0	50	1	22.87	6.00	64.00
Comparative Example 4	1.6	16	6.7	67	1.7	17	1	22.66	7.87	40.00
Comparative Example 5	---	---	---	---	---	---	---	6.90	4.47	184.60

Note 3: cotton rolls (available from A.R. Medicom Inc. Healthcare (Shanghai) Ltd., with the specification of “length: 38mm, diameter: 10mm” are used in Comparative Example 5

Examples 1-16 show that the moisture absorption piece according to the present disclosure has satisfactory (at least “acceptable”) water absorption and retention capabilities and softness.

Example 3 and Examples 6-11 show that when the moisture absorption piece comprises 45-80 wt.% of the first fibers, 10-45 wt.% of the second fibers and 10-35 wt.% of the third fibers based on the total weight of the moisture absorption piece, the moisture absorption piece has excellent water absorption and retention capabilities and softness.

Comparative Example 1 shows that when the moisture absorption piece only contains the second fibers, the moisture absorption piece does not have adequate water absorption and retention capabilities.

Comparative Example 2 shows that when the moisture absorption piece only contains the third fibers, the moisture absorption piece does not have adequate water retention capability and softness.

5 Comparative Example 3 shows that when the moisture absorption piece only contains the second fibers and the third fibers, the moisture absorption piece does not have adequate water retention capability.

10 Comparative Example 4 shows that when there is an inadequate content of the first fibers in the moisture absorption piece, the moisture absorption piece does not have adequate water retention capability. Comparative Example 5 shows that the cotton rolls commonly used in stomatology or dentistry in the prior art do not have adequate water absorption and retention capabilities and softness.

Examples 17-22

15 According to the materials of packaging bags listed in Table 4 and the methods described above, the moisture absorption pieces in Examples 3, 6, 7, 8, 10 and 11 are respectively placed in packaging bags with a closed periphery to obtain moisture absorption bags. In Examples 17-22, the moisture absorption bags are prepared by the following steps: Placing the moisture absorption piece in an open packaging bag; Sealing the periphery of the opening of the packaging bag by ultrasonic technologies or thermal bonding technologies known in the art. In Examples 17-22, the dimensions of the moisture
20 absorption bags is 4 cm x 1.5 cm x 1.5 cm (which are close to the dimensions of cotton rolls commonly used in stomatology or dentistry), the shape of the cross section of the moisture absorption bags is rectangular.

25 According to the methods described above, these moisture absorption bags are used as test samples to conduct the water absorption test and the water retention test (since the softness of the nonwoven fabric used in Examples 17-22 is much less than that of the moisture absorption pieces, the softness of the prepared moisture absorption bags undoubtedly satisfies the requirement). Test results are respectively listed in Table 4.

Examples 23

30 According to the materials of packaging bags listed in Table 4, the moisture absorption piece in Examples 11 placed in packaging bags with a closed periphery to obtain moisture absorption bag. In Example 23, the moisture absorption bag is prepared by

the following steps: Placing the moisture absorption piece in an open packaging bag; Sealing the periphery of the opening of the packaging bag by ultrasonic technologies or thermal bonding technologies known in the art. In Example 23, the dimensions of a moisture absorption bag is 4 cm x 1.5 cm x 1.5 cm (which is close to the dimensions of cotton rolls commonly used in stomatology or dentistry, the shape of the cross section of the moisture absorption bag is oval. In Example 23, there is a floss affixed on the outer surface of the moisture absorption bag.

According to the methods described above, the moisture absorption bag is used as test sample to conduct the water absorption test and the water retention test (since the softness of the nonwoven fabric used in Examples 23 is much less than that of the moisture absorption pieces, the softness of the prepared moisture absorption bags undoubtedly satisfies the requirement). Test results are respectively listed in Table 4.

Table 4 Test results of moisture absorption bags

	Moisture absorption piece	Packaging bag	Floss	Water absorption M	Water retention N
Example 17	Moisture absorption piece 3	polyethylene/polypropylene thermal bonded nonwoven fabric, average pore diameter: 0.01 mm, softness: 15 g	--	23.37	12.54
Example 18	Moisture absorption piece 6	polyethylene/polypropylene thermal bonded nonwoven fabric, average pore diameter: 0.01 mm, softness: 15 g	--	24.07	13.19
Example 19	Moisture absorption piece 7	polyethylene/polypropylene thermal bonded nonwoven fabric, average pore diameter: 0.01 mm, softness: 15 g	--	28.19	19.75
Example 20	Moisture absorption piece 8	polyethylene/polypropylene thermal bonded nonwoven fabric, average pore diameter: 0.01 mm, softness: 15 g	--	27.61	18.85
Example	Moisture	polyethylene/polypropylene thermal bonded	--	25.45	15.03

21	absorption piece 10	nonwoven fabric, average pore diameter: 0.01 mm, softness: 15 g			
Example 22	Moisture absorption piece 11	polyethylene/polypropylene thermal bonded nonwoven fabric, average pore diameter: 0.01 mm, softness: 15 g	--	23.91	12.72
Example 23	Moisture absorption piece 11	polyethylene/polypropylene thermal bonded nonwoven fabric, average pore diameter: 0.01 mm, softness: 15 g	Nylon dental floss	23.8	12.68

Examples 17-23 show that the moisture absorption bag according to the present disclosure also has satisfactory (at least acceptable) water absorption and retention capabilities. In these examples, the dimensions of a moisture absorption bag is 4 cm x 1.5 cm x 1.5 cm (which are close to the dimensions of cotton rolls commonly used in stomatology or dentistry), and the dimensions are less than the maximum dimensions that the moisture absorption piece in the moisture absorption bag can reach after absorbing water and swelling. Therefore, in these examples, the test results of the water absorption and retention capabilities of a moisture absorption bags are slightly less than the test results of the water absorption and retention capabilities of the corresponding moisture absorption piece.

To sum up, the moisture absorption piece and the moisture absorption bag according to the present disclosure have satisfactory (at least acceptable) water absorption and retention capabilities and softness.

The above-mentioned embodiments of the present disclosure are only used to illustratively describe the principles and the effects of the present disclosure, rather than limiting the present disclosure. One skilled in the art shall understand that any change and improvement made to the present disclosure without departing from the spirit and scope of the present disclosure shall fall within the scope of the present disclosure. The protection scope of the present disclosure shall be in accordance with the scope defined by the claims of the present application.

What is claimed is:

1. A moisture absorption piece, comprising:

20-90 wt.% of first fibers comprising at least one selected from the group consisting of sodium acrylate copolymer fibers, sheath-core structure modified polyacrylonitrile copolymer fibers, degreasing cotton, modified cellulose fibers, and modified poly vinyl alcohol fibers;

5-75 wt.% of second fibers comprising at least one selected from the group consisting of bamboo fibers, regenerated hemp fibers, cotton fibers, polylactic acid fibers, silk fibers, and soybean fibers; and

5-70 wt.% of third fibers comprising at least one selected from the group consisting of bi-component polyester fibers, polyethylene/polypropylene fibers, and bi-component polylactic acid fibers, based on the total weight of the moisture absorption piece.

2. The moisture absorption piece according to claim 1, wherein the moisture absorption piece comprises 45-80 wt.% of the first fibers, 10-45 wt.% of the second fibers, and 10-35 wt.% of the third fibers, based on the total weight of the moisture absorption piece.

3. The moisture absorption piece according to claim 1 or 2, wherein the third fibers have a melting point less than or equal to 130°C.

4. The moisture absorption piece according to claim 1 or 2, wherein the moisture absorption piece has a basis weight of 10-600 g/m².

5. A moisture absorption bag, comprising a packaging bag and the moisture absorption piece according to any one of claims 1-4 placed in the packaging bag, wherein the packaging bag comprises a nonwoven fabric.

6. The moisture absorption bag according to claim 5, wherein the nonwoven fabric comprises at least one material selected from the group consisting of polypropylene, polyethylene, polyester, and polylactic acid.

7. The moisture absorption bag according to claim 5, wherein the nonwoven fabric has a basis weight of 10-50 g/m², an air permeability of 50-10000 L/m²/s, an average pore diameter of 0.0004-0.4 mm, and a softness less than or equal to that of the moisture absorption piece.

8. The moisture absorption bag according to claim 5, wherein the moisture absorption piece is placed in a packaging bag with a closed periphery.

9. The moisture absorption bag according to claim 5, wherein the moisture absorption bag further comprises at least one floss which at least partially extends to the outside of the moisture absorption bag.

10. A method for preparing a moisture absorption piece, comprising the step of mixing all components of the moisture absorption piece according to any one of claims 1-4 to obtain a moisture absorption piece.

11. The method according to claim 10, wherein the method comprises the following steps:

mixing all components of the moisture absorption piece according to any one of claims 1-4 to obtain a first fibrous web; and

laying the first fibrous web to obtain a moisture absorption piece.

12. The method according to claim 11, wherein the method comprises the following steps:

laying the first fibrous web to obtain a second fibrous web; and

needling and reinforcing the second fibrous web to obtain a moisture absorption piece.

13. The method according to claim 11, wherein the method comprises the following steps:

laying the first fibrous web to obtain a second fibrous web; and
drying the second fibrous web to obtain a moisture absorption piece.

5

14. The method according to claim 11, wherein the method comprises the following steps:

laying the first fibrous web to obtain a second fibrous web; and
needling and reinforcing, and drying the second fibrous web to obtain a moisture
absorption piece.

10

15. A method for preparing a moisture absorption bag, comprising the step of placing the moisture absorption piece according to any one of claims 1-4 in a packaging bag to obtain a moisture absorption bag, wherein the packaging bag comprises nonwoven fabric.

15

16. Use of the moisture absorption piece according to any one of claims 1-4 for moisture absorption.

17. Use of the moisture absorption bag according to any one of claims 5-9 for moisture
absorption.

20

1/2

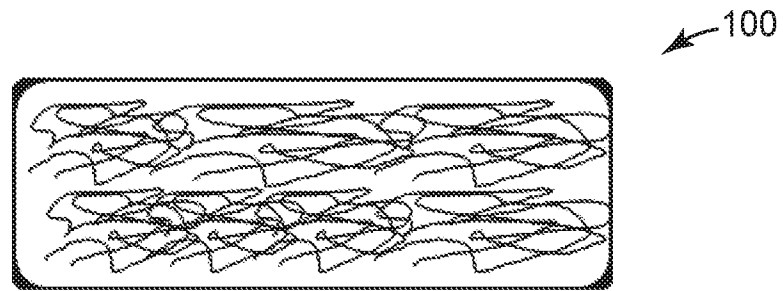


FIG. 1

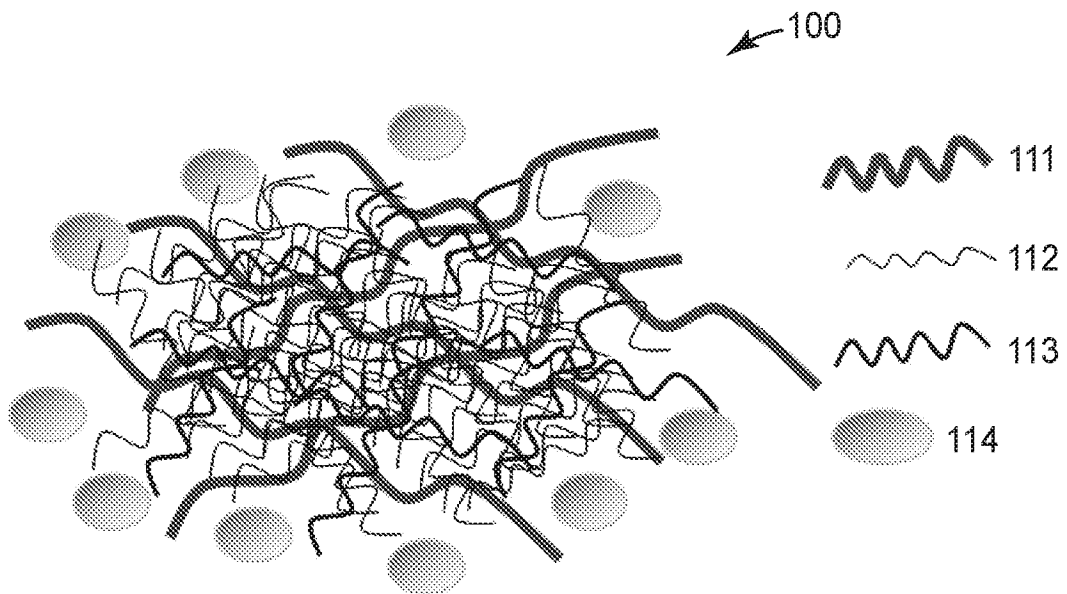


FIG. 2

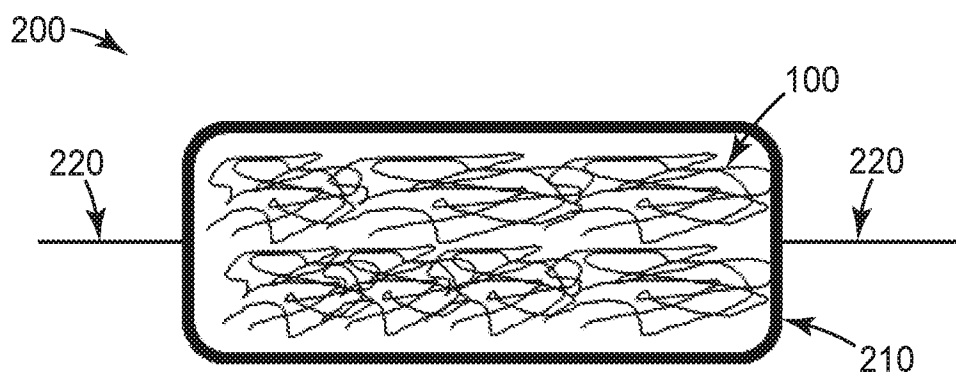


FIG. 3

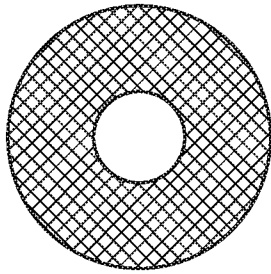


FIG. 4A

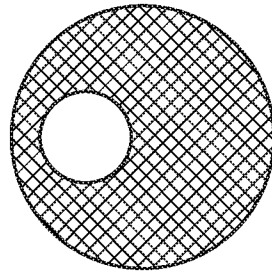


FIG. 4B

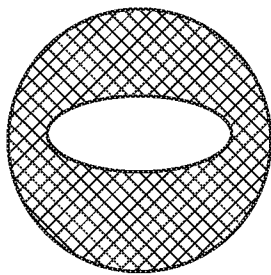


FIG. 4C

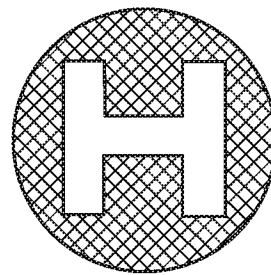


FIG. 4D

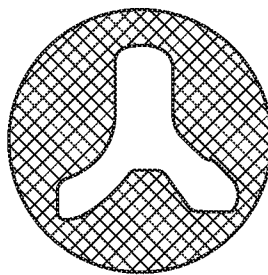


FIG. 4E

INTERNATIONAL SEARCH REPORT

International application No
PCT/US2016/031930

A. CLASSIFICATION OF SUBJECT MATTER

INV. A61F13/00 A61F13/20 A61L15/22
ADD.

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)

A61F A61L

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)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4 826 433 A (SAKAI TAKASHI [JP] ET AL) 2 May 1989 (1989-05-02) claims 1-6 column 2, line 20 - line 30 -----	1-17
A	GB 1 171 761 A (T J SMITH & NEWPHEW LTD) 26 November 1969 (1969-11-26) claims 1-13 -----	1-17
A	GB 890 682 A (ALFRED ADOLF BURGENI) 7 March 1962 (1962-03-07) page 14, line 103 - line 127 -----	1-17



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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"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

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Date of the actual completion of the international search

14 July 2016

Date of mailing of the international search report

26/07/2016

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/US2016/031930

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4826433	A	02-05-1989	AU 604022 B2 06-12-1990
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