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(54) **FILTER AND ATOMIZATION DEVICE**

(57) Disclosed are a filter nozzle (100) and an atomization device. The filter nozzle (100) includes a casing (1). A passage (11) is formed at the casing (1), the polylactic acid cotton element (4) is capable of adsorbing and capturing impurities from the gaseous substances output from the atomizer, and the support element (3) can support the casing (1). The support element (3) is provided with a gas passage (31), which reduces the resistance of smoke transmission. By setting the support element (3), the length of the polylactic acid cotton element (4) in the passage (11) can further be reduced, thereby reducing the suction resistance of the filter nozzle (100). The first functional substance (2) and the second functional substance (5) are substances with medicinal effects or fragrances. By filling the first functional substance (2) and/or the second functional substance (5), the effect (such as fragrance and/or medicinal effect) of the gaseous substance output by the filter nozzle (100) can be improved. The first filling section is filled with two of the first functional substance (2), the support element (3) and the polylactic acid cotton element (4) along the length direction of the casing (1), and the second filling section is filled with one of the second functional substance (5), the support element (3) and the polylactic acid cotton element (4).

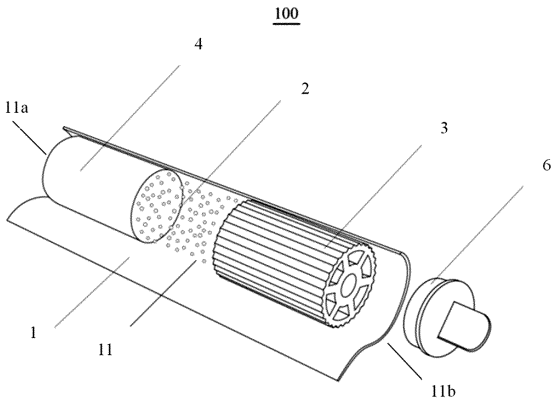

FIG. 1

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Description

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to Chinese Patent Application Nos. 202120571638.6, 202120572986.5, 202120572495.0, 202120566026.8, and 202120573501.4, all filed on March 19, 2021, and titled "FILTER NOZZLE AND ELECTRONIC CIGARETTE", the entire contents of which are incorporated herein by reference.

TECHNICAL FIELD

[0002] The present application relates to the technical field of filter nozzle and atomization, and in particular to a filter nozzle and an atomization device.

BACKGROUND

[0003] There are various types of atomizing devices, including the atomizing therapy apparatus used in the medical industry and electronic cigarettes used in people's daily life. The aforementioned atomization device cannot meet the diverse needs of people during use.

SUMMARY

[0004] The atomization device cannot meet the diverse needs of people during use.

[0005] The main purpose of the present application is to provide a filter nozzle and an atomization device, aiming to meet the diverse needs of people.

[0006] In order to solve the above objectives, the present application provides a filter nozzle including a casing.

[0007] A passage is formed along a length direction of the casing, a first opening is formed at an end of the passage, the first opening is configured for gas to be filtered to enter, and the passage includes a first filling section and a second filling section. The first filling section is adjacent to the first opening, and the first filling section is filled with two of a first functional substance, a support element and a polylactic acid cotton element along the length direction of the casing, the second filling section is filled with one of a second functional substance, the support element and the polylactic acid cotton element.

[0008] The support element is provided with a gas passage along the length direction of the casing.

[0009] In an embodiment, a second opening is formed at another end of the passage, and the second opening is adjacent to the second filling section, and the second filling section is filled with the second functional substance, and when the second functional substance is powdery, a protective cover is provided at the second opening.

[0010] In an embodiment, a side of the first filling section away from the first opening is filled with the first functional substance, and the first functional substance is powdery, and the second filling section is filled with the support element, and a protective cover is provided at the second opening.

[0011] In an embodiment, the first filling section is filled with the first functional substance and the support element, the support element is adjacent to the first opening, the first functional substance is granular or powdery, and a filter membrane is covered at the first opening; or

a side of the first filling section close to the first opening is filled with the first functional substance, the first functional substance is granular or powdery, and a filter membrane is covered at the first opening.

[0012] In an embodiment, the filter membrane is made of paper or polylactic acid cotton; and/or a porosity of the filter membrane ranges from 80 mesh to 120 mesh.

[0013] In an embodiment, a filter capsule is provided at the support element, and the filter capsule is abutted against at least part of an inner wall surface of the gas passage.

[0014] In an embodiment, the second filling section is filled with the polylactic acid cotton element, a third filling section is provided at the passage, the third filling section is provided at a side of the second filling section close to the second opening, and the third filling section is filled with the support element.

[0015] In an embodiment, the first filling section is filled with the first functional substance and the supporting member, the first functional substance is granular or powdery and is adjacent to the first opening, and the second filling section is filled with the support element; or

the first filling section is filled with the first functional substance and the polylactic acid cotton element, the first functional substance is granular or powdery and is adjacent to the first opening, and the second filling section is filled with the polylactic acid cotton element; or

the first filling section is filled with the polylactic acid cotton element and the support element, the polylactic acid cotton element is adjacent to the first opening, and the second filling section is filled with the polylactic acid cotton element; or

the first filling section is filled with the first functional substance and the support element, the first functional substance is granular or powdery and is adjacent to the first opening, and the second filling section is filled with the polylactic acid cotton element.

[0016] In an embodiment, the first functional substance is granular or powdery; and/or

a particle size of the first functional substance is not less than 0.0001 μm and not greater than 1000 μm; and/or

the second functional substance is powdery.

[0017] In an embodiment, the first functional substance is made of caffeine, essential oil, nicotine, probiotics, hyaluronic acid or vitamin D; and/or

the second functional substance includes at least one of freeze-dried powder, caffeine powder, nicotine-containing powder, probiotic powder, hyaluronic acid powder and vitamin D-containing powder; or

the first functional substance is the freeze-dried powder.

[0018] In an embodiment, the casing includes a molded paper layer, a printed layer and a protective layer stacked sequentially from an inside of the casing to an outside of the casing; and/or

a thickness of the casing is not less than 0.2 mm and not greater than 0.5 mm; and/or

a length of the casing is not less than 30 mm and not greater than 50 mm; and/or

an outer diameter of the casing is not less than 5 mm and not greater than 10 mm.

[0019] In an embodiment, when the first filling section is filled with the polylactic acid cotton and the polylactic acid cotton is adjacent to the first opening, a distance between an end of the polylactic acid cotton close to the first opening and a peristoma of the first opening is A1, and A1 is not less than 1 mm and not greater than 6 mm; and/or

a second opening is formed at another end of the passage, when the second filling section is filled with the polylactic acid cotton, a distance between an end of the polylactic acid cotton close to the second opening and a peristoma of the second opening is A2, and A2 is not less than 1 mm and not greater than 6 mm; and/or

a diameter of the polylactic acid cotton is not less than 5 mm and not greater than 10 mm; and/or,

a length of the polylactic acid cotton is not less than 8 mm and not greater than 13 mm; and/or,

a length of the support element is not less than 5 mm and not greater than 10 mm.

[0020] In an embodiment, an inner diameter of the gas passage gradually widens along a direction close to the inner wall of the casing; and/or
the filter nozzle includes a plurality of gas passages, and the plurality of gas passages are distributed at intervals.

[0021] The present application further provides an atomization device, including an atomizer and a filter nozzle as mentioned above. The atomizer outputs high-temperature gas during operation, the high-temperature gas enters the filter nozzle via the first opening of the filter nozzle, and the filter nozzle includes a casing,

a passage is formed along a length direction of the casing, a first opening is formed at an end of the passage, the first opening is configured for gas to be filtered to enter, and the passage includes a first filling section and a second filling section, the first filling section is adjacent to the first opening, and the first filling section is filled with two of a first functional substance, a support element and a polylactic acid cotton element along the length direction of the casing, the second filling section is filled with one of a second functional substance, the support element and the polylactic acid cotton element, and

the support element is provided with a gas passage along the length direction of the casing.

[0022] In the technical solution of the present application, when both the first filling section and the second filling section are filled with the polylactic acid cotton element, since the material of the polylactic acid cotton element is the polylactic acid cotton, the polylactic acid cotton is capable of adsorbing and capturing impurities from the gaseous substances (e-cigarette smoke) output from the atomizer, and the two polylactic acid cotton elements act as a multi-filter to purify the smoke. When the polylactic acid cotton element of the first filling section is connected to the polylactic acid cotton element of the second filling section, they can form an integral part. When a support element exists, the support element can support the casing, and the support element is provided with a gas passage, which reduces the resistance of smoke transmission. In addition, by setting the support element, the length of the polylactic acid cotton element in the passage can further be reduced, thereby reducing the suction resistance of the filter nozzle. When the support element of the first filling section is connected to the support element of the second filling section, they can form an integral part. In an embodiment, the first functional substance and the second functional substance can be substances with medicinal effects or fragrances. By filling the first functional substance and/or the second functional substance, the effect (such as fragrance and/or medicinal effect) of the gaseous substance output by the filter nozzle can be improved. When the first functional substance of the first filling section is connected to the second functional substance of the second filling section, they can form an integral part. In this embodiment, the first filling section is filled with two of the first functional substance, the support element and the polylactic acid cotton element along the length direction of the casing, and the second filling section is filled with one of the second functional substance, the support element and the polylactic acid cotton element. In this way, the performance of the filter nozzle can be optimized, and the filter nozzle can be combined with the atomizer, thereby meeting various requirements of users for filter nozzles and improving user experience.

BRIEF DESCRIPTION OF THE DRAWINGS

[0023] To illustrate the technical solutions of embodiments of the present application or the related art more clearly, the accompanying drawings of embodiments or the related art will be illustrated briefly. Apparently, the described embodiments are only some embodiments of the present application, and those skilled in the art can obtain other drawings according to the structures shown in these drawings without creative efforts.

FIG. 1 is a three-dimensional structure schematic view of a filter nozzle according to a first embodiment of the present application.

FIG. 2 is a three-dimensional structure schematic view of the filter nozzle according to a second embodiment of the present application.

FIG. 3 is a three-dimensional structure schematic view of the filter nozzle according to a third embodiment of the present application.

FIG. 4 is a structure schematic view of the filter nozzle according to a fourth embodiment of the present application.

FIG. 5 is a structure schematic view of the filter nozzle according to a fifth embodiment of the present application.

FIG. 6 is a structure schematic view of the filter nozzle according to a sixth embodiment of the present application.

FIG. 7 is a structure schematic view of the filter nozzle according to a seventh embodiment of the present application.

FIG. 8 is a structure schematic view of the filter nozzle according to an eighth embodiment of the present application.

FIG. 9 is a structure schematic view of the filter nozzle according to a ninth embodiment of the present application.

FIG. 10 is a structure schematic view of the filter nozzle according to a tenth embodiment of the present application.

FIG. 11 is a structure schematic view of the filter nozzle according to an eleventh embodiment of the present application.

FIG. 12 is a structure schematic view of the filter nozzle according to a twelfth embodiment of the present application.

FIG. 13 is a structure schematic view of the filter nozzle according to a thirteenth embodiment of the present

application.

FIG. 14 is a structure schematic view of the filter nozzle according to a fourteenth embodiment of the present application.

FIG. 15 is a structure schematic view of the filter nozzle according to a fifteenth embodiment of the present application.

FIG. 16 is a structure schematic view of the filter nozzle according to a sixteenth embodiment of the present application.

FIG. 17 is a structure schematic view of the filter nozzle according to a seventeenth embodiment of the present application.

FIG. 18 is a structure schematic view of the filter nozzle according to an eighteenth embodiment of the present application.

FIG. 19 is a structure schematic view of the filter nozzle according to a nineteenth embodiment of the present application.

FIG. 20 is a structure schematic view of the filter nozzle according to a twentieth embodiment of the present application.

FIG. 21 is a structure schematic view of the filter nozzle according to a twenty-first embodiment of the present application.

[0024] Description of reference numbers:

Reference number	Name	Reference number	Name
100	filter nozzle	31	gas passage
1	casing	4	polylactic acid cotton element
11	passage	5	second functional substance
11a	first opening	6	protective cover
11b	second opening	7	filter membrane
2	first functional substance	8	filter capsule
3	support element		

[0025] The realization of the objective, functional characteristics, and advantages of the present application are further described with reference to the accompanying drawings.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0026] The technical solutions of the embodiments of the present application will be described in detail below with reference to the accompanying drawings. It is obvious that the embodiments described herein are only some rather than all of the embodiments of the present application. All other embodiments obtained by those skilled in the art based on the embodiments of the present application without creative efforts shall fall within the claimed scope of the present application.

[0027] It should be noted that all the directional indications (such as up, down, left, right, front, rear...) in the embodiments of the present application are only used to explain the relative positional relationship, movement, or the like of the components in a certain posture (as shown in the drawings). If the specific posture changes, the directional indication will change accordingly.

[0028] Besides, the descriptions associated with, e.g., "first" and "second," in the present application are merely for descriptive purposes, and cannot be understood as indicating or suggesting relative importance or impliedly indicating the number of the indicated technical feature. Therefore, the feature associated with "first" or "second" can expressly or impliedly include at least one such feature. In addition, the meaning of "and/or" appearing in the whole application

includes three parallel schemes. For example, "A and/or B" includes scheme A, scheme B, or schemes that both A and B satisfy. Moreover, the technical solutions of the various embodiments can be combined with each other, but the combinations must be based on the realization of those skilled in the art. When the combination of technical solutions is contradictory or cannot be achieved, it should be considered that such a combination of technical solutions does not exist, nor does it fall within the scope of the present application.

[0029] There are various types of atomizing devices, including the atomizing therapy apparatus used in the medical industry and electronic cigarettes used in people's daily life. The aforementioned atomization device cannot meet the diverse needs of people during use.

[0030] The present application provides an atomization device and a filter nozzle. The atomization device includes a filter nozzle. The atomization device can be an atomizer in the medical or beauty industry. The filter nozzle can be applied to an atomizer in the medical or beauty industry, and can also be used in the conventional cigarette and the heat-not-burn electronic cigarette. For the convenience of understanding, the present application takes the form of a filter nozzle as a starting point, and its source of atomization as the atomizer of an electronic cigarette as an example. FIG. 1 to FIG. 21 are specific embodiments of the filter nozzle in the present application.

[0031] As shown in FIG. 1 to FIG. 21, the filter nozzle 100 includes a casing 1, and a passage 11 is formed at the casing 1 along a length direction of the casing 1. A first opening 11a is formed at an end of the passage 11, and the first opening 11a is configured for gas to be filtered to enter. The passage 11 includes a first filling section (not shown) and a second filling section (not shown). The first filling section is adjacent to the first opening 11a, and the first filling section is filled with two of a first functional substance 2, a support element 3 and a polylactic acid cotton element 4 along the length direction of the casing 1. The second filling section is filled with one of a second functional substance 5, the support element 3 and the polylactic acid cotton element 4. The support element 3 is provided with a gas passage 31 along the length direction of the casing 1, and there are filter capsules or not in the support element 3.

[0032] If the first substance exists, there is no need to arrange the filter capsules at the support element 3. If the first substance does not exist, the filter capsules can be arranged at the support element 3. If the first substance exists, the filter capsules can be arranged at the support element 3 to obtain two kinds of taste or increase the taste, and the like.

[0033] In the technical solution of the present application, when both the first filling section and the second filling section are filled with the polylactic acid cotton element 4, since the material of the polylactic acid cotton element 4 is the polylactic acid cotton, the polylactic acid cotton is capable of adsorbing and capturing impurities from the gaseous substances (e-cigarette smoke) output from the atomizer, and the two polylactic acid cotton elements 4 act as a multi-filter to purify the smoke. When the polylactic acid cotton element 4 of the first filling section is connected to the polylactic acid cotton element 4 of the second filling section, they can form an integral part. When a support element 3 exists, the support element 3 can support the casing 1, and the support element 3 is provided with a gas passage 31, which reduces the resistance of smoke transmission. In addition, by setting the support element 3, the length of the polylactic acid cotton element 4 in the passage 11 can further be reduced, thereby reducing the suction resistance of the filter nozzle 100. When the support element 3 of the first filling section is connected to the support element 3 of the second filling section, they can form an integral part. In an embodiment, the first functional substance 2 and the second functional substance 5 can be substances with medicinal effects or fragrances. By filling the first functional substance 2 and/or the second functional substance 5, the effect (such as fragrance and/or medicinal effect) of the gaseous substance output by the filter nozzle can be improved. When the first functional substance of the first filling section is connected to the second functional substance of the second filling section, they can form an integral part. In this embodiment, the first filling section is filled with two of the first functional substance 2, the support element 3 and the polylactic acid cotton element 4 along the length direction of the casing 1, and the second filling section is filled with one of the second functional substance 5, the support element 3 and the polylactic acid cotton element 4. In this way, the performance of the filter nozzle 100 can be optimized, and the filter nozzle 100 can be combined with the atomizer, thereby meeting various requirements of users for filter nozzles and improving user experience.

[0034] The material of the polylactic acid cotton is the polylactic acid cotton. Since the density of the polylactic acid cotton ranges from $0.1g/cm^3$ to $1.0g/cm^3$ and the density of the polylactic acid cotton can affect the suction resistance of the smoke, the polylactic acid cotton within the density range of $0.1g/cm^3$-$1.0g/cm^3$ can effectively improve the suction resistance of the filter nozzle 100. For example, the density range of the polylactic acid cotton can be $0.1g/cm^3$, $0.2g/cm^3$, $0.3g/cm^3$, $0.4g/cm^3$, $0.5g/cm^3$, $0.6g/cm^3$, $0.7g/cm^3$, $0.8g/cm^3$, $0.9g/cm^3$, and $1.0g/cm^3$. The polylactic acid cotton is capable of adsorbing and capturing the tobacco tar from the smoke, providing filtration and cooling, thus, the oil absorption parameters of the polylactic acid cotton needs to be reasonably designed to enable the polylactic acid cotton to effectively and fully perform its intended functions. In an embodiment, the oil absorption range of the polylactic acid cotton is 5g/g-15g/g, and the polylactic acid cotton with this oil absorption range can more fully and effectively absorb and block the tobacco tar in the smoke to play a better filtering and cooling effect. In an embodiment, the polylactic acid cotton element has certain elasticity, and is filled in the casing 1, so that the polylactic acid cotton element can be elastically abutted against the inner wall of the casing 1. The polylactic acid cotton element with appropriate elasticity can ensure the stable arrangement of the polylactic acid cotton, and it is also convenient for filling the polylactic acid

cotton. In an embodiment, the elastic recovery rate of the polylactic acid cotton is greater than 95%.

[0035] As shown in FIG. 6, FIG. 9, FIG. 11, FIG. 12, FIG. 15 and FIG. 18, a second opening 11b is formed at another end of the passage 11. The second opening 11b is adjacent to the second filling section, and the second filling section is filled with the second functional substance 5. When the second functional substance 5 is powdery, a protective cover 6 is provided at the second opening 11b to avoid leakage of the second functional substance 5 and affect the energy efficiency of the filter nozzle 100, and the protective cover 6 can be removed when use, which is safe and hygienic.

[0036] It should be noted that in FIG. 6 and FIG. 11, since the second functional substance 5 of the second filling section is powdery, to prevent the second functional substance 5 from entering the gas passage 31 and blocking the gas passage 31, the side of the support element 3 close to the second opening 11b is provided with a filter membrane 7, and the second functional substance 5 is supported by the filter membrane 7 to ensure that the smoke can enter the gas passage 31 smoothly.

[0037] In an embodiment, as shown in FIG. 1, FIG. 4, FIG. 16 and FIG. 21, the side of the first filling section away from the first opening 11a is filled with the first functional substance 2, and the first functional substance 2 is powdery. When the second filling section is filled with the support element 3, since the support element 3 includes a gas passage 31, the first functional substance 2 may leak from the gas passage 31 of the support element 3 in the second filling section. The protective cover 6 at the second opening 11b can avoid the leakage of the second functional substance 5 and the effect on the energy efficiency of the filter nozzle 100. When the filter nozzle 100 needs to be used, the protective cover 6 may be removed, which is safe and hygienic.

[0038] It should be noted that, to make the filter nozzle safe and hygienic, a protective cover is provided at the second opening. Since the second opening is the end for people to suck, by setting the protective cover, the filter nozzle 100 is safe and hygienic, and the user experience is improved.

[0039] In an embodiment, as shown in FIG. 20 and FIG. 21, the first filling section is filled with the first functional substance 2 and the support element 3, and the support element 3 is adjacent to the first opening 11a. The first functional substance 2 is granular or powdery. By covering the filter membrane 7 at the first opening 11a, since the filter membrane 7 is a gas-permeable film with certain gas permeability, the filter membrane 7 can block the first opening 11a, and allow smoke to pass through effectively. The filter membrane 7 has a certain degree of adsorption capability, and can partially block tobacco tar, condensate, and the like. The filter membrane 7 can also effectively prevent the first functional substance 2 from being scattered through the gas passage 31 of the support element 3. It can be understood that the filter membrane 7 can also be provided between the support element 3 and the first functional substance 2.

[0040] In an embodiment, the filter membrane is arranged along with the first functional substance 2 and the second functional substance 5. For example, as shown in FIG. 2, FIG. 4, FIG. 5, FIG. 10 to FIG. 13 and FIG. 20, when the first functional substance is arranged in the first opening, the filter membrane is covered at the first opening. As shown in FIG. 6, FIG. 15 and FIG. 20, when the second functional substance is provided at the second filling section and a support element is provided at the side of the first filling section away from the first opening, a filter membrane is provided at the side of the support element away from the first opening.

[0041] In an embodiment, as shown in FIG. 10 to FIG. 13, when the side of the first filling section close to the first opening 11a is filled with the first functional substance 2, the first functional substance 2 is granular or powdery, and a filter membrane 7 is provided at the first opening 11a. Since the filter membrane 7 is a breathable film with a certain degree of gas permeability, the filter membrane 7 can block the first opening 11a, and can effectively allow the smoke to pass through. The filter membrane 7 has a certain degree of adsorption capability, and can partially block tobacco tar, condensate, and the like. The filter membrane 7 can also effectively prevent the first functional substance 2 from being scattered from the first filling section.

[0042] The filter membrane 7 can be made of a plurality of materials. For example, the filter membrane 7 can be made of plastics, silica gel and the like. Specifically, in the present application, the filter membrane 7 can be made of papery or lactic acid cotton. In this way, since both paper and lactic acid cotton are breathable materials, the smoke can effectively pass through. Moreover, paper and lactic acid cotton have a certain degree of adsorption capability, and can partially block tobacco tar, condensate, and the like. In addition, both paper and lactic acid cotton have the small weight, thereby effectively reducing the overall weight of the filter nozzle 100.

[0043] To ensure that the filter membrane 7 can allow gas to pass through while the first functional substance 2 and the second functional substance 5 are blocked, the porosity of the filter membrane 7 ranges from 80 mesh to 120 mesh. In another embodiment, the porosity of the filter membrane 7 can be set according to the requirements, which will not be limited in this embodiment.

[0044] To enhance the energy efficiency of the filter nozzle 100, as shown in FIG. 2 and FIG. 3, the support element 3 filled in the first filling section is provided with filter capsules 8, and the filter capsules 8 are abutted against at least part of the inner wall surface of the gas passage 31. The filter capsules 8 are provided at the support element 3, and the filter capsules 8 flow out a liquid with a fragrance when the filter capsules 8 are crushed, so that the smoke flowing through the support element 3 will have a corresponding taste, and the tastes of electronic cigarettes are diversity. In addition, the filter capsule 8 is abutted against at least part of the inner wall surface of the gas passage 31, so that the

filter capsule 8 is not easy to move, and the user can locate and crush the filter capsule 8 easily. The filter nozzle of the present application has good user experience and strong market competitiveness.

[0045] It should be noted that there are various materials of the support element 3. For example, the material of the support element 3 can be paper. In an embodiment, the material of the support element 3 is the safe and non-toxic silicone gel. The silicone gel has certain elasticity, which not only makes it convenient for processing the gas passage 31, but also makes the operation simple when the filter capsule 8 needs to be installed at the support element 3, and the support element 3 is not easily deformed after the user squeezes the filter capsule 8. The filter capsule 8 is located in the middle of the inner core, which can avoid that the filter capsule 8 is too close to the second opening to cause the splashed liquid to fly directly into the user's mouth when the filter capsule 8 is broken affecting the taste and causing safety hazard. The number of filter capsules 8 at the support element 3 is not limited, which can be one or more. When a plurality of the filter capsules 8 are provided, the filter capsules 8 with different tastes can be chosen to form a richer taste, or a combination of the filter capsules 8 with a single taste can be chosen to enhance the concentration of the taste and extend the duration of taste.

[0046] In an embodiment, the filter capsule 8 includes a casing (not shown) and the liquid inside the casing. When the filter capsule 8 is crushed by external force, the liquid will flow out. The smoke outputted from the electronic cigarette will has different tastes, fragrance, functions, and the like due to the different formula of the liquid. The liquid may be scented liquids with different fragrances or tastes, such as creamy liquids, mint liquids, and the like, or medicinal liquids with health efficacy. In an embodiment, the filter capsule 8 is shaped in a sphere with a diameter of about 2.5-4 mm.

[0047] In order to reduce the suction resistance of the filter nozzle 100, as shown in FIG. 3, when the second filling section is filled with the polylactic acid cotton element 4, the passage 11 further includes a third filling section, and the third filling section is provided at the side of the second filling section close to the second opening 11b, and the third filling section is filled with the support element 3. In this way, since the support element 3 is provided with a gas passage 31 and the third filling section is filled with the support element 3, the transmission resistance of the gaseous substance can be reduced, the length of the polylactic acid cotton element 4 in the casing 1 can be reduced, and the suction resistance of the filter nozzle 100 can be reduced, thereby improving the user experience.

[0048] As shown in FIG. 4, in an embodiment, the first filling section is filled with the first functional substance 2 and the support element 3. When the first functional substance 2 is granular or powdery and is adjacent to the first opening 11a, the second filling section is filled with the support element 3, so that the first functional substance 2 can first contact with the smoke, and the first functional substance 2 can be better heated and release fragrance or medicinal effect, thereby improving the efficacy of the smoke. By setting two support elements 3 in the casing 1, the gas passages 31 of the two support elements 3 are communicated with each other, and the smoke directly enters the mouth of the smoker through the gas passage 31 of the support element 3, which reduces the transmission resistance of gaseous substance and the suction resistance of the filter nozzle 100, thereby improving the user's smoking experience. In this case, the two support elements 3 may be integrated into one.

[0049] As shown in FIG. 5, in an embodiment, when the first filling section is filled with the first functional substance 2 and the polylactic acid cotton element 4, the first functional substance 2 is granular or powdery and is adjacent to the first opening 11a, and the second filling section is filled with the polylactic acid cotton element 4, so that the first functional substance 2 can first contact with the smoke, and the first functional substance can be better heated and release fragrance or medicinal effect, thereby improving the efficacy of the smoke. Two polylactic acid cotton elements 4 are provided in the casing 1, and the two polylactic acid cotton elements 4 are made of the polylactic acid cotton. The polylactic acid cotton can absorb and block the impurities in the tobacco tar of the smoke to play a multi-filtration and purification role. In this way, the smoke with a fine taste is finally discharged and is more pure, which improves the user experience. When the user smokes, the mouth will contact with the polylactic acid cotton element 4. Compared with silicone, the polylactic acid cotton is softer and more elastic, and has a better touch. In this case, the two polylactic acid cotton elements 4 can be integrated in to one.

[0050] In an embodiment, as shown in FIG. 14, when the first filling section is filled with the polylactic acid cotton element 4 and the support element 3, and the polylactic acid cotton element 4 is adjacent to the first opening 11a, the second filling section is filled with the polylactic acid cotton element 4. In this way, two polylactic acid cotton elements 4 are provided in the casing 1, and the two polylactic acid cotton elements 4 are made of the polylactic acid cotton. The polylactic acid cotton can absorb and block impurities in the tobacco tar of the smoke to play a multi-filtration and purification role. The support element 3 can support the outer tube, and the support element 3 includes a gas passage 31 extending along the length direction of the casing 1. In this case, the smoke filtered by the polylactic acid cotton in the first filling section can enter the gas passage 31, then the smoke can gather in the gas passage 31 and will be filtered by the polylactic acid cotton in the second filling section, and the smoke with a fine taste is finally discharged and is more pure, which improves the user experience. When the user smokes, the mouth will contact with the polylactic acid cotton element 4. Compared with silicone, the polylactic acid cotton is softer and more elastic, and has a better touch. In this case, if the filter capsule 8 exists in the support element 3, the suction effect will be better.

[0051] It should be noted that the gas passage 31 may be shaped in a straight line or in a curve, and the number of

the gas passage 31 may be one or multiple, which is not limited in this embodiment.

[0052] In an embodiment, as shown in FIG. 10, when the first filling section is filled with the first functional substance 2 and the support element 3, the first functional substance 2 is granular or powdery and is adjacent to the first opening 11a, and the second filling section is filled with the polylactic acid cotton element 4. In this case, the first functional substance 2 can first contact with the smoke, and the first functional substance 2 can be better heated and release fragrance or medicinal effect, thereby improving the efficacy of the smoke. Then the smoke passes through the gas passage 31 of the support element 3, which can reduce the transmission resistance of the gaseous substance, and the smoke will be filtered by the polylactic acid cotton element 4 in the second filling section. The suction resistance of the filter nozzle 100 will be reduced due to the reduction of the length of the polylactic acid cotton element 4, thereby improving the user smoking experience.

[0053] In an embodiment, the first functional substance 2 is granular or powdery, so that the first functional substance 2 is conveniently stored in the first casing 1.

[0054] It should be noted that, in an embodiment of the present application, the particle size of the first functional substance 2 ranges from 0.0001 μm to 1000 μm. In this way, within this particle size range, the first functional substance 2 can form the solid aerosol along with the airflow when the electronic cigarette is smoked by the user, and the first functional substance 2 at the micro-nano level is also easier to be absorbed by the human body. In other embodiments, the particle size of the first functional substance 2 can be determined according to the requirements, which is not limited in this embodiment. In addition, in another embodiment similar to FIG. 10, the polylactic acid cotton element 4 is for filtering out substances harmful to the human body from the smoke, and the functional substances in the first functional substance 2 will not be filtered out or can partially pass through, thereby ensuring that the components in the first functional substance 2 can pass through effectively.

[0055] In an embodiment, the second functional substance 5 is powdery, so that the first functional substance 2 and the smoke can form an aerosol to enter the oral cavity or nasal cavity of the smoker along with the smoke.

[0056] It should be noted that the first functional substance 2 can be made of many kinds of materials, and the first functional substance 2 is a substance with a medicinal effect or fragrance. For example, in the present application, the first functional substance 2 includes at least one of caffeine, essential oil, nicotine, probiotics, hyaluronic acid or vitamin D.

[0057] It should also be noted that the second functional substance 5 can be made of many kinds of materials, and the second functional substance 5 is a substance with a medicinal effect or fragrance. For example, in the present application, the second functional substance 5 includes at least one of freeze-dried powder, caffeine powder, nicotine-containing powder, probiotic powder, hyaluronic acid powder and vitamin D-containing powder.

[0058] In addition, it should be noted that both the first functional substance and the second functional substance are composed of a physiologically active substance and a casing wrapping the physiologically active substance. The physiologically active substance can be the mixture of one or more of immobilized probiotics, fermented products of probiotics, other natural active substances with health care and therapeutic effects and their extracts. Health care and therapeutic effects may include clearing the throat, refreshing the mind, improving memory, enhancing immunity, regulating intestinal flora, losing weight, improving skin, improving and assisting in lowering blood lipids and blood sugar, and anti-aging. In actual scenarios, different physiologically active substances are reasonably combined to achieve effects such as maintaining health in the oral cavity and the respiratory tract, refreshing the mind, accelerating sobering up, losing weight, beautifying and anti-aging. In this embodiment, the physiologically active substance is the probiotic or the fermented product of probiotics. The materials of the casing 1 include one or more of cyclodextrin, gelatin, sodium alginate, and gum arabic. After the physiologically active substance is wrapped by the casing 1, on the one hand, the direct contact between the physiologically active substance and air can be avoided, thereby ensuring the unaffected activity; on the other hand, the selection range of physiologically active substances can be further extended to active substances that are difficult to atomize, easy to oxidative denaturation, and poor thermal stability.

[0059] In this embodiment, the first functional substance 2 is the freeze-dried powder, which is convenient for storage and absorption by the human body. In an embodiment, the first functional substance 2 can be processed into the powder, specifically, it can be obtained by various methods such as low-temperature pulverization, spray drying, and freeze-drying.

[0060] In an embodiment, the casing 1 includes a molded paper layer, a printed layer and a protective layer stacked sequentially from an inside of the casing to an outside of the casing. In this way, the casing 1 is composed of stacked layers, including the molded paper layer, the printed layer and the protective layer, which not only securely holds the fillers within the first and second filling sections, but also enhances the aesthetics and recognition of the filter nozzle 100 through printed identifications, patterns, and the like. The protective layer will protect the printed layer. On one hand, the protective layer will avoid the direct contact between the printed ink and the user's mouth, reducing potential safety risks. On the other hand, the protective layer is waterproof, and can preventing the printed layer from being affected by wet oral environments and sweaty hands.

[0061] It should be noted that, in an embodiment of the present application, the thickness of the casing 1 is 0.2 mm to 0.5 mm. By optimizing the thickness of the casing 1, the gas permeability of the casing 1 is ensured, and the excessive filtration temperature which will cause potential safety hazard is avoided, In addition, by reducing the thickness, con-

sumables are saved, and the internal space of the casing 1 is correspondingly increased, which helps to improve the filtering and cooling effects of the filter nozzle 100.

[0062] It should be noted that, in an embodiment of the present application, the length of the casing 1 ranges from 30 mm to 50 mm, so that the filter nozzle 100 is portable and beautiful.

[0063] In addition, it should be noted that, in an embodiment of the present application, the outer diameter of the casing 1 ranges from 5 mm to 10 mm. In this way, the casing 1 within this range can not only fix the polylactic acid cotton well, but also play a blocking role, to reduce potential safety hazards, consumables of the casing 1 and costs.

[0064] When the length, the thickness and the outer diameter of the casing 1 are defined at the same time, the casing 1 has the above-mentioned effects. For example, in an embodiment, the length of the casing 1 ranges from 41mm to 43 mm. For example, the length of the casing 1 can be 41 mm, 42 mm, 43 mm, and the like. When the length of the casing 1 is within this range, the length of the polylactic acid cotton filled inside the casing 1 may include various sizes. On the premise of ensuring the filtering effect, the selection range is wide and the processing is easy. Besides, the filter nozzle 100 is easier for users to hold and suck due to the longer length of the casing 1. In an embodiment, the length of the casing 1 ranges from 33 mm to 35 mm. For example, the length of the casing 1 may be 33 mm, 33.6 mm, 34 mm, 34.5 mm, 35 mm and the like. Through multiple tests, the inventor found that when the length of the casing 1 ranges from 32 mm to 44 mm, when the outer diameter of the casing 1 ranges from 4mm 7 mm and when the thickness of the casing 1 ranges from 0.38 mm to 0.45 mm, impurities can be fully filtered out. Under this condition, the length of the casing 1 is reduced. Since the length of the polylactic acid cotton element 4 will be reduced accordingly, on the one hand, the gas permeability of the polylactic acid cotton element 4 will be better and the smoke flavor more full; on the other hand, consumables will be saved and costs will be reduced. In addition, when the filter nozzle 100 with this length is matched with smoke generating components in the current conventional electronic cigarette, the length ratio is more suitable and the appearance is better. In an embodiment, the outer diameter of the casing 1 is 7 mm, and the thickness of the casing 1 is 0.4 mm. In this way, the casing 1 of this size can not only fix the polylactic acid cotton element 4 well, but also play a blocking role, to reduce potential safety hazards, consumables of the casing 1 and costs.

[0065] When the first filling section is filled with the polylactic acid cotton and the polylactic acid cotton is adjacent to the first opening 11a, a distance between an end of the polylactic acid cotton close to the first opening 11a and a peristoma of the first opening 11a is A1, and A1 is not less than 1 mm and not greater than 6 mm. Within this range, not only the polylactic acid cotton can be prevented from protruding beyond the casing 1, but also an excessive spacing can be avoided to affect the aesthetics. In an embodiment, the distance between the end of the polylactic acid cotton adjacent to the first opening 11a and the first opening 11a may be 1 mm, 2 mm, 3 mm, 3.5 mm, 4 mm, 5 mm, 6 mm, and the like.

[0066] When the second filling section is filled with the polylactic acid cotton, a distance between an end of the polylactic acid cotton close to the second opening 11b and a peristoma of the second opening 11b is A2, and A2 is not less than 1 mm and not greater than 6 mm. Within this range, not only the polylactic acid cotton can be prevented from protruding beyond the casing 1, but also an excessive spacing can be avoided to affect the aesthetics. In an embodiment, the distance between the end of the polylactic acid cotton adjacent to the second opening 11b and the second opening 11b may be 1 mm, 2 mm, 3 mm, 3.5 mm, 4 mm, 5 mm, 6 mm, and the like.

[0067] The casing 1 has various shapes, for example, the casing 1 may be shaped in a cylinder, prism, and the like. The polylactic acid cotton may be shaped in a correspondingly column and prism. The size of the polylactic acid cotton element 4 is adapted to the inner diameter of the casing 1. In the present application, the casing 1 is roughly shaped in a cylinder, and the polylactic acid cotton element 4 is roughly shaped in a column. After assembly, the size of the polylactic acid cotton element 4 is adapted to the inner diameter of the casing 1, so that the outer surface of the polylactic acid cotton element 4 can be elastically abutted against the inner wall of the casing 1, effectively ensuring the stable arrangement of the polylactic acid cotton element 4.

[0068] As shown in FIG. 1 and FIG. 2, the polylactic acid cotton is roughly shaped in a column, and the diameter of the polylactic acid cotton element 4 ranges from 5 mm to 10 mm, and the length of the polylactic acid cotton element 4 ranges from 8 mm to 13 mm. In this way, not only the tobacco tar passing through the polylactic acid cotton element 4 can be fully filtered, but also the increase in the suction resistance of the filter nozzle 100 due to the excessive length of the polylactic acid cotton element 4 can be avoided. In an embodiment, the diameter of the polylactic acid cotton can be 5 mm, 6 mm, 7 mm, 8 mm, 9 mm or 10 mm, the length of the polylactic acid cotton can be 8 mm, 9 mm, 10 mm, 11 mm, 12 mm or 13 mm, and the length of the support element 3 can range from 5mm to 10 mm. In this way, the length of the polylactic acid cotton element 4 provided in the casing 1 can be reduced, thereby reducing the suction resistance of the filter nozzle 100. In an embodiment, the length of the support element 3 can be 5 mm, 6 mm, 7 mm, 8 mm, 9 mm or 10 mm.

[0069] As shown in FIG. 1, an inner diameter of the gas passage 31 gradually widens along a direction close to the inner wall of the casing 1, so that the suction resistance of the smoke flowing through the gas passage 31 can be effectively reduced, thereby improving user experience.

[0070] It should be noted that the filter nozzle 100 includes a plurality of gas passages 31, and the plurality of gas passages 31 are distributed at intervals. In this way, not only the smoke can pass through the plurality of gas passages

31, and the suction resistance of the smoke flowing through the gas passage 31 can be effectively reduced, but also the contact area between the smoke and the plurality of gas passages 31 can be increased. In addition, when the filter capsule 8 needs to be set, they can be evenly distributed in the plurality of gas passages 31, so that when the substance stored in the filter capsule 8 overflows, the concentration of the substance in the filter capsule 8 carried by the smoke is increased, and the taste of the smoke is improved.

[0071] The above are only some embodiments of the present application, and do not limit the scope of the present application thereto. Any equivalent structure transformation made according to the description and drawings of the present application, or direct/indirect application in other related technical fields are included in the scope of the present disclosure.

Claims

1. A filter nozzle, **characterized by** comprising a casing, wherein:

   a passage is formed along a length direction of the casing, a first opening is formed at an end of the passage, the first opening is configured for gas to be filtered to enter, and the passage comprises a first filling section and a second filling section,
   the first filling section is adjacent to the first opening, and the first filling section is filled with two of a first functional substance, a support element and a polylactic acid cotton element along the length direction of the casing, the second filling section is filled with one of a second functional substance, the support element and the polylactic acid cotton element, and
   the support element is provided with a gas passage along the length direction of the casing.

2. The filter nozzle according to claim 1, wherein:

   a second opening is formed at another end of the passage, and the second opening is adjacent to the second filling section; and
   the second filling section is filled with the second functional substance, and when the second functional substance is powdery, a protective cover is provided at the second opening.

3. The filter nozzle according to claim 1, wherein:

   a side of the first filling section away from the first opening is filled with the first functional substance, and the first functional substance is powdery, and
   the second filling section is filled with the support element, and a protective cover is provided at the second opening.

4. The filter nozzle according to claim 1, wherein:

   the first filling section is filled with the first functional substance and the support element, the support element is adjacent to the first opening, the first functional substance is granular or powdery, and a filter membrane is covered at the first opening; or
   a side of the first filling section close to the first opening is filled with the first functional substance, the first functional substance is granular or powdery, and a filter membrane is covered at the first opening.

5. The filter nozzle according to claim 4, wherein the filter membrane is made of paper or polylactic acid cotton; and/or a porosity of the filter membrane ranges from 80 mesh to 120 mesh.

6. The filter nozzle according to claim 1, wherein a filter capsule is provided at the support element, and the filter capsule is abutted against at least part of an inner wall surface of the gas passage.

7. The filter nozzle according to claim 1, wherein the second filling section is filled with the polylactic acid cotton element, a third filling section is provided at the passage, the third filling section is provided at a side of the second filling section close to the second opening, and the third filling section is filled with the support element.

8. The filter nozzle according to claim 1, wherein:

the first filling section is filled with the first functional substance and the supporting member, the first functional substance is granular or powdery and is adjacent to the first opening, and the second filling section is filled with the support element; or

the first filling section is filled with the first functional substance and the polylactic acid cotton element, the first functional substance is granular or powdery and is adjacent to the first opening, and the second filling section is filled with the polylactic acid cotton element; or

the first filling section is filled with the polylactic acid cotton element and the support element, the polylactic acid cotton element is adjacent to the first opening, and the second filling section is filled with the polylactic acid cotton element; or

the first filling section is filled with the first functional substance and the support element, the first functional substance is granular or powdery and is adjacent to the first opening, and the second filling section is filled with the polylactic acid cotton element.

9. The filter nozzle according to claim 1, wherein:

the first functional substance is granular or powdery; and/or

a particle size of the first functional substance is not less than 0.0001 μm and not greater than 1000 μm; and/or

the second functional substance is powdery.

10. The filter nozzle according to claim 9, wherein:

the first functional substance is made of caffeine, essential oil, nicotine, probiotics, hyaluronic acid or vitamin D; and/or

the second functional substance comprises at least one of freeze-dried powder, caffeine powder, nicotine-containing powder, probiotic powder, hyaluronic acid powder and vitamin D-containing powder; or

the first functional substance is the freeze-dried powder.

11. The filter nozzle according to claim 1, wherein:

the casing comprises a molded paper layer, a printed layer and a protective layer stacked sequentially from an inside of the casing to an outside of the casing; and/or

a thickness of the casing is not less than 0.2 mm and not greater than 0.5 mm; and/or

a length of the casing is not less than 30 mm and not greater than 50 mm; and/or

an outer diameter of the casing is not less than 5 mm and not greater than 10 mm.

12. The filter nozzle of claim 1, wherein:

when the first filling section is filled with the polylactic acid cotton and the polylactic acid cotton is adjacent to the first opening, a distance between an end of the polylactic acid cotton close to the first opening and a peristoma of the first opening is A1, and A1 is not less than 1 mm and not greater than 6 mm; and/or

a second opening is formed at another end of the passage, when the second filling section is filled with the polylactic acid cotton, a distance between an end of the polylactic acid cotton close to the second opening and a peristoma of the second opening is A2, and A2 is not less than 1 mm and not greater than 6 mm; and/or

a diameter of the polylactic acid cotton is not less than 5 mm and not greater than 10 mm; and/or,

a length of the polylactic acid cotton is not less than 8 mm and not greater than 13 mm; and/or,

a length of the support element is not less than 5 mm and not greater than 10 mm.

13. The filter nozzle according to claim 1, wherein:

an inner diameter of the gas passage gradually widens along a direction close to the inner wall of the casing; and/or

the filter nozzle comprises a plurality of gas passages, and the plurality of gas passages are distributed at intervals.

14. An atomization device, **characterized by** comprising an atomizer and a filter nozzle according to any one of claims 1 to 13, wherein:

the atomizer outputs high-temperature gas during operation, the high-temperature gas enters the filter nozzle

via the first opening of the filter nozzle, and the filter nozzle comprises a casing,
a passage is formed along a length direction of the casing, a first opening is formed at an end of the passage, the first opening is configured for gas to be filtered to enter, and the passage comprises a first filling section and a second filling section,
the first filling section is adjacent to the first opening, and the first filling section is filled with two of a first functional substance, a support element and a polylactic acid cotton element along the length direction of the casing, the second filling section is filled with one of a second functional substance, the support element and the polylactic acid cotton element, and
the support element is provided with a gas passage along the length direction of the casing.

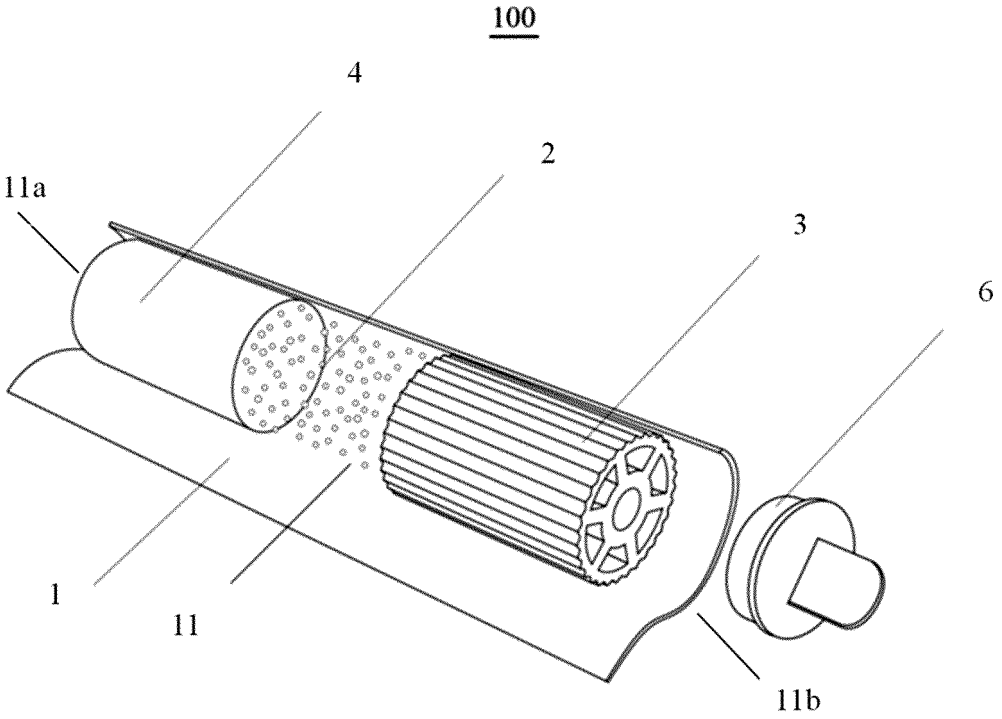

FIG. 1

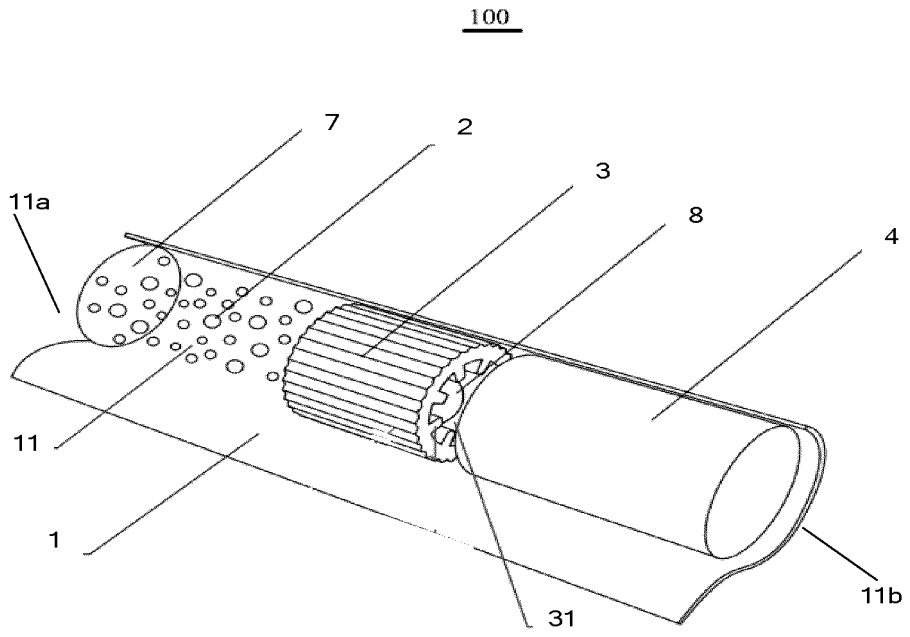

FIG. 2

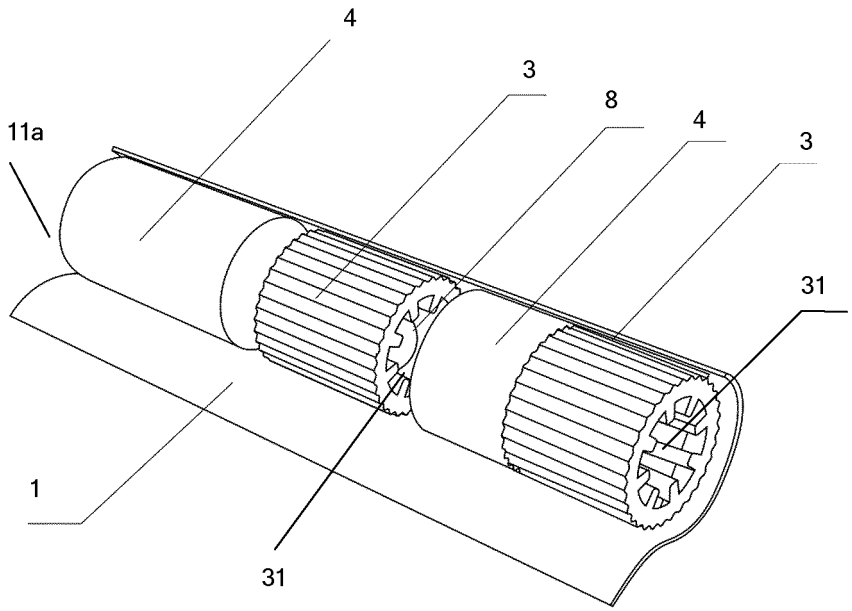

FIG. 3

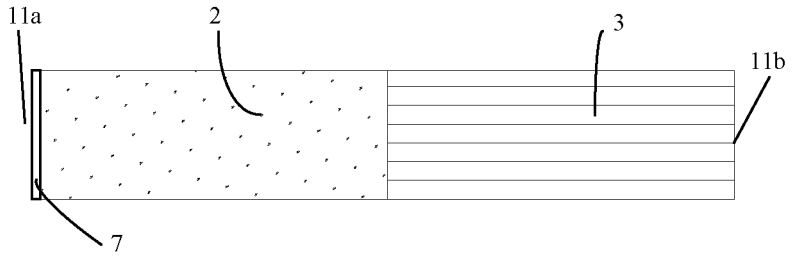

FIG. 4

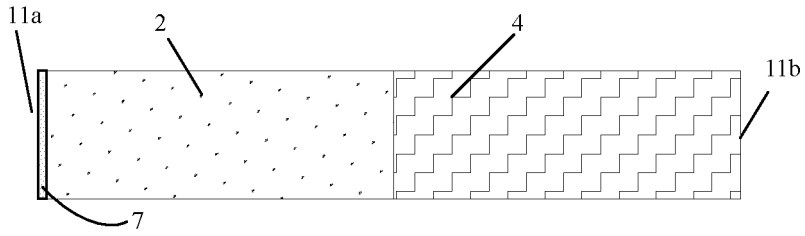

FIG. 5

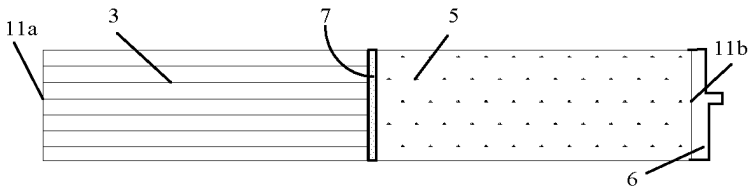

FIG. 6

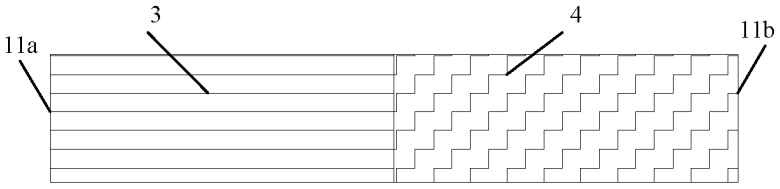

FIG. 7

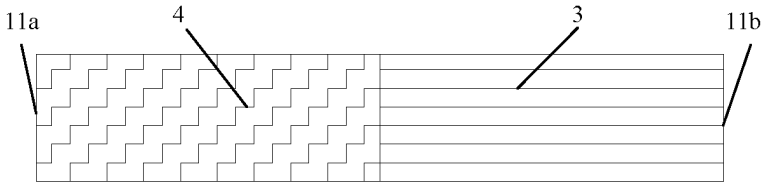

FIG. 8

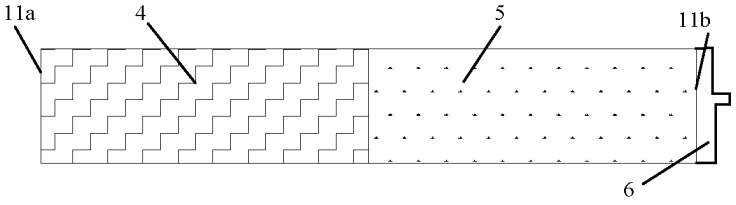

FIG. 9

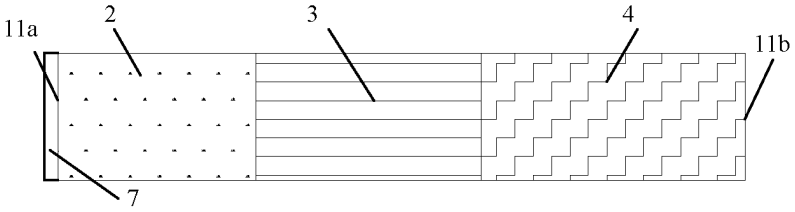

FIG. 10

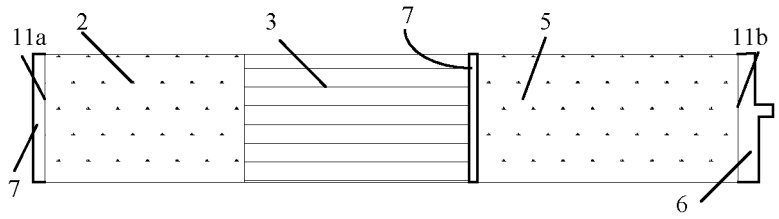

FIG. 11

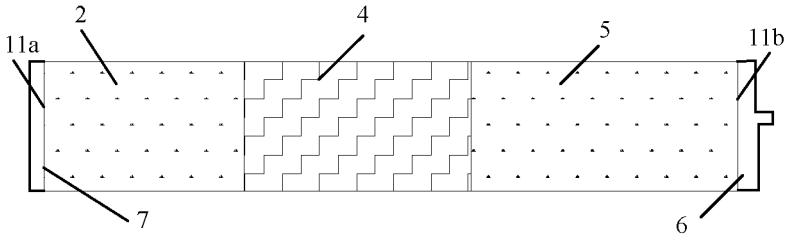

FIG. 12

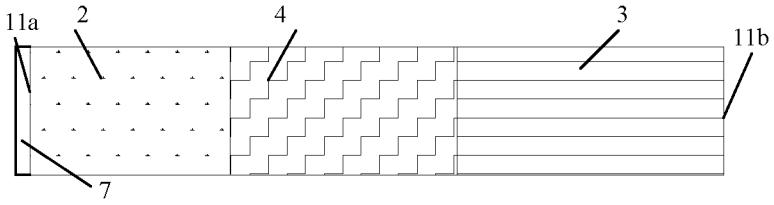

FIG. 13

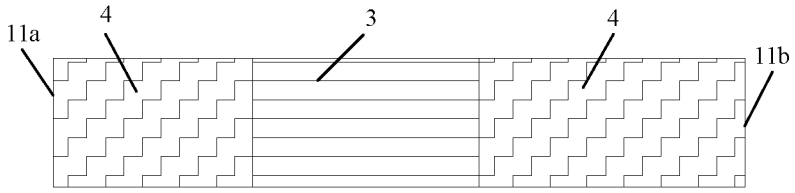

FIG. 14

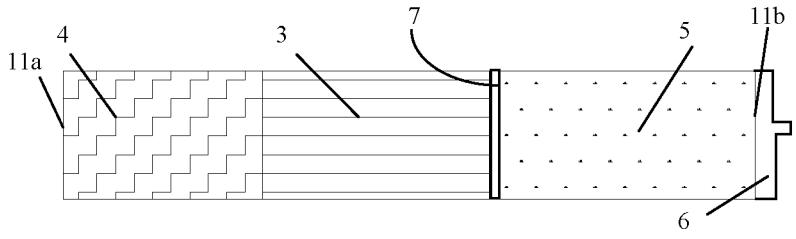

FIG. 15

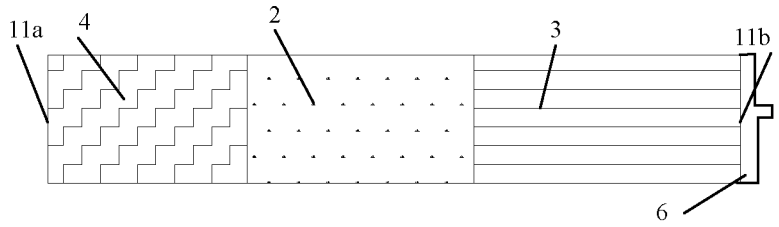

FIG. 16

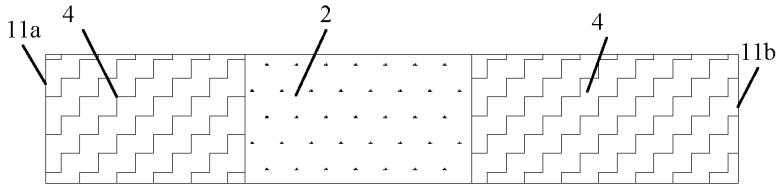

FIG. 17

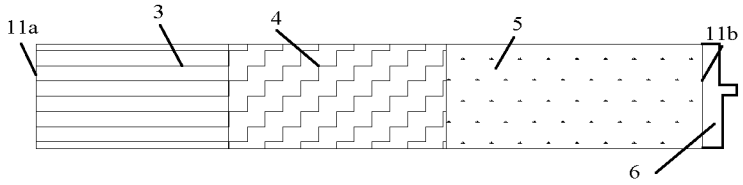

FIG. 18

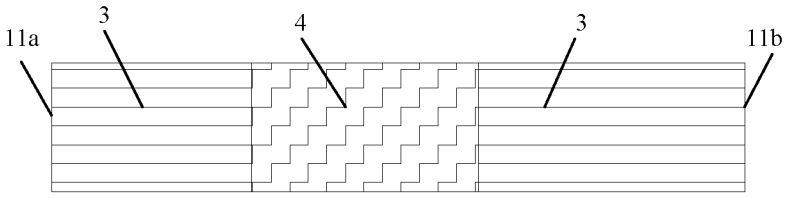

FIG. 19

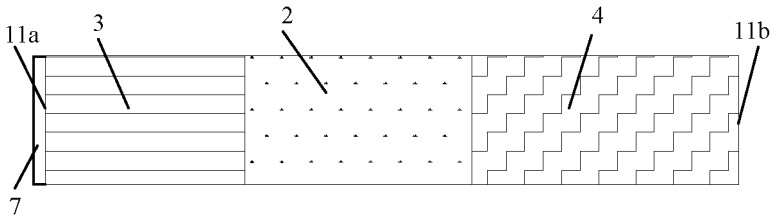

FIG. 20

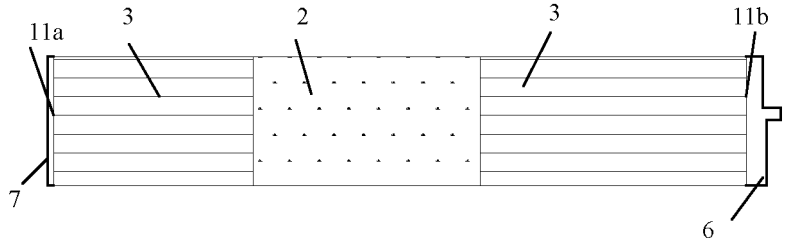

FIG. 21

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2021/136851

A. CLASSIFICATION OF SUBJECT MATTER

A24D 3/06(2006.01)i; A24F 47/00(2020.01)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)

A24D, A24F

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)

CNPAT, WPI, EPODOC, CNKI: 过滤嘴 or 烟嘴, 支撑, 支持, 硅胶, 香, 药, 色, 功能, 功效, filter tip???, support???, frame, silic???, perfume, spice, condiment, essence, flavour?, fragrance?, essential, medici???, drug, function+, effect, efficacy

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 214677541 U (SHENZHEN SOYEE TECHNOLOGY CO., LTD.) 12 November 2021 (2021-11-12) description, paragraphs [0029]-[0057], and figures 1-4	1-12, 14-15
PX	CN 214759092 U (SHENZHEN SOYEE TECHNOLOGY CO., LTD.) 19 November 2021 (2021-11-19) description, paragraphs [0028]-[0058], and figures 1-4	1-12, 14-15
PX	CN 214677544 U (SHENZHEN SOYEE TECHNOLOGY CO., LTD.) 12 November 2021 (2021-11-12) description, paragraphs [0035]-[0057], and figures 1-4	1-12, 14-15
PX	CN 214677545 U (SHENZHEN SOYEE TECHNOLOGY CO., LTD.) 12 November 2021 (2021-11-12) description, paragraphs [0030]-[0052], and figures 1-3	1-12, 14-15
X	CN 207220167 U (XIE CHUNLING) 13 April 2018 (2018-04-13) description, paragraphs [0002] and [0014]-[0015], and figures 1-2	1-12, 14-15
Y	CN 207220167 U (XIE CHUNLING) 13 April 2018 (2018-04-13) description, paragraphs [0002] and [0014]-[0015], and figures 1-2	1-12, 14-15

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

* Special categories of cited documents:
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"E" earlier application or patent but published on or after the international filing date
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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
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 February 2022	**01 March 2022**
Name and mailing address of the ISA/CN **China National Intellectual Property Administration (ISA/CN)** **No. 6, Xitucheng Road, Jimenqiao, Haidian District, Beijing 100088, China** Facsimile No. **(86-10)62019451**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2021/136851

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	CN 112021656 A (WUHAN DAHUI NEW TECHNOLOGY CO., LTD.) 04 December 2020 (2020-12-04) description, paragraphs [0044] and [0053], and figure 7	1-12, 14-15
X	CN 210382605 U (FUJIAN GREEN GOLD BIOTECHNOLOGY CO., LTD.) 24 April 2020 (2020-04-24) description, paragraphs [0032]-[0052], and figures 1-5	1-12, 14-15
X	CN 209058127 U (HONGYUN HONGHE TOBACCO (GROUP) CO., LTD.) 05 July 2019 (2019-07-05) description, paragraphs [0020]-[0035], and figures -2	1-12, 14-15
X	WO 2020142002 A1 (YSQ INTERNATIONAL PTE. LTD.) 09 July 2020 (2020-07-09) description, page 13, line 30 to page 21, line 23, and figures 1-5	1-12, 14-15
A	CN 210695925 U (BEIJING RONGCHAOLI TECHNOLOGY CO., LTD.) 09 June 2020 (2020-06-09) entire document	1-12, 14-15
A	CN 211746954 U (SHENZHEN YOUME NETWORK TECHNOLOGY CO., LTD.) 27 October 2020 (2020-10-27) entire document	1-12, 14-15

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2021/136851

Patent document cited in search report			Publication date (day/month/year)	Patent family member(s)			Publication date (day/month/year)
CN	214677541	U	12 November 2021	None			
CN	214759092	U	19 November 2021	None			
CN	214677544	U	12 November 2021	None			
CN	214677545	U	12 November 2021	None			
CN	207220167	U	13 April 2018	None			
CN	112021656	A	04 December 2020	None			
CN	210382605	U	24 April 2020	None			
CN	209058127	U	05 July 2019	None			
WO	2020142002	A1	09 July 2020	SG	10201903923S	A	30 March 2020
				EP	3694344	A1	19 August 2020
				WO	2020142005	A1	09 July 2020
CN	210695925	U	09 June 2020	None			
CN	211746954	U	27 October 2020	None			

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REFERENCES CITED IN THE DESCRIPTION

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- CN 202120572986 **[0001]**
- CN 202120572495 **[0001]**
- CN 202120566026 **[0001]**
- CN 202120573501 **[0001]**