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(72) Inventors:

- **YANG, Rong**
Hong Kong 999077 (CN)
- **WANG, Yuanhang**
Hong Kong 999077 (CN)
- **ZHANG, Yuechuan**
Hong Kong 999077 (CN)
- **PAN, Wenjie**
Hong Kong 999077 (CN)

(74) Representative: **Mathys & Squire**

The Shard
32 London Bridge Street
London SE1 9SG (GB)

(54) **HEAT-NOT-BURN CARTRIDGE**

(57) A heat-not-burn cartridge (1) includes a tube (10), a closing portion (20), a smoke generating portion (30), a cooling portion (40), and a filter portion (50). The tube (10) has a first end (11) and a second end (12) opposite to the first end (11). The closing portion (20) is configured to seal the first end (11). The smoke generating portion (30) is accommodated in the tube (10) and disposed adjacent to the first end (11). The cooling portion (40) is accommodated in the tube (10) and disposed adjacent to the smoke generating portion (30). The filter portion (50) is accommodated in the tube (10) and disposed at the second end (12). The filter portion (50) is spaced apart from the cooling portion (40) to define an accommodating cavity (60). The heat-not-burn cartridge (1) can increase the drawing concentration of aerosol.

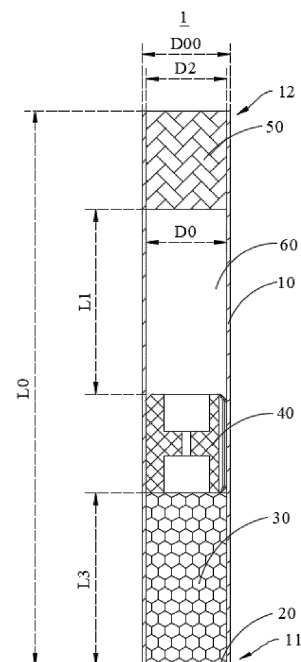


FIG. 3

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Description

CROSS-REFERENCE TO RELATED APPLICATION(S)

[0001] This application claims priority to Chinese Patent Application No. 202221116237.2, filed May 10, 2022, and entitled "HEAT-NOT-BURN CARTRIDGE", the entire disclosure of which is hereby incorporated by reference.

TECHNICAL FIELD

[0002] This disclosure relates to electronic atomization devices, and in particular to a heat-not-burn cartridge.

BACKGROUND

[0003] With the development of science and technology, more and more users use heat-not-burn cartridges. When the heat-not-burn cartridge is drawn, the aerosol concentration is easy to be insufficient.

SUMMARY

[0004] A heat-not-burn cartridge is provided in implementations of the present disclosure. The heat-not-burn cartridge includes a tube, a closing portion, a smoke generating portion, a cooling portion, and a filter portion. The tube has a first end and a second end opposite to the first end. The closing portion is configured to seal the first end. The smoke generating portion is accommodated in the tube and disposed adjacent to the first end. The cooling portion is accommodated in the tube and disposed adjacent to the smoke generating portion. The filter portion is accommodated in the tube and disposed at the second end. The filter portion is spaced apart from the cooling portion to define an accommodating cavity.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005]

FIG. 1 is a schematic structural view of a heat-not-burn cartridge provided in implementations of the present disclosure.

FIG. 2 is an exploded perspective view of the heat-not-burn cartridge provided in the implementations in FIG. 1.

FIG. 3 is a schematic cross-sectional view of the heat-not-burn cartridge provided in an implementation of the implementations in FIG. 1 taken along line A-A.

FIG. 4 is a schematic cross-sectional view of the heat-not-burn cartridge provided in another implementation of the implementations in FIG. 1 taken along line A-A.

FIG. 5 is a schematic structural view of a cooling

portion in the heat-not-burn cartridge provided in the implementation in FIG. 4.

FIG. 6 is a schematic sectional view of a cooling portion in the heat-not-burn cartridge provided in the implementation in FIG. 5 taken along line B-B.

FIG. 7 is a schematic cross-sectional view of the heat-not-burn cartridge provided in yet another implementation of the implementations in FIG. 1 taken along line A-A.

FIG. 8 is a schematic structural view of the heat-not-burn cartridge provided in the implementation in FIG. 7 in a first state.

FIG. 9 is a schematic structural view of the heat-not-burn cartridge provided in the implementation in FIG. 7 in a second state.

FIG. 10 is a schematic cross-sectional view of the heat-not-burn cartridge provided in yet another implementation of the implementations in FIG. 1 taken along line A-A.

FIG. 11 is a schematic structural view of a cooling portion in the heat-not-burn cartridge provided in the implementation in FIG. 10.

FIG. 12 is a schematic sectional view of the cooling portion in the heat-not-burn cartridge provided in FIG. 11 taken long line C-C.

FIG. 13 is a schematic structural cross-sectional view of the cooling portion in the heat-not-burn cartridge provided in the implementation in FIG. 10.

FIG. 14 is a schematic structural view of a heat-not-burn cartridge provided in another implementation of the present disclosure.

FIG. 15 is an exploded schematic perspective view of the heat-not-burn cartridge provided in the implementation in FIG. 14.

FIG. 16 is a schematic cross-sectional view of the heat-not-burn cartridge provided in the implementation in FIG. 14 taken along line D-D.

FIG. 17 is a partial enlarged schematic view of the heat-not-burn cartridge provided in the implementation in FIG. 16 at circle I.

[0006] Reference signs: heat-not-burn cartridge 1; tube 10; closing portion 20; smoke generating portion 30; cooling portion 40; filter portion 50; accommodating cavity 60; package 70; first end 11; second end 12; gas groove 41; first accommodating space 42; second accommodating space 43; gas hole 44; chamfer 45.

DETAILED DESCRIPTION

[0007] A heat-not-burn cartridge is provided in implementations of the present disclosure. The heat-not-burn cartridge includes a tube, a closing portion, a smoke generating portion, a cooling portion, and a filter portion. The tube has a first end and a second end opposite to the first end. The closing portion is configured to seal the first end. The smoke generating portion is accommodated in the tube and disposed adjacent to the first end. The

cooling portion is accommodated in the tube and disposed adjacent to the smoke generating portion. The filter portion is accommodated in the tube and disposed at the second end. The filter portion is spaced apart from the cooling portion to define an accommodating cavity.

[0008] In a direction from the first end to the second end, a ratio of a length $L1$ of the accommodating cavity to a length $L0$ of the tube satisfies: $30\% \leq L1/L0 \leq 35\%$.

[0009] The cooling portion defines uniformly distributed gas grooves in a periphery of the cooling portion. The gas grooves each penetrate through the cooling portion in a direction from the first end to the second end. The gas grooves each are in communication with the accommodating cavity.

[0010] The cooling portion defines a first accommodating space and a second accommodating space opposite to each other in the direction from the first end to the second end. The first accommodating space is closer to the smoke generating portion than the second accommodating space. The first accommodating space is used for accommodating the smoke generating portion. The second accommodating space is in communication with the accommodating cavity.

[0011] The cooling portion further defines a gas hole. The gas hole is in communication with the first accommodating space and the second accommodating space.

[0012] In a preset cross-sectional direction, a ratio of a sum of cross-sectional areas $S1$ of the gas grooves and a cross-sectional area $S2$ of the gas hole to a cross-sectional area $S0$ of the cooling portion satisfies: $15\% \leq (S1+S2)/S0 \leq 20\%$. The preset cross-sectional direction is perpendicular to the direction from the first end to the second end.

[0013] An outer diameter $D1$ of the cooling portion is larger than an inner diameter $D0$ of the tube. The cooling portion is in an interference fit with the tube. The cooling portion is fixed to the tube.

[0014] The cooling portion defines a chamfer at each of both ends of the cooling portion. An outer diameter of the cooling portion at the chamfer is smaller than the inner diameter of the tube.

[0015] A material of the cooling portion includes at least one of poly(ether-ether-ketone) (PEEK), polyphenylene sulfone resins (PPSU), poly(ethylene imine) (PEI), polyamide (PA), polyoxymethylene (POM), or silica gel.

[0016] The following will clearly and completely describe technical solutions of embodiments of the present disclosure with reference to the accompanying drawings. Apparently, embodiments described herein are merely some embodiments, rather than all embodiments. Based on the embodiments of the present disclosure, all other embodiments obtained by those of ordinary skill in the art without creative effort shall fall within the protection scope of the present disclosure.

[0017] The terms such as "first", "second", etc., in the specification, the claims, and the above accompanying drawings of the present disclosure are used to distinguish different objects, rather than describing a particular order.

In addition, the terms "including", "comprising", and "having" as well as variations thereof are intended to cover non-exclusive inclusion. For example, a process, method, system, product, or device including a series of steps or units is not limited to the listed steps or units, on the contrary, it can optionally include other steps or units that are not listed; alternatively, other steps or units inherent to the process, method, product, or device can be included either.

[0018] The term "embodiment" or "implementation" referred to herein means that particular features, structures, or properties described in conjunction with implementations may be defined in at least one embodiment of the present disclosure. The phrase "embodiment" or "implementation" appearing in various places in the specification does not necessarily refer to the same embodiment or an independent/alternative embodiment that is mutually exclusive with other embodiments. Those skilled in the art will understand expressly and implicitly that an embodiment described in the present disclosure may be combined with other embodiments.

[0019] A heat-not-burn cartridge 1 is provided in implementations of the present disclosure. Reference can be made to FIG. 1, FIG. 2, and FIG. 3, where FIG. 1 is a schematic structural view of a heat-not-burn cartridge provided in implementations of the present disclosure, FIG. 2 is an exploded perspective view of the heat-not-burn cartridge provided in the implementations in FIG. 1, and FIG. 3 is a schematic cross-sectional view of the heat-not-burn cartridge provided in an implementation of the implementations in FIG. 1 taken along line A-A. In the implementations, the heat-not-burn cartridge 1 includes a tube 10, a closing portion 20, a smoke generating portion 30, a cooling portion 40, and a filter portion 50. The tube 10 has a first end 11 and a second end 12 opposite to the first end 11. The closing portion 20 is configured to seal the first end 11. The smoke generating portion 30 is accommodated in the tube 10 and disposed adjacent to the first end 11. The cooling portion 40 is accommodated in the tube 10 and disposed adjacent to the smoke generating portion 30. The filter portion 50 is accommodated in the tube 10 and disposed at the second end 12. The filter portion 50 is spaced apart from the cooling portion 40 to define an accommodating cavity 60.

[0020] In this implementation, the tube 10 has an accommodating function. Specifically, the tube 10 can accommodate the smoke generating portion 30, the cooling portion 40, and the filter portion 50. The tube 10 is made of a food-graded material, which may be, but is not limited to, one or more of white cardboard paper of $50 \text{ g/m}^2 - 200 \text{ g/m}^2$ or kraft paper of $50 \text{ g/m}^2 - 200 \text{ g/m}^2$. In an implementation, the tube 10 is formed by convolutedly winding the food-graded material. Specifically, the tube 10 is formed by convolutedly winding two to three layers of the food-graded material. In another implementation, the tube 10 is formed by spirally winding the food-graded material. Specifically, the tube 10 is formed by spirally winding two to three layers of the food-graded material.

Specifically, a length $L0$ of the tube 10 satisfies: $42\text{ mm} \leq L0 \leq 46\text{ mm}$. An inner diameter $D0$ of tube 10 satisfies: $6.4\text{ mm} \leq D0 \leq 6.65\text{ mm}$. An outer diameter $D00$ of the tube 10 satisfies: $6.9\text{ mm} \leq D00 \leq 7.1\text{ mm}$. When a user uses the heat-not-burn cartridge 1, the first end 11 of the tube 10 is a far-lip end, and the second end 12 is a near-lip end.

[0021] In this implementation, the closing portion 20 is configured to seal the first end 11 of the tube 10, to prevent the smoke generating portion 30 from falling off from the first end 11. The closing portion 20 is made of a food-graded material, which may be, but is not limited to, one or more of silk tissue paper of $10\text{ g/m}^2 - 50\text{ g/m}^2$, highly air-permeable paper of $10\text{ g/m}^2 - 50\text{ g/m}^2$, or butter paper of $45\text{ g/m}^2 - 105\text{ g/m}^2$. Specifically, the food-graded material is adhered to an end surface of the tube 10 close to the first end 11 by an adhesive first, and then the food-graded material is cut along an outer contour of the tube 10 to form the closing portion 20. The closing portion 20 may be formed by cutting, but not limited to, die punching, cutter punching, laser cutting, or the like.

[0022] In this implementation, a material of the smoke generating portion 30 includes an aerosol-generating substrate (such as at least one of a smoke generating particle or a smoke generating sheet). A material of the aerosol-generating substrate includes tobacco or a non-tobacco plant herbaceous unit. When the aerosol-generating substrate includes the non-tobacco plant herbaceous unit, the aerosol-generating substrate does not produce harmful substances such as tar, nicotine, or the like. In addition, when the plant herbaceous unit is heated, the plant herbaceous unit will not burn, pollute the surrounding environment, or affect the surrounding people, thereby ensuring the physical health of people who draw the heat-not-burn cartridge 1 and the physical health of the surrounding people. Moreover, when the plant herbaceous unit in the aerosol-generating substrate includes a material of a traditional Chinese medicine (such as ginseng and gastrodia elata), the heat-not-burn cartridge 1 can have a good health care function. Furthermore, a packing length $L3$ of the smoke generating portion 30 accommodated in the tube 10 satisfies: $13\text{ mm} \leq L3 \leq 18\text{ mm}$.

[0023] In this implementation, the cooling portion 40 is accommodated in the tube 10 and disposed adjacent to the smoke generating portion 30. The cooling portion 40 is configured to lower the temperature of the aerosol produced by the smoke generating portion 30. In an implementation, the cooling portion 40 is spaced apart from the smoke generating portion 30. In another implementation, the cooling portion 40 abuts against the smoke generating portion 30.

[0024] In this implementation, the filter portion 50 is accommodated in the tube 10 and disposed at the second end 12. A material of the filter portion 50 includes a food-grade porous fluffy material, such as polylactic acid (PLA), etc. Specifically, the filter portion 50 is formed by an extrusion molding process. An outer diameter $D2$ of the filter portion 50 is larger than an inner diameter $D0$ of

the tube 10, so that the filter portion 50 is in interference fit with the tube 10, and the filter portion 50 is fixed to the second end 12. Specifically, $D2$ satisfies: $6.5\text{ mm} \leq D2 \leq 7\text{ mm}$. In addition, an end surface of the filter portion 50 away from the first end 11 is flush with an end surface of the tube 10 at the second end 12.

[0025] In addition, the filter portion 50 is spaced apart from the cooling portion 40 to define the accommodating cavity 60. The accommodating cavity 60 can accommodate aerosol produced by heating the smoke generating portion 30. The aerosol produced by heating the smoke generating portion 30 flows into the accommodating cavity 60 after being cooled by the cooling portion 40, and is gathered in the accommodating cavity 60, and finally, the aerosol is drawn by the user through the filter portion 50. Since the aerosol may be gathered in the accommodating cavity 60 to form aerosol with a certain concentration, the concentration of the aerosol passing through the filter portion 50 can be increased, that is, the concentration of the aerosol drawn by the user is increased.

[0026] In summary, the heat-not-burn cartridge 1 is provided in the implementations of the present disclosure. The heat-not-burn cartridge 1 includes the tube 10, the closing portion 20, the smoke generating portion 30, the cooling portion 40, and the filter portion 50. The tube 10 has the first end 11 and the second end 12 opposite to the first end 11. The closing portion 20 is configured to seal the first end 11. The smoke generating portion 30 is accommodated in the tube 10 and disposed adjacent to the first end 11. The cooling portion 40 is accommodated in the tube 10 and disposed adjacent to the smoke generating portion 30. The filter portion 50 is accommodated in the tube 10 and disposed at the second end 12. The filter portion 50 is spaced apart from the cooling portion 40 to define the accommodating cavity 60. The aerosol produced by heating the smoke generating portion 30 is gathered in the accommodating cavity 60, so that the aerosol with a certain concentration is formed in the accommodating cavity 60, thereby increasing the concentration of the aerosol for the user to draw. Therefore, heat-not-burn cartridge 1 in the present disclosure can increase the drawing concentration of the aerosol.

[0027] Referring to FIG. 3 again, in this implementation, in a direction from the first end 11 to the second end 12, a ratio of a length $L1$ of the accommodating cavity 60 to a length $L0$ of the tube 10 satisfies: $30\% \leq L1/L0 \leq 35\%$.

[0028] In this implementation, the accommodating cavity 60 needs to have a certain length, to provide enough space for accommodating the aerosol to increase the concentration of the aerosol. When the length $L0$ of the tube 10 is constant, the length $L1$ of the accommodating cavity 60 may affect a packing length $L2$ of the smoke generating portion 30. In other words, if the length $L1$ of the accommodating cavity 60 is too long, the packing length $L3$ of the smoke generating portion 30 may be too small, thereby affecting the smoke generating amount of the smoke generating portion 30, and reducing

the drawing experience of the heat-not-burn cartridge 1. Therefore, the accommodating cavity 60 needs to keep an appropriate length. Specifically, in the direction from the first end 11 to the second end 12, the ratio of the length $L1$ of the accommodating cavity 60 to the length $L0$ of the tube 10 satisfies: $30\% \leq L1/L0 \leq 35\%$. The accommodating cavity 60 cannot only accommodate the aerosol to improve the drawing concentration of the aerosol, but also allow sufficient space to be reserved in the tube 10 to pack the smoke generating portion 30 to ensure the smoke generating amount of the smoke generating portion 30.

[0029] Reference can be made to FIG. 4, FIG. 5, and FIG. 6, where FIG. 4 is a schematic cross-sectional view of the heat-not-burn cartridge provided in another implementation of the implementations in FIG. 1 taken along line A-A, FIG. 5 is a schematic structural view of a cooling portion in the heat-not-burn cartridge provided in the implementation in FIG. 4, and FIG. 6 is a schematic sectional view of a cooling portion in the heat-not-burn cartridge provided in the implementation in FIG. 5 taken along line B-B. In this implementation, the cooling portion 40 defines uniformly distributed gas grooves 41 in a periphery of the cooling portion 40. The gas grooves 41 each penetrate through the cooling portion 40 in a direction from the first end 11 to the second end 12. The gas grooves 41 each are in communication with the accommodating cavity 60.

[0030] In this implementation, multiple gas grooves 41 are uniformly distributed in the periphery of the cooling portion 40. The multiple gas grooves 41 can increase air permeability of the cooling portion 40, so that the aerosol produced by heating the smoke generating portion 30 can pass through the cooling portion 40 better. Specifically, the multiple gas grooves 41 and the inner wall of the tube 10 cooperatively define passages, so that the aerosol can pass through the passages. When the smoke generating portion 30 contains the granular aerosol-generating substrate, that is, smoke generating particles, an inner diameter of each gas groove 41 is smaller than an outer diameter of a single smoke generating particle, so as to prevent the smoke generating particles from falling through the gas grooves 41 into other structures in the heat-not-burn cartridge 1, thereby avoiding affecting the use of the heat-not-burn cartridge 1. Specifically, in a preset cross-sectional direction, the maximum width W of the gas groove 41 satisfies: $0.8\text{ mm} \leq W \leq 1.2\text{ mm}$, and the depth H of the gas groove 41 satisfies: $0.5\text{ mm} \leq H \leq 0.6\text{ mm}$. The preset cross-sectional direction is perpendicular to the direction from the first end 11 to the second end 12.

[0031] Reference can be made to FIG. 7, FIG. 8, and FIG. 9 together, where FIG. 7 is a schematic cross-sectional view of the heat-not-burn cartridge provided in yet another implementation of the implementations in FIG. 1 taken along line A-A, FIG. 8 is a schematic structural view of the heat-not-burn cartridge provided in the implementation in FIG. 7 in a first state, and FIG. 9 is a schematic

structural view of the heat-not-burn cartridge provided in the implementation in FIG. 7 in a second state. In this implementation, the cooling portion 40 defines a first accommodating space 42 and a second accommodating space 43 opposite to each other in the direction from the first end 11 to the second end 12. The first accommodating space 42 is closer to the smoke generating portion 30 than the second accommodating space 43. The first accommodating space 42 may be used for accommodating the smoke generating portion 30. The second accommodating space 43 is in communication with the accommodating cavity 60.

[0032] In this implementation, the first accommodating space 42 can provide sufficient space for the smoke generating portion 30 to move. If without the first accommodating space 42, when the smoke generating portion 30 is squeezed, the density of the smoke generating portion 30 is increased, so that the air gap inside the smoke generating portion 30 is reduced, thereby increasing the resistance to draw of the heat-not-burn cartridge 1 and affecting the use of the user. Specifically, when the heat-not-burn cartridge 1 is heated, the heat-not-burn cartridge 1 needs to be inserted into a smoking set, so that a heating component (e.g., a heating needle or a heating sheet) in the smoking set is inserted into the smoke generating portion 30. Since the heating component has a certain volume, the smoke generating portion 30 may be squeezed by the heating component, and the squeezed part of the smoke generating portion 30 may enter the first accommodating space 42 to partially or completely fill the first accommodating space 42, thereby avoiding the excessive resistance to draw caused by the aerosol-generating substrate being squeezed. Specifically, a volume of the first accommodating space 42 is $30\text{ mm}^3 - 35\text{ mm}^3$, so that the first accommodating space 42 provides sufficient space for the smoke generating portion 30 to move.

[0033] In this implementation, when the manufacturing of the heat-not-burn cartridge 1 is completed, the heat-not-burn cartridge 1 is in a first state (referring to FIG. 8), and the smoke generating portion 30 is completely outside the first accommodating space 42. When the heat-not-burn cartridge 1 is inserted into the smoking set, the heat-not-burn cartridge 1 is in a second state (referring to FIG. 9), and part of the smoke generating portion 30 enters the first accommodating space 42 to partially or completely fill the first accommodating space 42. It may be noted that in FIG. 9, the part of the smoke generating portion 30 enters the first accommodating space 42 and partially fills the first accommodating space 42, but the amount of the smoke generating portion 30 entering the first accommodating space 42 is not limited. It may be noted that during the manufacturing of the heat-not-burn cartridge 1, a part of the smoke generating portion 30 may enter the first accommodating space 42 due to a machining tolerance, transportation between machining procedures, or other reasons, so that the heat-not-burn cartridge 1 is also in the second state. It may be noted that

when the heat-not-burn cartridge 1 is not inserted into the smoking set, a part of the smoke generating portion 30 may enter the first accommodating space 42 due to transportation, external force collision, or other reasons, so that the heat-not-burn cartridge 1 is also in the second state. Therefore, the first state only indicates that the smoke generating portion 30 is completely outside the first accommodating space 42, and the second state only indicates that a part of the smoke generating portions 30 enters the first accommodating space 42. It can be understood that the first state and the second state do not limit a use state of the heat-not-burn.

[0034] The second accommodating space 43 may be the same as or different from the first accommodating space 42, but the second accommodating space 43 has the same function as the first accommodating space 42. That is, in another implementation, when an orientation of the cooling portion 40 is opposite to an orientation of the cooling portion 40 illustrated in FIG. 7, the second accommodating space 43 is closer to the smoke generating portion 30 than the first accommodating space 42, the smoke generating portion 30 may enter the second accommodating space 43, and the first accommodating space 42 is in communication with the accommodating cavity 60. The volume of the second accommodating space 43 is $30 \text{ mm}^3 - 35 \text{ mm}^3$.

[0035] In addition, when the first accommodating space 42 is the same as the second accommodating space 43, the thickness of the cooling portion 40 may be uniform, so as to prevent the cooling portion 40 from shrinking and deforming during manufacturing, which is beneficial to controlling the size of each part of the cooling portion 40.

[0036] Reference can be made to FIG. 10, which is a schematic cross-sectional view of the heat-not-burn cartridge provided in yet another implementation of the implementations in FIG. 1 taken along line A-A. In this implementation, the cooling portion 40 further defines a gas hole 44. The gas hole 44 is in communication with the first accommodating space 42 and the second accommodating space 43.

[0037] In this implementation, the cooling portion 40 further defines the gas hole 44, and the gas hole 44 is in communication with the first accommodating space 42 and the second accommodating space 43. The gas hole 44 can increase air permeability of the cooling portion 40, so that the aerosol produced by heating the smoke generating portion 30 can pass through the cooling portion 40 better. When the smoke generating portion 30 contains the granular aerosol-generating substrate, that is, smoke generating particles, an inner diameter of the gas hole 44 is smaller than an outer diameter of a single smoke generating particle, so as to prevent the smoke generating particles from falling through the gas hole 44 into other structures in the heat-not-burn cartridge 1, thereby avoiding affecting the use of the heat-not-burn cartridge 1. Specifically, the inner diameter $D3$ of the gas hole 44 satisfies: $0.6 \text{ mm} \leq D3 \leq 1 \text{ mm}$.

[0038] Reference can be made to FIG. 11 and FIG. 12, where FIG. 11 is a schematic structural view of a cooling portion in the heat-not-burn cartridge provided in the implementation in FIG. 10, and FIG. 12 is a schematic sectional view of the cooling portion in the heat-not-burn cartridge provided in FIG. 11 taken long line C-C. In this implementation, in a preset cross-sectional direction, a ratio of a sum of cross-sectional areas $S1$ of the gas grooves 41 and a cross-sectional area $S2$ of the gas hole 44 to a cross-sectional area $S0$ of the cooling portion 40 satisfies: $15\% \leq (S1+S2)/S0 \leq 20\%$, where the preset cross-sectional direction is perpendicular to the direction from the first end 11 to the second end 12.

[0039] In this implementation, in the preset cross-sectional direction, a cross section of each gas groove 41, a cross section of the gas hole 44, and a cross section of the cooling portion 40 are illustrated in FIG. 12. The gas groove 41 and the gas hole 44 each need to have a suitable size so that the heat-not-burn cartridge 1 has the suitable resistance to draw. If the size of each of the gas groove 41 and the gas hole 44 is too large, the resistance to draw of the heat-not-burn cartridge 1 is too small, which affects the drawing experience of the user. If the size of each of the gas groove 41 and the gas hole 44 is too small, the resistance to draw of the heat-not-burn cartridge 1 is too large, which also affects the drawing experience of the user. In addition, if the size of each of the gas groove 41 and the gas hole 44 is too small, the concentration of the aerosol in the heat-not-burn cartridge 1 for drawing may also be too low. Therefore, the gas groove 41 and the gas hole 44 each need to have a suitable size. Specifically, in the preset cross-sectional direction, the ratio of the sum of the cross-sectional areas $S1$ of the gas grooves 41 and the cross-sectional area $S2$ of the gas hole 44 to the cross-sectional area $S0$ of the cooling portion 40 satisfies: $15\% \leq (S1+S2)/S0 \leq 20\%$, where the preset cross-sectional direction is perpendicular to the direction from the first end 11 to the second end 12. $S1$ is the sum of cross-sectional areas of all the gas grooves 41 in the preset cross-sectional direction.

[0040] Referring to FIG. 1 again, and reference can be made to FIG. 13, which is a schematic structural cross-sectional view of the cooling portion in the heat-not-burn cartridge provided in the implementation in FIG. 10. In this implementation, an outer diameter $D1$ of the cooling portion 40 is larger than an inner diameter $D0$ of the tube 10, so that the cooling portion 40 is in interference fit with the tube 10, and the cooling portion 40 is fixed to the tube 10.

[0041] In this implementation, the outer diameter $D1$ of the cooling portion 40 is larger than the inner diameter $D0$ of the tube 10, so that the cooling portion 40 is in interference fit with the tube 10, and the cooling portion 40 can be fixed to the tube 10. Therefore, the cooling portion 40 can be disposed in the tube 10 at a preset position of the tube 10 and keep a relative position unchanged, so as to support the tube 10. Specifically, the outer diameter $D1$ of the cooling portion 40 satisfies: $6.5 \text{ mm} \leq D1 \leq 6.8 \text{ mm}$.

The inner diameter $D0$ of the tube 10 satisfies: $6.4 \text{ mm} \leq D0 \leq 6.65 \text{ mm}$.

[0042] Referring to FIG. 1 and FIG. 13 again, in this implementation, the cooling portion 40 defines a chamfer 45 at each of both ends of the cooling portion 40. An outer diameter of the cooling portion 40 at the chamfer 45 is smaller than the inner diameter of the tube 10.

[0043] In this implementation, both ends of the cooling portion 40 each define the chamfer 45, so that the outer diameter of the cooling portion 40 at the chamfer 45 is smaller than the inner diameter of the tube 10. When the cooling portion 40 is packed into the tube 10, the chamfer 45 can play a role of guiding and assisting the packing. If the cooling portion 40 has no chamfer 45, or if the outer diameter of the cooling portion 40 at the chamfer 45 is larger than or equal to the inner diameter of the tube 10, the cooling portion 40 may squeeze the second end 12 when the cooling portion 40 is packed into the tube 10, thereby damaging the tube 10. Therefore, the outer diameter of the cooling portion 40 at the chamfer 45 is smaller than the inner diameter of the tube 10, so that the damage to the second end 12 of the tube 10 can be avoided when the cooling portion 40 is packed into the tube 10. Specifically, a length $L4$ of the chamfer 45 in a radial direction of the cooling portion 40 satisfies: $0.6 \text{ mm} \leq L4 \leq 1 \text{ mm}$. An angle of the chamfer 45 is not limited, such as 30° , 45° , 60° , 75° , etc.

[0044] Referring to FIG. 1 and FIG. 13 again, in this implementation, the length $L2$ of the cooling portion 40 is larger than the outer diameter $D1$ of the cooling portion 40.

[0045] In this implementation, the length $L2$ of the cooling portion 40 is larger than the outer diameter $D1$ of the cooling portion 40, so as to facilitate recognition of a packing direction of the cooling portion 40 before the cooling portion 40 is packed into the tube 10. For example, if the length $L2$ of the cooling portion 40 is smaller than or equal to the outer diameter $D1$ of the cooling portion 40, when the cooling portion 40 is conveyed, it may be difficult to control a length direction of the cooling portion 40 to be consistent with a conveyance direction of the cooling portion 40, or it may be necessary to additionally provide a direction recognition mechanism to recognize a direction of the cooling portion 40. As a result, the manufacturing efficiency of the heat-not-burn cartridge 1 is reduced, the packing of the cooling portion 40 is easy to make a mistake, and specifically, both ends of the cooling portion 40 face an inner wall of the tube 10 when the cooling portion 40 is packed into the tube 10. Therefore, the length $L2$ of the cooling portion 40 needs to be larger than the outer diameter $D1$ of the cooling portion 40. Specifically, $L2$ satisfies: $8 \text{ mm} \leq L2 \leq 10 \text{ mm}$, and $D1$ satisfies: $6.5 \text{ mm} \leq D1 \leq 6.8 \text{ mm}$.

[0046] In addition, in an implementation, a material of the cooling portion 40 includes at least one of poly(ether-ether-ketone) (PEEK), polyphenylene sulfone resins (PPSU), poly(ethylene imine) (PEI), polyamide (PA), polyoxymethylene (POM), or silica gel.

[0047] In this implementation, the material of the cooling portion 40 is food-grade plastic, food-grade silica gel, or the like, and has a good heat resistance effect. Specifically, the cooling portion 40 has a heat resistance temperature of $270^\circ - 400^\circ$. When the aerosol produced by heating the smoke generating portion 30 passes through the cooling portion 40, the cooling portion 40 can absorb the heat of the aerosol, thereby achieving a good cooling effect. Specifically, the material of the cooling portion 40 may be, but is not limited to, one or more of PEEK, PPSU, PEI, PA, POM, or silica gel. When the cooling portion 40 is made of a material such as plastic, the cooling portion 40 is manufactured by an injection molding process. When the cooling portion 40 is made of a material such as silica gel, the cooling portion 40 is manufactured by a hot-press molding process.

[0048] Reference can be made to FIG. 14, FIG. 15, FIG. 16, and FIG. 17, where FIG. 14 is a schematic structural view of a heat-not-burn cartridge provided in another implementation of the present disclosure, FIG. 15 is an exploded schematic perspective view of the heat-not-burn cartridge provided in the implementation in FIG. 14, FIG. 16 is a schematic cross-sectional view of the heat-not-burn cartridge provided in the implementation in FIG. 14 taken along line D-D, and FIG. 17 is a partial enlarged schematic view of the heat-not-burn cartridge provided in the implementation in FIG. 16 at circle I. In this implementation, the heat-not-burn cartridge 1 includes a tube 10, a closing portion 20, a smoke generating portion 30, a cooling portion 40, and a filter portion 50. The tube 10 has a first end 11 and a second end 12 opposite to the first end 11. The closing portion 20 is configured to seal the first end 11. The smoke generating portion 30 is accommodated in the tube 10 and disposed adjacent to the first end 11. The cooling portion 40 is accommodated in the tube 10 and disposed adjacent to the smoke generating portion 30. The filter portion 50 is accommodated in the tube 10 and disposed at the second end 12. The filter portion 50 is spaced apart from the cooling portion 40 to define an accommodating cavity 60. In addition, in this implementation, the heat-not-burn cartridge 1 further includes a package 70. The package 70 surrounds the tube 10, and both ends of the package 70 are flush with both ends of the tube 10, respectively.

[0049] In this implementation, the package 70 can surround the tube 10 and hide dirt, lines made by spiral wound, or the like on an outer surface of the tube 10. Specifically, a material of the package 70 is tipping paper, which may be but is not limited to tipping paper of $32 \text{ g/m}^2 - 40 \text{ g/m}^2$. In addition, the package 70 may surround the tube 10 in a convolute-wound manner, so that an end surface of one end of the package 70 is flush with a surface of the closing portion 20 away from the first end 11, and an end surface of the other end of the package 70 is flush with a surface of the tube 10 at the second end 12. Specifically, a length $L5$ of the package 70 satisfies: $42 \text{ mm} \leq L5 \leq 46 \text{ mm}$, and an outer diameter $D4$ of the package 70 satisfies: $7.15 \text{ mm} \leq D4 \leq 7.3 \text{ mm}$.

[0050] Although embodiments of the present disclosure have been illustrated and described above, it can be understood that the above embodiments are exemplary and cannot be understood as limitations to the present disclosure. Those of ordinary skill in the art can change, amend, replace, and modify the above embodiments within the scope of the present disclosure, and these modifications and improvements are also regarded as the protection scope of the present disclosure.

Claims

1. A heat-not-burn cartridge comprising:

a tube having a first end and a second end opposite to the first end;
a closing portion configured to seal the first end;
a smoke generating portion accommodated in the tube and disposed adjacent to the first end;
a cooling portion accommodated in the tube and disposed adjacent to the smoke generating portion; and
a filter portion accommodated in the tube and disposed at the second end, wherein the filter portion is spaced apart from the cooling portion to define an accommodating cavity.

2. The heat-not-burn cartridge of claim 1, wherein in a direction from the first end to the second end, a ratio of a length $L1$ of the accommodating cavity to a length $L0$ of the tube satisfies: $30\% \leq L1/L0 \leq 35\%$.

3. The heat-not-burn cartridge of claim 1, wherein the cooling portion defines uniformly distributed gas grooves in a periphery of the cooling portion, the gas grooves each penetrate through the cooling portion in a direction from the first end to the second end, and the gas grooves each are in communication with the accommodating cavity.

4. The heat-not-burn cartridge of claim 3, wherein the cooling portion defines a first accommodating space and a second accommodating space opposite to each other in the direction from the first end to the second end, the first accommodating space is closer to the smoke generating portion than the second accommodating space, the first accommodating space is used for accommodating the smoke generating portion, and the second accommodating space is in communication with the accommodating cavity.

5. The heat-not-burn cartridge of claim 4, wherein the cooling portion further defines a gas hole, and the gas hole is in communication with the first accommodating space and the second accommodating space.

6. The heat-not-burn cartridge of claim 5, wherein in a preset cross-sectional direction, a ratio of a sum of cross-sectional areas $S1$ of the gas grooves and a cross-sectional area $S2$ of the gas hole to a cross-sectional area $S0$ of the cooling portion satisfies: $15\% \leq (S1+S2)/S0 \leq 20\%$, wherein the preset cross-sectional direction is perpendicular to the direction from the first end to the second end.

7. The heat-not-burn cartridge of claim 5, wherein an outer diameter $D1$ of the cooling portion is larger than an inner diameter $D0$ of the tube, the cooling portion is in an interference fit with the tube, and the cooling portion is fixed to the tube.

8. The heat-not-burn cartridge of claim 7, wherein the cooling portion defines a chamfer at each of both ends of the cooling portion, and an outer diameter of the cooling portion at the chamfer is smaller than the inner diameter of the tube.

9. The heat-not-burn cartridge of claim 7, wherein a length $L2$ of the cooling portion is larger than the outer diameter $D1$ of the cooling portion.

10. The heat-not-burn cartridge of any one of claims 1 to 9, wherein a material of the cooling portion comprises at least one of poly(ether-ether-ketone) (PEEK), polyphenylene sulfone resins (PPSU), poly(ethylene imine) (PEI), polyamide (PA), polyoxymethylene (POM), or silica gel.

11. The heat-not-burn cartridge of claim 1, wherein a material of the tube comprises one or more of white cardboard paper of 50 g/m^2 - 200 g/m^2 or kraft paper of 50 g/m^2 - 200 g/m^2 .

12. The heat-not-burn cartridge of claim 1, wherein a length $L0$ of the tube satisfies: $42 \text{ mm} \leq L0 \leq 46 \text{ mm}$.

13. The heat-not-burn cartridge of claim 1, wherein an inner diameter $D0$ of the tube satisfies: $6.4 \text{ mm} \leq D0 \leq 6.65 \text{ mm}$, and an outer diameter $D00$ of the tube satisfies: $6.9 \text{ mm} \leq D00 \leq 7.1 \text{ mm}$.

14. The heat-not-burn cartridge of claim 1, wherein a material of the closing portion comprises one or more of silk tissue paper of 10 g/m^2 - 50 g/m^2 , highly air-permeable paper of 10 g/m^2 - 50 g/m^2 , or butter paper of 45 g/m^2 - 105 g/m^2 .

15. The heat-not-burn cartridge of claim 1, wherein a material of the smoke generating portion comprises an aerosol-generating substrate.

16. The heat-not-burn cartridge of claim 1, wherein a packing length $L3$ of the smoke generating portion accommodated in the tube satisfies: $13 \text{ mm} \leq L3 \leq 18$

mm.

17. The heat-not-burn cartridge of claim 1, wherein the cooling portion is spaced apart from the smoke generating portion. 5
18. The heat-not-burn cartridge of claim 1, wherein the cooling portion abuts against the smoke generating portion. 10
19. The heat-not-burn cartridge of claim 1, wherein a material the filter portion comprises a food-grade porous fluffy material.
20. The heat-not-burn cartridge of claim 1, wherein an outer diameter of the filter portion is larger than an inner diameter of the tube. 15

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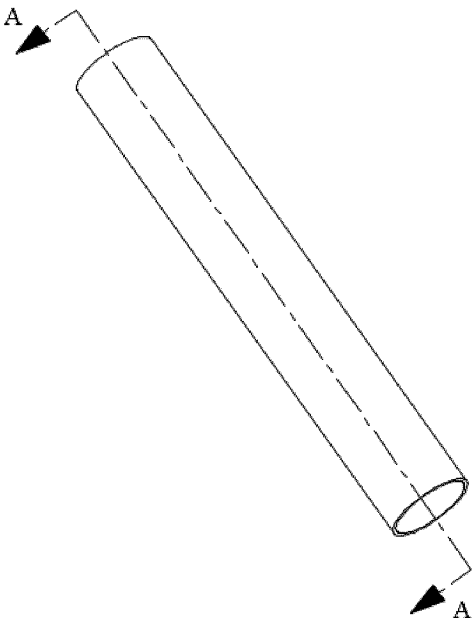


FIG. 1

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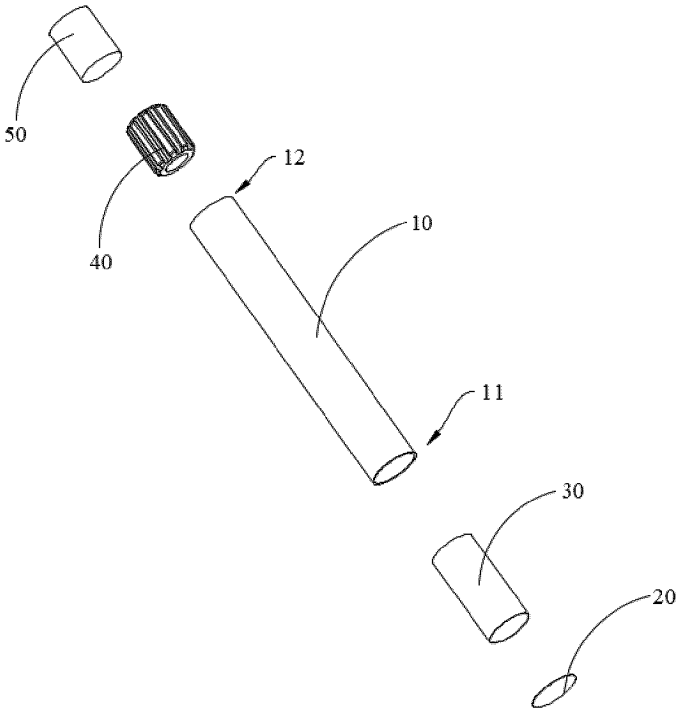


FIG. 2

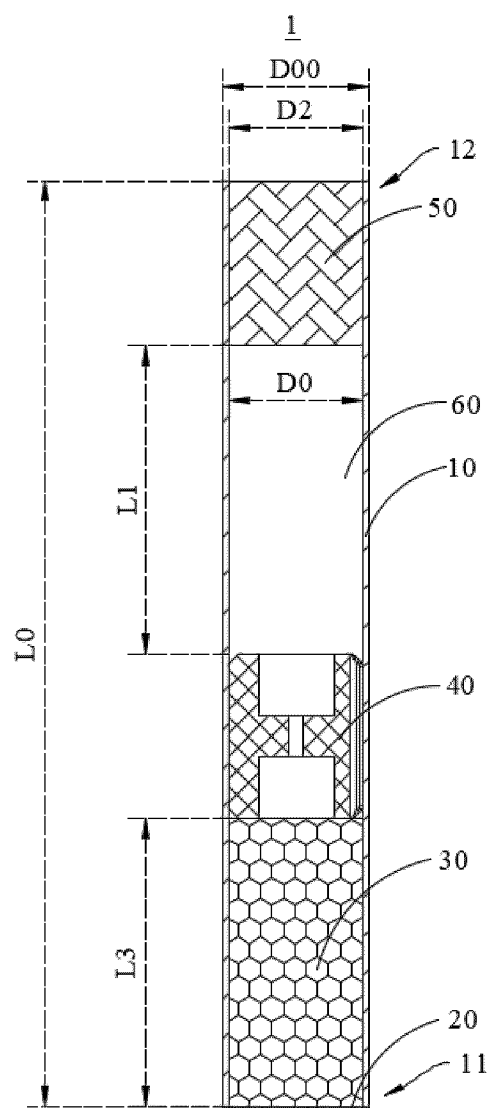


FIG. 3

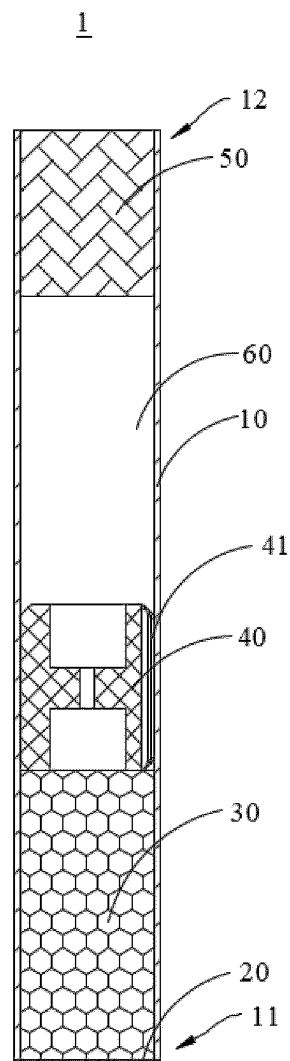


FIG. 4

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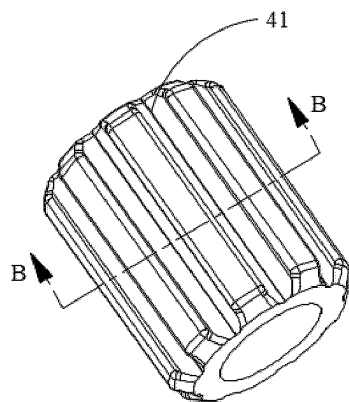


FIG. 5

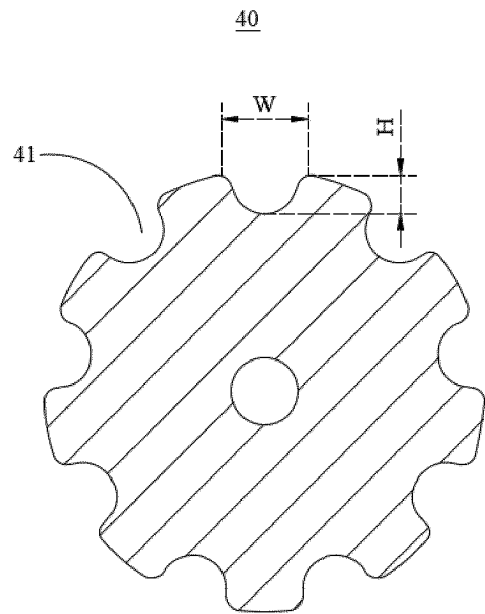


FIG. 6

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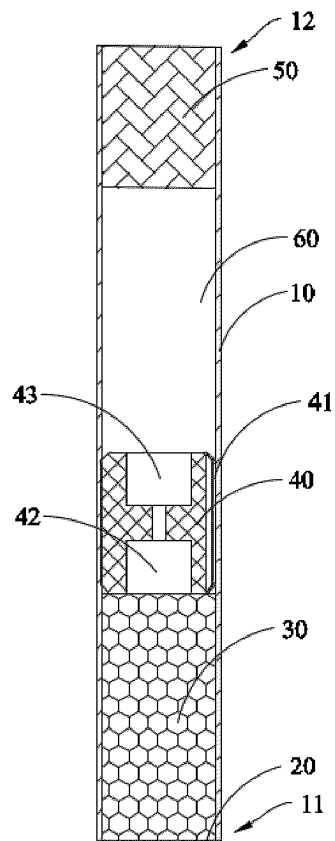


FIG. 7

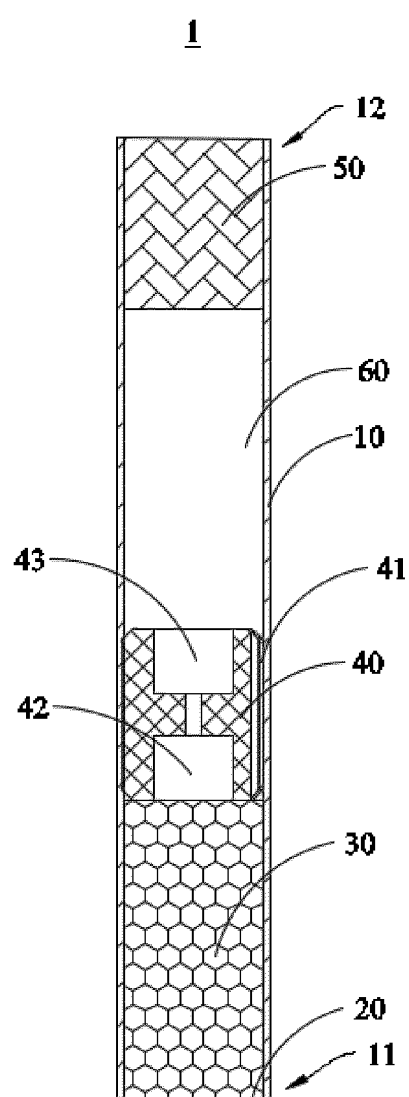


FIG. 8

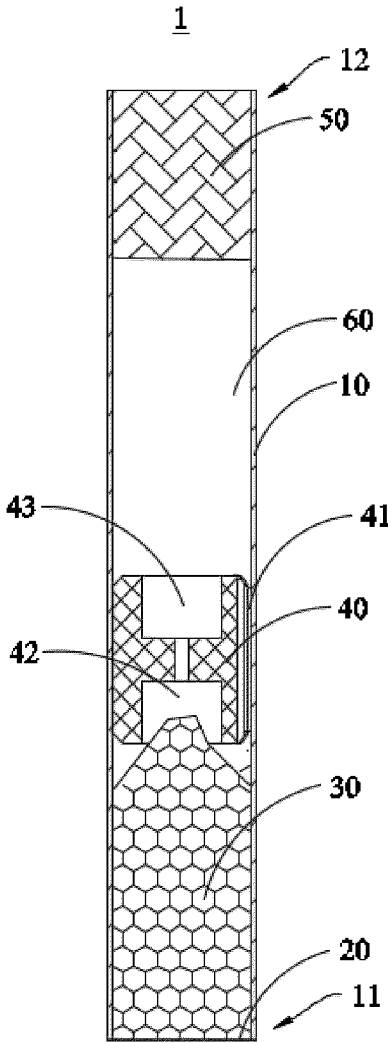


FIG. 9

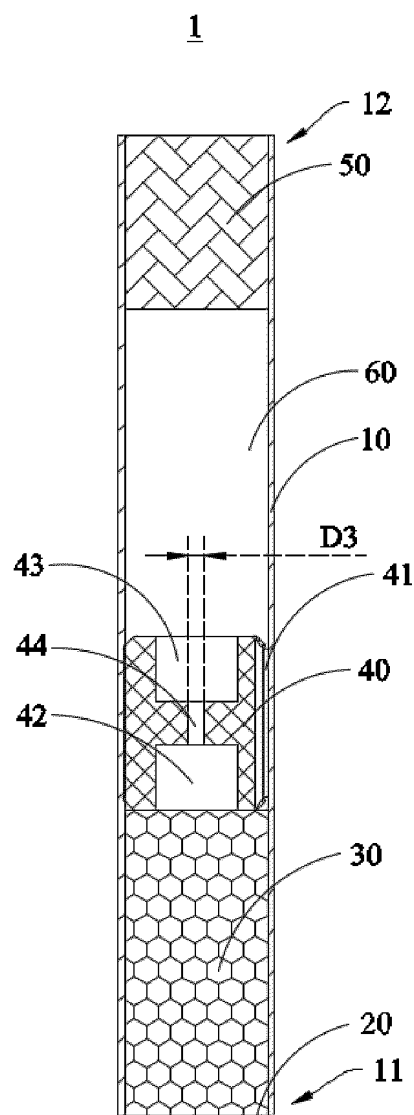


FIG. 10

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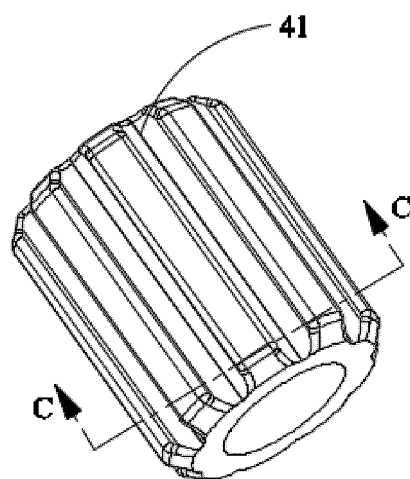


FIG. 11

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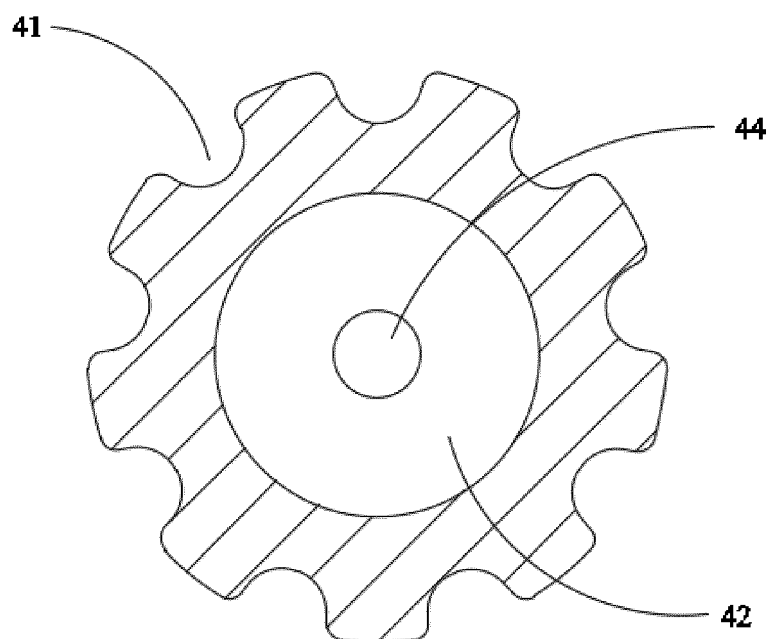


FIG. 12

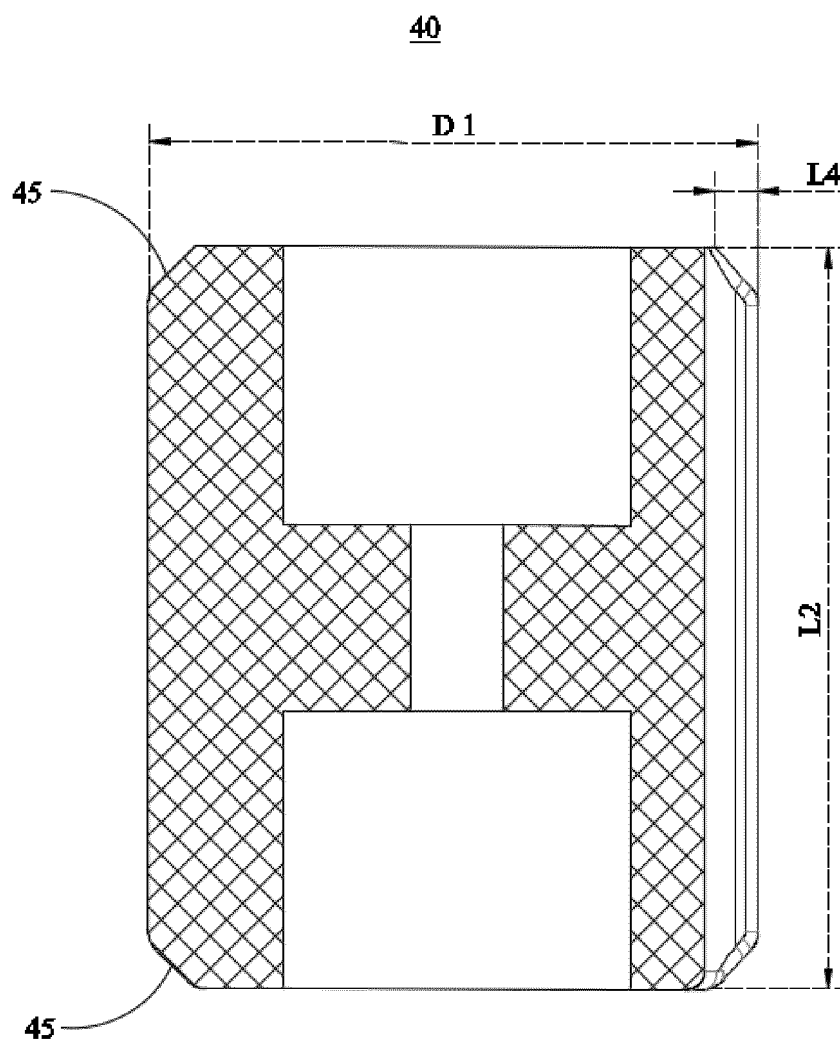


FIG. 13

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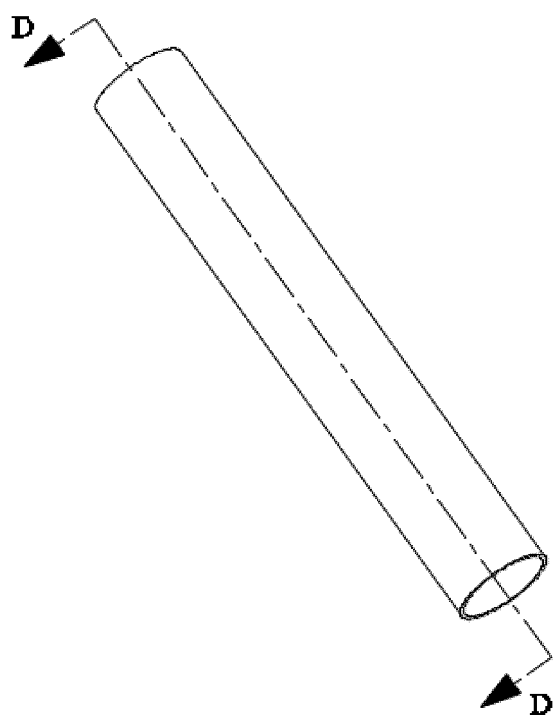


FIG. 14

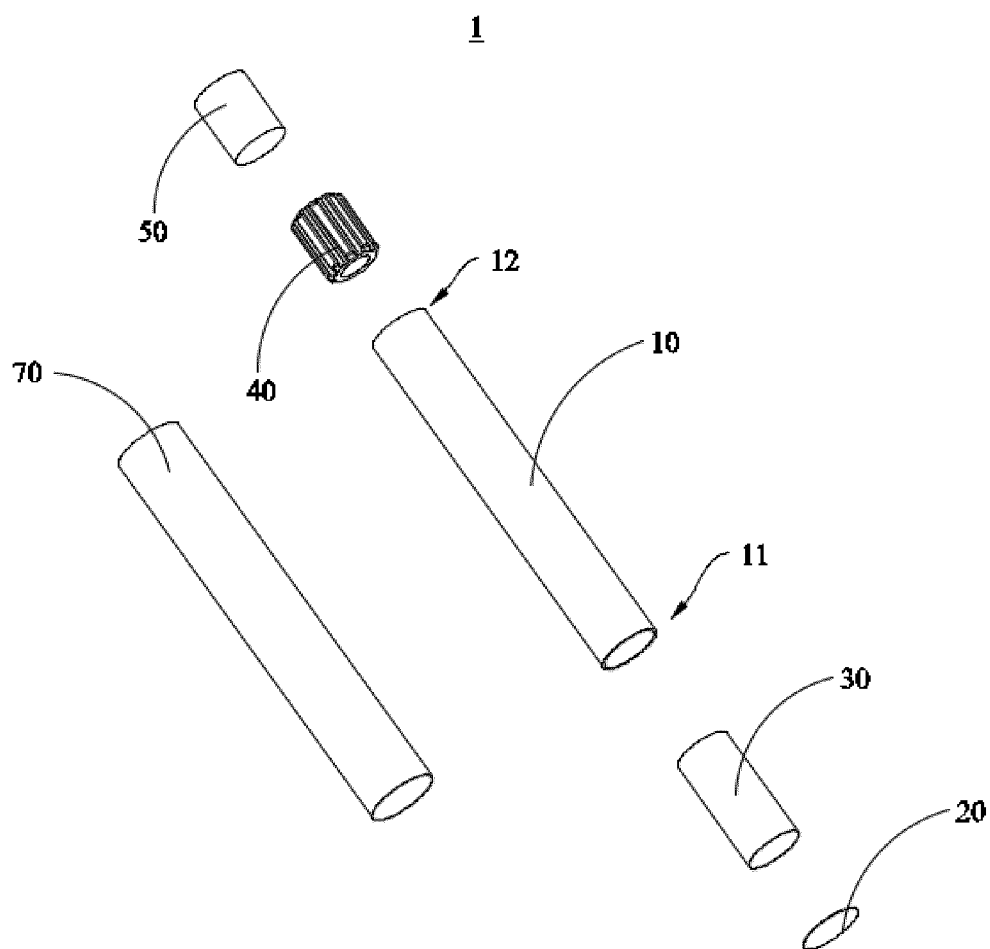


FIG. 15

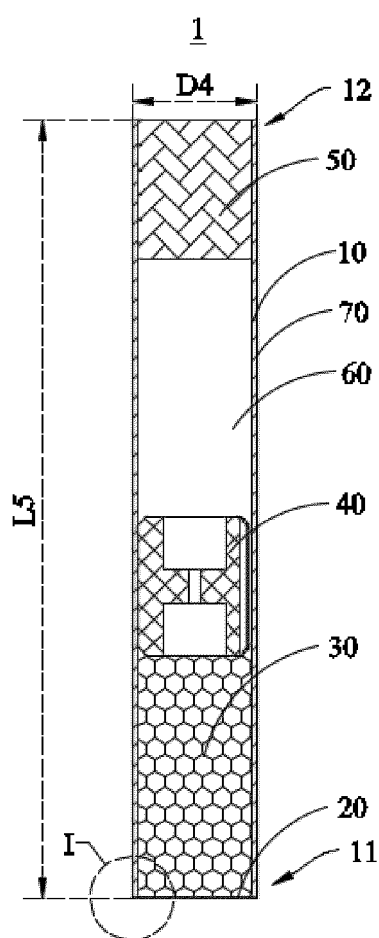


FIG. 16

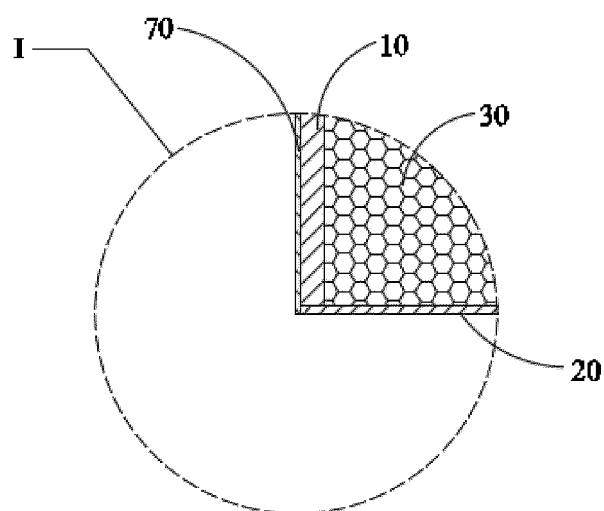


FIG. 17

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2022/095321

A. CLASSIFICATION OF SUBJECT MATTER

A24F 40/57(2020.01)i; A24F 40/40(2020.01)i; A24D 1/20(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)

A24F; A24D

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

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

CNABS, CNTXT, CNKI, DWPI, SIPOABS, TWABS, JPABS, USTXT; 乐智有限公司, 杨荣, 气溶胶, 烟, 降温, 冷却, 凹, 孔, 槽, 过滤, 发烟, 腔, 封, aerosol, cigarette, seal+, cavity, cool+, hole, pore, recess, filter+

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	CN 113925230 A (SHENZHEN WOODY VAPES TECHNOLOGY CO., LTD.) 14 January 2022 (2022-01-14) specific embodiments	1-20
X	CN 112438426 A (YUNNAN CIGOO TECHNOLOGY CO., LTD.) 05 March 2021 (2021-03-05) description, paragraphs 7-15, embodiment 3, and figure 15	1-20
X	CN 111802698 A (YUNNAN CIGOO TECHNOLOGY CO., LTD.) 23 October 2020 (2020-10-23) embodiment 6, and figure 6	1-20
X	CN 112956755 A (HENGXINWEIYE TECHNOLOGY (DONGGUAN) CO., LTD.) 15 June 2021 (2021-06-15) description, paragraphs 38-49, and figures 3-4	1-20
A	WO 2020100876 A1 (JAPAN TOBACCO INC.) 22 May 2020 (2020-05-22) entire document	1-20

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

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

Date of the actual completion of the international search

03 December 2022

Date of mailing of the international search report

16 December 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

Authorized officer

Facsimile No. (86-10)62019451

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2022/095321

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2022/095321

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		WO 2022016714 A1	27 January 2022
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		TW 202025920 A	16 July 2020
CN 107927913 A	20 April 2018	None	

Form PCT/ISA/210 (patent family annex) (January 2015)

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