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(54) ATOMIZER AND ELECTRONIC CIGARETTE COMPRISING THE SAME

(57) An atomizer includes an outer glass tube, a heating element, and an inner glass tube. The inner glass tube is disposed in and is integrated with the outer glass tube; the inner wall of the outer glass tube and the outer wall of the inner glass tube form a cavity for accommodating e-liquid. The heating element is disposed in the outer glass tube and below the inner glass tube and the cavity; and when in use, the heating element atomizes the e-liquid to produce vapor flowing from the inner glass tube to the outer glass tube for inhaling by a user.

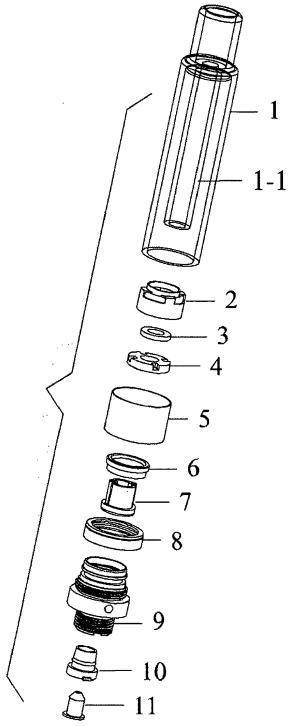

FIG. 1

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Description

[0001] The disclosure relates to an atomizer and an electronic cigarette comprising the same.

[0002] Conventional atomizers have complex e-liquid storage structure and air/vapor channel, and the materials of the components are costly. In addition, the components of the atomizers that are in contact with the e-liquid are metal. After a period of use, the metal may be corroded by the e-liquid and thus the quality of the e-liquid is adversely affected.

[0003] The disclosure provides an atomizer comprising an outer glass tube, a heating element, and an inner glass tube; the inner glass tube is disposed in and is integrated with the outer glass tube; an inner wall of the outer glass tube and an outer wall of the inner glass tube form a cavity for accommodating e-liquid; the heating element is disposed in the outer glass tube and below the inner glass tube and the cavity; and when in use, the heating element atomizes the e-liquid to produce vapor flowing from the inner glass tube to the outer glass tube for inhaling by a user.

[0004] In a class of this embodiment, the heating element is in the shape of a hollow round cake, and an edge of an upper surface of the round cake is provided with a plurality of grooves as air outlets.

[0005] In a class of this embodiment, one end of the outer glass tube is provided with a fixing sleeve; the fixing sleeve comprises at least one notch; the heating element is disposed in the fixing sleeve and the plurality of grooves is partially covered by the fixing sleeve; the plurality of grooves is below the at least one notch; and the cavity for accommodating e-liquid is above the at least one notch.

[0006] In a class of this embodiment, the atomizer further comprises a first silica ring; the first silica ring is hollow and disposed between the heating element and a bottom end of the inner glass tube; a central hollow part of the first silica ring, a central hollow part of the heating element and the inner glass tube communicates with one another to function as an air passage.

[0007] In a class of this embodiment, the atomizer further comprises a leak-proof ring disposed in the fixing sleeve and below the heating element to fix and support the heating element.

[0008] In a class of this embodiment, the atomizer further comprises a fixed ring and a base; the fixed ring is screwed on the base to support the outer glass tube; a bottom end of the outer glass tube and the fixing sleeve are both disposed on the base.

[0009] In a class of this embodiment, the base comprises a plurality of air inlets.

[0010] The disclosure also provides an electronic cigarette comprising the aforesaid atomizer and a battery assembly.

[0011] The following advantages are associated with the atomizer and an electronic cigarette comprising the same of the disclosure:

1. The atomizer comprises an outer glass tube and an inner glass tube. The inner wall of the outer glass tube and the outer wall of the inner glass tube form a cavity for accommodating e-liquid, and the hollow part of the inner glass tube functions as an air passage, thus solving the problem of conventional atomizers having complex e-liquid storage structure and air/vapor channel.

2. The heating element is in the shape of a hollow round cake, and the heating wire is horizontally bent and coiled back and forth, which has a large heating area and can produce large amount of smoke/vapor.

3. The guiding and sealing structures, the e-liquid storage structure, and the air passages of the atomizer are made of glass, which is environmentally friendly and healthy.

FIG. 1 is an exploded view of an atomizer according to one embodiment of the disclosure;

FIG. 2 is a perspective view of an atomizer according to one embodiment of the disclosure;

FIG. 3 is a sectional view of an atomizer according to one embodiment of the disclosure; and

FIG. 4 shows an air flow direction of an atomizer according to one embodiment of the disclosure.

[0012] To further illustrate, embodiments detailing an atomizer and an electronic cigarette comprising the same are described below. It should be noted that the following embodiments are intended to describe and not to limit the disclosure.

[0013] As shown in FIGS. 1-3, an atomizer comprises an outer glass tube 1, an inner glass tube 1-1, a fixing sleeve 2, a first silica ring 3, a heating element 4, a decorative ring 5, a leak-proof ring 6, a second silica ring 7, a fixed ring 8, a base 9, an insulation ring 10, and an electrode 11. The inner wall of the outer glass tube 1 and the outer wall of the inner glass tube 1-1 form a cavity for accommodating e-liquid. The inner glass tube 1-1 functions as a duct for discharging air and vapor. The first silica ring 3 is hollow and disposed on the heating element 4 to seal the bottom end of the inner glass tube 1-1. The fixing sleeve 2 comprises a heating chamber and the heating element 4 is disposed in the heating chamber. One end of the fixing sleeve 2 comprises an e-liquid inlet. One end of the e-liquid inlet communicates with the cavity for accommodating e-liquid, the other end faces the heating element 4. The leak-proof ring 6 is disposed in the heating chamber of the fixing sleeve. The upper end of the leak-proof ring 6 abuts against the heating element 4 to fix and support the heating element 4. The outer peripheral wall of the leak-proof ring 6 abuts against the inner wall of the heating chamber to prevent

the vapor and e-liquid exuded from the outer peripheral wall of the heating element from flowing out along the peripheral wall of the heating chamber. The fixing sleeve 2 is fixed in the bottom opening of the outer glass tube 1 and the bottom end of the inner glass tube 1-1 is in contact with the first silica ring 3. The second silica ring 7 is disposed in the base 9 for preventing the leakage of air and e-liquid. The fixed ring 8 is screwed on the base 9 to support the outer glass tube 1. The decorative ring 5 is disposed around the fixed ring 8 to fix the outer glass tube 1. The lower end of the outer glass tube 1 is disposed in the decorative ring 5 and the bottom end of the outer glass tube 1 is supported by the fixed ring 8. The fixing sleeve 2 is disposed in the top opening of the base 9. The insulation ring 10 is disposed in the bottom opening of the base 9 to separate the positive and negative pins of the heating element 4 to prevent short circuit. The electrode 11 is disposed in the insulation ring 10 to fix the positive pin of the heating element 4 for electric conduction.

[0014] FIG. 4 shows the flow direction of the e-liquid and air of the atomizer. Specifically, the e-liquid flows into the heating element 4 via the opening of the fixing sleeve 2 and is atomized by the heating element. The air flows into the base 9 via the air inlet on the outer wall of the bottom part of the base, flows through the hollow center of the second silica ring 7 and drives the vapor produced by the heating element 4 to flow through the first silica ring 3 and enter the inner glass tube 1-1, and then flows to the outer glass tube 1 for inhaling by a user.

[0015] Optionally, the base 9 comprises an air regulation ring provided with the air inlet. The opening size of the air inlet is adjustable by rotating the air regulation ring thereby adjusting the amount of the produced vapor. The material of the inner and outer glass tubes can be replaced by ceramics, quartz, mica, jade, and the like. The resistance of the heating element is arbitrary. The heating element is a metal or a metal alloy. The heating element 4 can be in an arbitrary shape, and the periphery thereof can be wrapped with cotton, and the number of the air inlet on the base 9 is more than one in any shape.

Claims

1. An atomizer, comprising an outer glass tube, a heating element, and an inner glass tube; wherein the inner glass tube is disposed in and is integrated with the outer glass tube; an inner wall of the outer glass tube and an outer wall of the inner glass tube form a cavity for accommodating e-liquid; the heating element is disposed in the outer glass tube and below the inner glass tube and the cavity; and when in use, the heating element atomizes the e-liquid to produce vapor flowing from the inner glass tube to the outer glass tube for inhaling by a user.

2. The atomizer of claim 1, wherein the heating element is in the shape of a hollow round cake, and an edge of an upper surface of the round cake is provided with a plurality of grooves as air outlets.

3. The atomizer of claim 2, wherein one end of the outer glass tube is provided with a fixing sleeve; the fixing sleeve comprises at least one notch; the heating element is disposed in the fixing sleeve and the plurality of grooves is partially covered by the fixing sleeve; the plurality of grooves is below the at least one notch; and the cavity for accommodating e-liquid is above the at least one notch.

4. The atomizer of claim 1, wherein the atomizer further comprises a first silica ring; the first silica ring is hollow and disposed between the heating element and a bottom end of the inner glass tube; a central hollow part of the first silica ring, a central hollow part of the heating element and the inner glass tube communicates with one another to function as an air passage.

5. The atomizer of claim 3, wherein the atomizer further comprises a leak-proof ring disposed in the fixing sleeve and below the heating element to fix and support the heating element.

6. The atomizer of claim 3, wherein the atomizer further comprises a fixed ring and a base; the fixed ring is screwed on the base to support the outer glass tube; a bottom end of the outer glass tube and the fixing sleeve are both disposed on the base.

7. The atomizer of claim 6, wherein the base comprises a plurality of air inlets.

8. An electronic cigarette, comprising the atomizer of any one of claims 1-7 and a battery assembly.

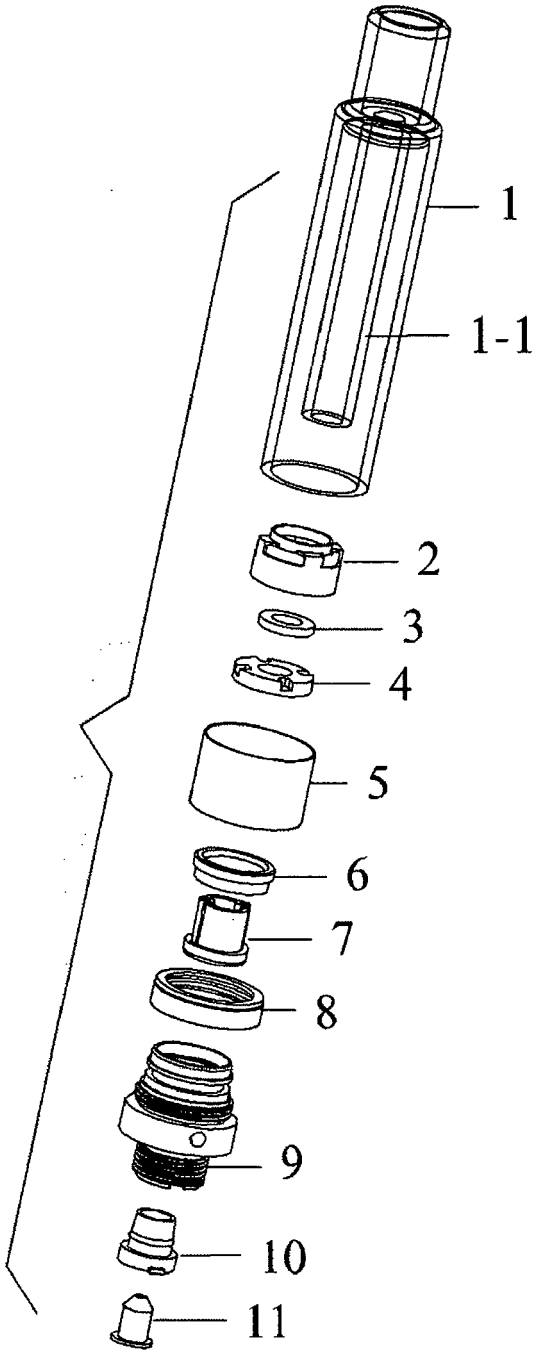

FIG. 1

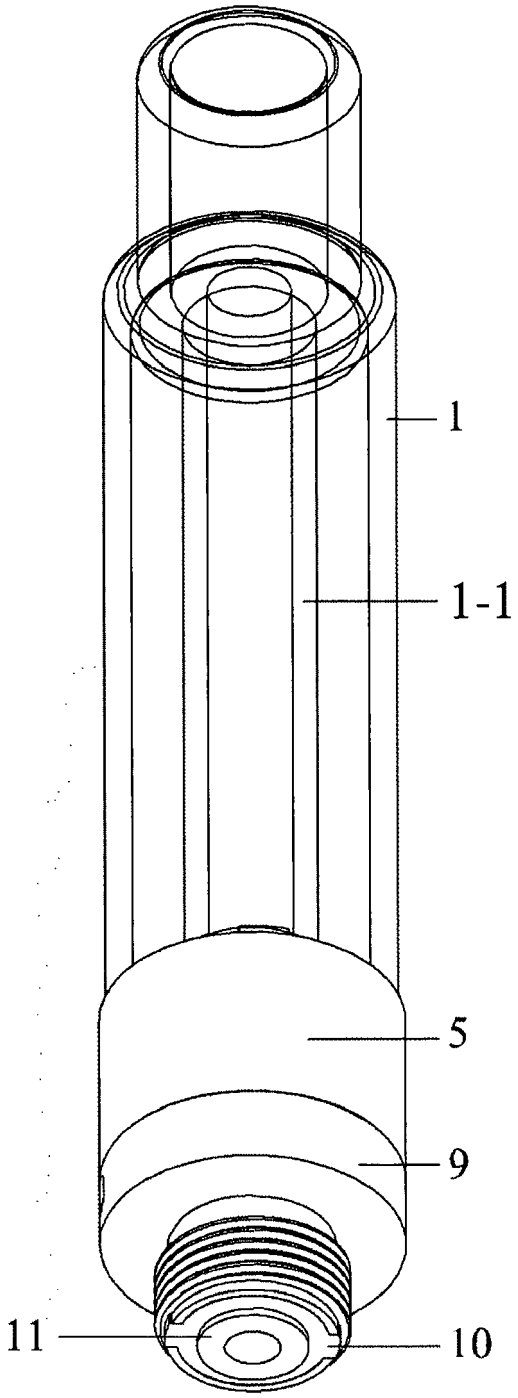

FIG. 2

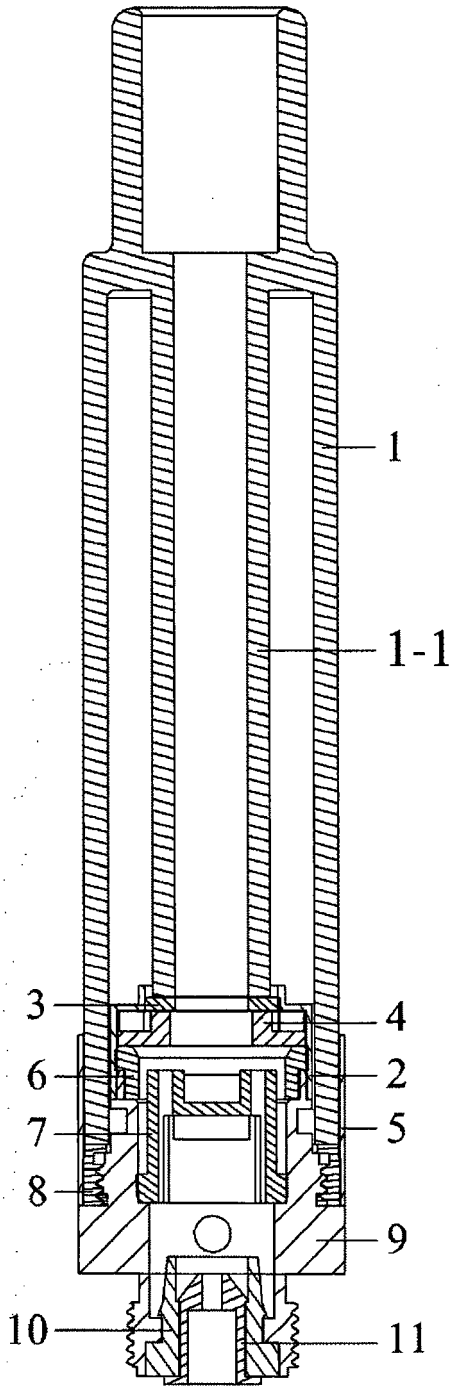

FIG. 3

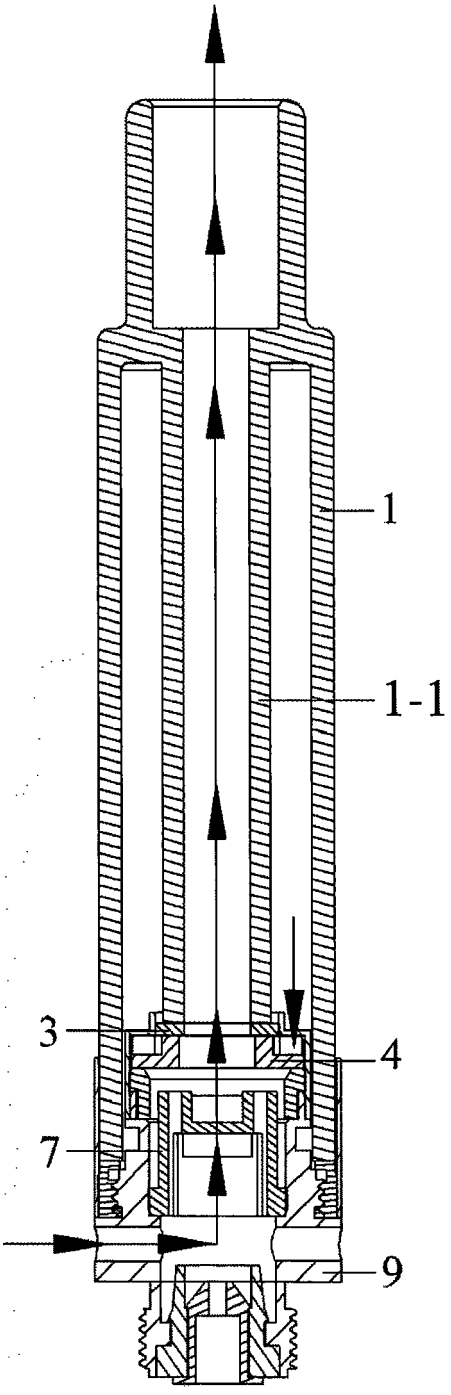

FIG. 4

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EUROPEAN SEARCH REPORT

Application Number
EP 21 00 0337

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	CN 112 189 900 A (SHENZHEN YIJIATE TECH CO LTD) 8 January 2021 (2021-01-08)	1,4,8	INV. A24F40/40
A	* paragraphs [0010] - [0012], [0018] * * figures 1-5a *	2,3,5-7	A24F40/46
X	CN 112 120 294 A (DONGGUAN MOKE TECH CO LTD) 25 December 2020 (2020-12-25)	1	
A	* paragraph [0042]; figures 1-15 *	2,3,5-7	
X	US 2020/085108 A1 (LI GUANGHUI [CN] ET AL) 19 March 2020 (2020-03-19)	1,4,8	
A	* abstract * * figures 1-19 *	2,3,5-7	
A	US 10 375 997 B2 (SHENZHEN FIRST UNION TECH CO [CN]) 13 August 2019 (2019-08-13) * abstract * * figures 1-5 *	1-8	

TECHNICAL FIELDS SEARCHED (IPC)

A24F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	27 April 2022	Cabrele, Silvio

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 21 00 0337

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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