(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 4 265 131 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
25.10.2023 Bulletin 2023/43

(21) Application number: **21905713.0**

(22) Date of filing: **14.12.2021**

(51) International Patent Classification (IPC):
A24F 1/30 *(2006.01)*

(52) Cooperative Patent Classification (CPC):
A24F 1/30

(86) International application number:
PCT/CN2021/137898

(87) International publication number:
WO 2022/127784 (23.06.2022 Gazette 2022/25)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
KH MA MD TN

(30) Priority: **15.12.2020 CN 202011471675**
15.12.2020 CN 202023007971 U
02.02.2021 CN 202110143124
02.02.2021 CN 202120294195 U

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(54) **SMOKE GENERATING AND FILTERING DEVICE, AND E-HOOKAH**

(57) A smoke generating and filtering device (100) and an e-hookah (1000), which are applicable to the technical field of electronic cigarettes. The smoke generating and filtering device (100) comprises a heating assembly (10) and a water filtering assembly (20), wherein the heating assembly (10) is used for heating tobacco materials to generate smoke and delivering the smoke; the water filtering assembly (20) is used for performing water filtering for the smoke generated by the heating assembly (10); the water filtering assembly (20) comprises a first end (211) and a second end (212) arranged opposite each other; the heating assembly (10) is detachably connected to the first end (211), and the second end (212) is provided with a vaping portion (213) for a user to inhale the smoke. The smoke generating and filtering device (100) is convenient for the user to hold by hand for vaping and cleaning, and has good water dissolving effect for harmful substances in the smoke.

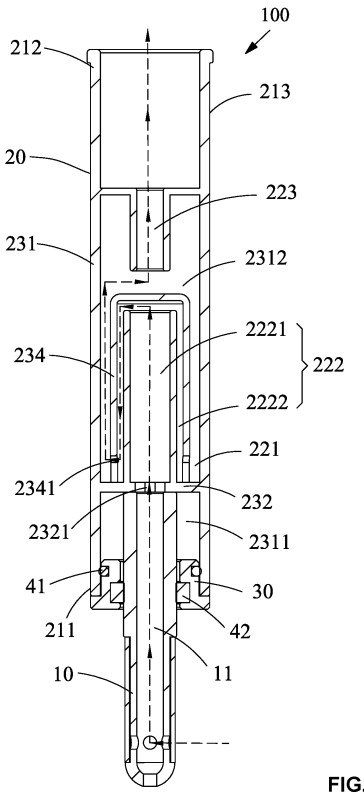

FIG. 2

EP 4 265 131 A1

Description

[0001] The disclosure relates to the field of electronic cigarettes, and more particularly, to a smoke generation and filtration device, and a hookah comprising the same.

[0002] A conventional hookah includes a smoke generation and filtration device. The smoke generation and filtration device typically includes a heating component and a smoke filtration component. The smoke filtration component is configured to filter out the toxins from the smoke. The heating component heats the tobacco material to generate smoke. The smoke is then passed through the smoke filtration component, discharged to a contact part, and ultimately inhaled by users.

[0003] In the conventional smoke generation and filtration devices, the heating component are usually located on the side or top of the smoke filtration component, resulting in excessive lateral dimensions of the smoke generation and filtration device. This is inconvenient for users in holding the smoke generation and filtering component while smoking. Moreover, the smoke enters the smoke filtration device from the side or top, leading to insufficient dissolution of harmful substances in the water.

[0004] Furthermore, the conventional hookahs are typically integrally formed, making it difficult to clean the smoke generation and filtration device. During smoking, the smoke generation and filtration device cannot be detached from the main body of the hookah, resulting in inconvenience in terms of usability and portability. Moreover, replacing individual components is also inconvenient.

[0005] To solve the aforesaid problems, the first objective of the disclosure is to provide a smoke generation and filtration device, to solve the technical problems of inconvenient handheld state and poor effectiveness in dissolving harmful substances in water of existing smoke generation and filtration devices.

[0006] A second objective of the disclosure is to provide a hookah.

[0007] The smoke generation and filtration device comprises:

a heating component, configured to heat the tobacco material to generate smoke;

a smoke filtration component, configured to filter toxins out from the generated smoke that passes through the water; the smoke filtration component comprises a first end and a second end opposite to the first end; the heating component is detachably connected to the first end, and the second end comprises a contact part through which a user inhales the smoke.

[0008] In a class of this embodiment, the smoke filtration component comprises a smoke filtration chamber, a first smoke guide channel, and a second smoke guide channel;

one end of the first smoke guide channel is connected to the heating component, and the other end of the first smoke guide channel is connected to the smoke filtration chamber; and

one end of the second smoke guide channel is connected to the smoke filtration chamber, and the other end of the second smoke guide channel is connected to the contact part.

[0009] In a class of this embodiment, the first smoke guide channel comprises a first smoke inlet channel and a reflux channel;

the reflux channel is disposed between and connected to both the first smoke inlet channel and the smoke filtration chamber; the first smoke inlet channel is connected to the heating component; the first smoke inlet channel, the reflux channel, and the smoke filtration chamber are sequentially disposed from inside to outside in the smoke filtration component; and

the generated smoke flows out of the heating component, passes through the first smoke inlet channel and the reflux channel, sequentially, and enters the smoke filtration chamber for smoke filtration.

[0010] In a class of this embodiment, the smoke filtration component comprises an outer tube and an isolation plate; the isolation plate comprises a first communication hole; and

the isolation plate is radially connected to the inner wall of the outer tube, to separate the inner cavity of the outer tube into a first cavity and a second cavity; the heating component is disposed inside the first cavity and extends out of the first cavity; the smoke filtration chamber, the first smoke guide channel, and the second smoke guide channel are disposed in the second cavity; and the heating component is connected to the first smoke guide channel via the first communication hole.

[0011] In a class of this embodiment, the smoke filtration component comprises glass, quartz or crystal.

[0012] In a class of this embodiment, the heating component comprises a second smoke inlet channel connected to the smoke filtration component; the generated smoke flows through the second smoke inlet channel and enters the smoke filtration component.

[0013] In a class of this embodiment, the heating component comprises a heating body and a metal heating unit;

the heating body comprises a first smoke guiding chamber and a second communication hole; the first smoke guiding chamber is connected to the external environment via the second communication hole; and the first smoke guiding chamber communicates

with the second smoke inlet channel;

the metal heating unit is disposed around the heating body; or, the heating body further comprises a sidewall enclosing the first smoke guiding chamber, and the metal heating unit is embedded in the sidewall.

[0014] In a class of this embodiment, the heating body comprises a connecting portion and a heating portion connected to the connecting portion; and
the connecting portion is detachably connected to the first end of the smoke filtration component; the heating portion extends outward from the connecting portion and is away from the second end of the smoke filtration component; the heating portion is disposed in an induction coil disposed outside the smoke generation and filtration device; and both the metal heating unit and the second communication hole are disposed on the heating portion.

[0015] In a class of this embodiment, the heating body comprises glass, quartz, agate, or crystal.

[0016] In a class of this embodiment, the heating component comprises a connecting pipe and a metal container for holding the tobacco material; the metal container is detachably connected to the connecting pipe and is disposed inside the induction coil; the induction coil is independent from the smoke generation and filtration device; and
the connecting pipe comprises an inner cavity communicating with the second smoke inlet channel; the metal container comprises a third communication hole; and the inner cavity of the connecting pipe communicates with the external environment via the third communication hole.

[0017] In a class of this embodiment, the heating component comprises a metal heating body; the metal heating body comprises a second smoke guiding chamber and a fourth communication hole; the second smoke guiding chamber communicates with the external environment via the fourth communication hole; and the second smoke guiding chamber communicates with the second smoke inlet channel;
one end of the metal heating body is detachably connected to the first end of the smoke filtration component, and the other end of the metal heating body is disposed in the induction coil; the induction coil is independent from the smoke generation and filtration device; and the fourth communication hole is disposed at the other end of the metal heating body.

[0018] In a class of this embodiment, the one end of the metal heating body is closer to the smoke filtration component and comprises a notch for shielding electromagnetic interference; the heating component further comprises a ceramic insulating member with a hollow cavity; the ceramic insulating member is disposed in the second smoke guiding chamber; the second smoke guiding chamber comprises a chamber wall, and the ceramic insulating member is attached to the chamber wall to prevent the smoke from escaping through the notch.

[0019] In a class of this embodiment, the smoke generation and filtration device further comprises a connecting member disposed between the smoke filtration component and the heating component.

[0020] The second objective of the disclosure is to provide a hookah.

[0021] The hookah comprises:

the smoke generation and filtration device, and;

a heater;

the smoke generation and filtration device is detachably disposed in the heater; and the heater is configured to heat the heating component.

[0022] In a class of this embodiment, the heater comprises:

a housing, comprising a first chamber and a second chamber;

a power supply, disposed in the first chamber; and

the induction coil, electrically connected to the power supply and disposed in the second chamber;

the smoke generation and filtration device is disposed inside the second chamber, and the induction coil is disposed around the heating component.

[0023] In the disclosed smoke generation and filtration device and the hookah, the smoke filtration component comprises the first end and the second end opposite to the first end; the heating component is detachably connected to the first end, and the second end functions as the contact part through which a user inhales the smoke. The heating component and the contact part are disposed at both ends of the smoke filtration component, enabling users to comfortably hold and smoke. The generated smoke flows through the first end and encounters the water in the smoke filtration component, allowing harmful substances to dissolve in the water. The heating component is detachably connected to the smoke filtration component, enabling convenient and separate cleaning of each component after a period of use.

[0024] To provide a clearer explanation of the embodiments of the disclosure or the technical solutions in the prior art, a brief introduction will be given to the accompanying drawings associated with the embodiments. It is evident that the accompanying drawings in the following description are only some examples of the disclosure. For ordinary skill in the art, other accompanying drawings can be obtained based on the structures shown in these drawings without any creative effort.

FIG. **1** is an exploded view of a smoke generation and filtration device according to Example **1** of the

disclosure;

FIG. **2** is a cross sectional view of a smoke generation and filtration device according to Example **1** of the disclosure;

FIG. **3** is a cross sectional view of a smoke filtration component according to Example **1** of the disclosure;

FIG. **4** is an exploded view of a heating component according to Example **1** of the disclosure;

FIG. **5** is a cross sectional view of a heating component according to Example **1** of the disclosure;

FIG. **6** is a perspective view of a hookah according to Example **1** of the disclosure;

FIG. **7** is a cross sectional view of a hookah according to Example **1** of the disclosure;

FIG. **8** is a cross sectional view of a heating component according to Example **2** of the disclosure;

FIG. **9** is a cross sectional view of a smoke generation and filtration device according to Example **2** of the disclosure;

FIG. **10** is a cross sectional view of another smoke generation and filtration device according to Example **2** of the disclosure;

FIG. **11** is a cross sectional view of a heating component according to Example **3** of the disclosure;

FIG. **12** is a cross sectional view of a smoke generation and filtration device according to Example **3** of the disclosure;

FIG. **13** is an exploded view of a heating component according to Example **4** of the disclosure;

FIG. **14** is a cross sectional view of a heating component according to Example **4** of the disclosure;

FIG. **15** is a cross sectional view of a smoke generation and filtration device according to Example **4** of the disclosure;

FIG. **16** is a perspective view of a hookah according to Example **4** of the disclosure;

FIG. **17** is a cross sectional view of a hookah according to Example **4** of the disclosure; and

FIG. **18** is a perspective view of a heater according to Example **4** of the disclosure.

[0025] In the drawings, the following reference numbers are used: **1000.** Hookah; **100.** Smoke generation and filtration device; **10.** Heating component; **11.** Second smoke inlet channel; **12.** Heating body; **121.** First smoke guiding chamber; **122.** Second communication hole; **123.** Installation groove; **124.** Connecting portion; **125.** Heating portion; **13.** Metal heating unit; **14.** Connecting pipe; **15.** Metal container; **151.** Third communication hole; **16.** Metal heating body; **161.** Second smoke guiding chamber; **162.** Fourth communication hole; **163.** Notch; **17.** Ceramic insulating member; **20.** Smoke filtration component; **211.** First end; **212.** Second end; **213.** Contact part; **221.** Smoke filtration chamber; **222.** First smoke guide channel; **2221.** First smoke inlet channel; **2222.** Reflux channel; **223.** Second smoke guide channel; **231.** Outer tube; **2311.** First cavity; **2312.** Second cavity; **232.** Isolation plate; **2321.** First communication hole; **233.** Inner tube; **234.** Reflux tube; **2341.** First passage hole; **235.** Closure plate; **236.** First smoke outlet tube; **237.** Mouthpiece; **2371.** Main body; **2372.** Second smoke outlet tube; **238.** Third smoke outlet tube; **2381.** Second passage hole; **30.** Connecting member; **41.** First seal member; **42.** Second seal member; **200.** Heater; **201.** Housing; **2011.** First chamber; **2012.** Second chamber; **202.** Power supply; and **203.** Induction coil.

[0026] To further illustrate the disclosure, embodiments detailing a smoke generation and filtration device and a hookah of the disclosure are described below. It should be noted that the following embodiments are intended to describe and not to limit the disclosure.

[0027] It should be noted that all directional indications (such as up, down, left, right, front, rear...) in the embodiments of the disclosure are only used to explain the relative position relationship, motion situation, etc. between components in a specific posture. If the specific posture changes, the directional indication also changes accordingly.

[0028] It should also be noted that when a component is referred to as "fixed to" or "disposed on" another component, it can be directly on the other component or there may be a centering component at the same time. When a component is referred to as "connecting" to another component, it can be directly connected to another component or there may be both centering components present.

[0029] In addition, the description of "first", "second", etc. in the disclosure is only for descriptive purposes and cannot be understood as indicating or implying their relative importance or implying the number of indicated technical features. Therefore, features limited to "first" and "second" can explicitly or implicitly include at least one of these features. In addition, the technical solutions between various embodiments can be combined with each other, but must be based on the ability of ordinary technical personnel in the art to achieve them. When the combination of technical solutions conflicts or cannot be achieved, it should be considered that the combination of such technical solutions does not exist and is not within

the scope of protection required by the disclosure.

[0030] The dashed lines with arrows in the figures indicate the direction of smoke flow.

Example 1

[0031] Referring to FIGS. **1** and **2**, the disclosure provides a smoke generation and filtration device **100.** The smoke generation and filtration device comprises a heating component **10** and a smoke filtration component **20.** Water is added to the smoke filtration component **20.** The heating component **10** heats the tobacco material to generate smoke. The smoke is then passed through the smoke filtration component **20**, so that the toxins are filtered out from the smoke that passes through the water. The smoke filtration component **20** comprises a first end **211** and a second end **212** opposite to the first end. The heating component **10** is detachably connected to the first end **211**, and the second end **212** comprises a contact part **213** through which a user inhales the smoke.

[0032] Specifically, the heating component **10** and the contact part **213** are disposed at both ends of the smoke filtration component **20.** In use, the contact part **213** and the heating component **10** are respectively disposed at the upper and lower ends of the smoke filtration component **20**, enabling users to comfortably hold and smoke. The generated smoke flows through the lower end of the smoke filtration component **20** and encounters the water in the smoke filtration component **20**, allowing harmful substances to dissolve in the water. Therefore, the water effectively filters out the toxins from the smoke. Additionally, the heating component **10** is detachably connected to the smoke filtration component **20**, enabling convenient and separate cleaning of each component after a period of use.

[0033] Referring to FIGS. **2** and **3**, the smoke filtration component **20** comprises a smoke filtration chamber **221**, a first smoke guide channel **222**, and a second smoke guide channel **223.** One end of the first smoke guide channel **222** is connected to the heating component **10**, and the other end of the first smoke guide channel **222** is connected to the smoke filtration chamber **221.** Similarly, one end of the second smoke guide channel **223** is connected to the smoke filtration chamber **221**, and the other end of the second smoke guide channel **223** is connected to the contact part **213.** In use, the heating component **10** heats the tobacco material to generate smoke. The generated smoke flows out of the heating component **10**, passes through the first smoke guide channel **222**, and enters the smoke filtration chamber **221** for smoke filtration. Then the smoke enters the second smoke guide channel **223** and is finally released from the contact part **213** for user inhalation.

[0034] Referring to FIGS. **2** and **3**, the first smoke guide channel **222** comprises a first smoke inlet channel **2221** and a reflux channel **2222.** The reflux channel **2222** is disposed between and connected to both the first smoke inlet channel **2221** and the smoke filtration chamber **221.** The first smoke inlet channel **2221** is connected to the heating component **10.** The first smoke inlet channel **2221**, the reflux channel **2222**, and the smoke filtration chamber **221** are sequentially disposed from inside to outside in the smoke filtration component, with the innermost layer being the first smoke inlet channel **2221.** The generated smoke flows out of the heating component **10**, passes through the first smoke inlet channel **2221** and the reflux channel **2222**, sequentially, and enters the smoke filtration chamber **221** for smoke filtration.

[0035] Referring to FIGS. **2** and **3**, the smoke filtration component **20** comprises an outer tube **231** and an isolation plate **232.** The isolation plate **232** comprises a first communication hole **2321.** The isolation plate **232** is radially connected to the inner wall of the outer tube **231**, so as to separate the inner cavity of the outer tube **231** into a first cavity **2311** and a second cavity **2312.** The heating component **10** is disposed inside the first cavity **2311** and extends out of the first cavity **2311.** The smoke filtration chamber **221**, the first smoke guide channel **222**, and the second smoke guide channel **223** are disposed in the second cavity **2312.** The heating component **10** is connected to the first smoke guide channel **222** via the first communication hole **2321.** In use, the first cavity **2311** is disposed at the lower end of the outer tube **231**, and the second cavity **2312** is disposed at the upper end of the outer tube **231**, so that the heating component **10** is disposed inside the lower end of the outer tube **231.** The second smoke guide channel **223** is disposed in the second cavity **2312** and is connected to the contact part **213**, so that the contact part **213** is disposed at the upper end of the outer tube **231.**

[0036] Referring to FIG. **3**, the smoke filtration component **20** further comprises an inner tube **233** and a reflux tube **234.** The reflux tube **234** is disposed around the inner tube **233.** Both the inner tube **233** and the reflux tube **234** are disposed in the outer tube **231.** The reflux tube **234** is disposed between the inner tube **233** and the outer tube **231.** One end of the reflux tube **234** and one end of the inner tube **233** are both connected to the isolation plate **232.** The other end of the reflux tube **234** is connected to a closure plate **235.** A gap is formed between the other end of the reflux tube **234** and the other end of the inner tube **233.** The inner cavity of the inner tube **233** functions as the first smoke inlet channel **2221** and communicates with the first communication hole **2321.** The gap between the inner tube **233** and the reflux tube **234** functions as the reflux channel **2222.** The one end of the reflux tube **234** is near the isolation plate **232** and comprises a through hole functioning as a first passage hole **2341.** The reflux channel **2222** is connected to the smoke filtration chamber **221** via the first passage hole **2341.**

[0037] Referring to FIGS. **2** and **3**, the smoke filtration component **20** further comprises a first smoke outlet tube **236** having a smaller diameter than the outer diameter of the outer tube **231.** The first smoke outlet tube **236** is disposed in the second cavity **2312.** One end of the first

smoke outlet tube **236** is connected to the inner wall of the outer tube **231**, and the other end of the first smoke outlet tube **236** extends towards the first cavity **2311** and is spaced apart from the closure plate **235.** The inner cavity of the first smoke outlet tube **236** functions as the second smoke guide channel **223.** One end of the outer tube **231** is away from the heating component **10** and functions as the contact part **213.**

[0038] In an alternative preferred embodiment, the smoke filtration component **20** comprises glass, allowing for observation of the water level in the smoke filtration chamber **221**; as the generated smoke passes through the smoke filtration component **20**, no odors are produced, because glass is an environmentally friendly material and easy to clean. In an alternative embodiment, the smoke filtration component **20** comprises quartz or crystal.

[0039] Referring to FIG. **2**, the heating component **10** comprises a second smoke inlet channel **11** connected to the smoke filtration component **20.** The generated smoke flows through the second smoke inlet channel **11** and enters the smoke filtration component **20.** In use, the second smoke inlet channel **11** is connected to the first smoke inlet channel **2221** through the first communication hole **2321.**

[0040] Refer to FIGS. **2**, **4** and **5**, the heating component **10** comprises a heating body **12** and a metal heating unit **13.** The heating body **12** comprises a first smoke guiding chamber **121** and a second communication hole **122.** The first smoke guiding chamber **121** is connected to the external environment via the second communication hole **122.** The first smoke guiding chamber **121** communicates with the second smoke inlet channel **11.** The metal heating unit **13** is disposed around the heating body **12.** When the heating component **10** is disposed in an induction coil, the induction coil is independent from the smoke generation and filtration device **100.** The metal heating unit **13** heats up through the magnetic induction in the magnetic field generated by the induction coil. In use, the metal heating unit **13** comprises stainless steel, which is easy to shape, cost-effective, and has excellent heating efficiency.

[0041] In an alternative preferred embodiment, the outer surface of the heating body **12** is concave, forming an installation groove **123.** The metal heating unit **13** is disposed in the installation groove **123**, ensuring a smoother outer surface of the heating component **10.**

[0042] Referring to FIGS. **2** and **5**, the heating body **12** comprises a connecting portion **124** and a heating portion **125** connected to the connecting portion **124.** The connecting portion **124** is detachably connected to the first end **211** of the smoke filtration component **20.** The heating portion **125** extends outward from the connecting portion **124** and is away from the second end **212** of the smoke filtration component **20.** The heating portion **125** is disposed in the induction coil. The induction coil is independent from the smoke generation and filtration device **100.** Both the metal heating unit **13** and the second communication hole **122** are disposed on the heating portion **125.** In use, the connecting portion **124** is disposed inside the first cavity **2311** and connected to the isolation plate **232**; and the heating portion **125** extends outside the first cavity **2311,** facilitating its placement within the induction coil.

[0043] In use, the heating component **10** is powered to produce heat and is inserted into the tobacco material. The tobacco material is then heated to generate smoke. The smoke passes through the second communication hole **122**, the second smoke inlet channel **11**, the first communication hole **2321,** the first smoke inlet channel **2221,** the reflux channel **2222** and the smoke filtration chamber **221**, sequentially, and then flows through the second smoke guide channel **223**, ultimately reaching the contact part **213** for the user to inhale.

[0044] In an alternative preferred embodiment, the heating body **12** comprises glass and thus is resistant to high temperatures. As the generated smoke passes through the heating body **12**, no odors are produced, because glass is an environmentally friendly material and easy to clean. In an alternative embodiment, the heating body **12** comprises quartz, agate, or crystal.

[0045] Referring to FIGS. **1** and **2**, the smoke generation and filtration device **100** further comprises a connecting member **30** disposed between the smoke filtration component **20** and the heating component **10.** In this example, the smoke generation and filtration device **100** further comprises a first seal member **41** and a second seal member **42.** The first seal member **41** is disposed between the outer tube **231** and the connecting member **30**, and the second seal member **42** is disposed between the heating component **10** and the connecting member **30.**

[0046] Referring to FIGS. **2**, **6**, and **7**, the disclosure further provides a hookah **1000.** The hookah comprises the smoke generation and filtration device **100** and a heater **200.** The smoke generation and filtration device **100** is detachably disposed in the heater **200.** The heater is used to heat the heating component **10.** The smoke generation and filtration device **100** provides convenience for users to hold, smoke, clean, and effectively dissolve harmful substances in the water. Additionally, in the hookah **1000,** the smoke generation and filtration device **100** is detachably disposed in the heater **200**, allowing for easy removal from the heater **200.** While smoking, only the smoke generation and filtration device **100** is held for inhalation, resulting in a lightweight, easy to handle, and convenient portable experience. Furthermore, a malfunctioned smoke generation and filtration device **100** can be replaced without the need to replace the entire hookah **1000.**

[0047] Referring to FIGS. **2**, **6**, and **7**, the heater **200** comprises a housing **201**, a power supply **202**, and the induction coil **203.** The housing **201** comprises a first chamber **2011** and a second chamber **2012.** The power supply **202** is disposed in the first chamber **2011**, and the induction coil **203** is electrically connected to the pow-

er supply **202** and disposed in the second chamber **2012.** The smoke generation and filtration device **100** is disposed inside the second chamber **2012**, and the induction coil **203** is disposed around the heating component **10.**

[0048] In use, the power supply **202** supplies power to the induction coil **203.** The heating component **10** heats up through the magnetic induction in the magnetic field generated by the induction coil **203.** The smoke generation and filtration device **100** is removed from the second chamber **2012** and inserted into the tobacco material. The tobacco material is heated to produce smoke. During smoking, the smoke passes through the second communication hole **122**, the second smoke inlet channel **11**, the first smoke inlet channel **2221**, the reflux channel **2222** and the smoke filtration chamber **221**, sequentially, and then flows through the second smoke guide channel **223**, ultimately reaching the contact part **213** for the user to inhale.

[0049] In the example, the power supply **202** is detachably disposed in the first chamber **2011**, allowing for easy replacement when the battery is depleted.

Example 2

[0050] A second example of the smoke generation and filtration device is illustrated in FIGS. **5** and **8.** It is similar to Example **1**, except for the following specific differences: and in Example **1**, the metal heating unit **13** is disposed around the heating body **12**; in this example, the heating body **12** further comprises a sidewall enclosing the first smoke guiding chamber **121**; the metal heating unit **13** is embedded in the sidewall.

[0051] Referring to FIGS. **8** and **9**, in this example, the heating component **10** comprises the heating body **12** and the metal heating unit **13.** The metal heating unit **13** is disposed in the cavity wall of the heating body **12**, forming the first smoke guiding chamber **121.** Specifically, the heating body **12** is a tubular structure comprising an upper through hole and a lower through hole. The first smoke guiding chamber **121** communicates with the first communication hole **2321** via the upper through hole, and the lower through hole functions as the second communication hole **122.** Additionally, referring to FIG. **10**, the heating body **12** is a hollow cylindrical structure comprising a bottom wall. The second communication hole **122** is disposed on the bottom wall of the heating body **12.**

[0052] Referring to FIG. **9**, the contact part **213** in the example is different from Example **1.** Specifically, the smoke filtration component **20** further comprises a mouthpiece **237** disposed at one end of the outer tube **231** and away from the heating component **10.** The mouthpiece **237** comprises a main body **2371** and a second smoke outlet tube **2372.** The main body **2371** is connected to the wall of the outer tube **231.** The second smoke outlet tube **2372** extends from the main body **2371** into the second cavity **2312** and is spaced apart from the closure plate **235.** The inner cavity of the second smoke outlet tube **2372** functions as the second smoke guide channel **223.** The main body **2371** functions as the contact part **213.**

[0053] In addition to the above differences, the smoke generation and filtration device **100**, water pipe **1000,** and their associated components provided in this embodiment can be optimized based on Embodiment **1.**

Example 3

[0054] A third example of the smoke generation and filtration device is illustrated in FIGS. **8** and **11.** It is similar to Example **2**, except for the following specific differences: in Example **2**, the heating component **10** comprises a heating body **12** and a metal heating element **13**; and in this example, the heating component **10** comprises a connecting pipe **14** and a metal container **15** for holding the tobacco material.

[0055] Referring to FIGS. **11** and **12**, the metal container **15** is detachably connected to the connecting pipe **14** and is disposed inside the induction coil **203.** The inner cavity of the connecting pipe **14** communicates with the second smoke inlet channel **11.** The metal container **15** comprises a third communication hole **151.** The inner cavity of the connecting pipe **14** communicates with the external environment via the third communication hole **151.**

[0056] In use, the power supply **202** provides power to the induction coil **203**, causing the metal container **15** to heat up through the magnetic induction in the magnetic field generated by the induction coil **203.** The smoke generation and filtration device **100** is removed from the second chamber **2012,** and the tobacco material is heated by the metal container **15** to generate smoke. During smoking, the smoke passes through the third communication hole **151**, the second smoke inlet channel **11**, the first smoke inlet channel **2221**, the reflux channel **2222** and the smoke filtration chamber **221**, sequentially, and then flows through the second smoke guide channel **223**, ultimately reaching the contact part **213** for the user to inhale.

[0057] In addition to the above differences, the smoke generation and filtration device **100**, the hookah **1000,** and the components described herein can be further improved by referring to Examples **1** and **2.**

Example 4

[0058] A fourth example of the smoke generation and filtration device is illustrated and similar to Examples **1-3**, except for the following specific differences: in this example, the heating component **10** comprises a metal heating body **16.**

[0059] Referring to FIGS. **13-15,** the metal heating body **16** comprises a second smoke guiding chamber **161** and a fourth communication hole **162.** The second smoke guiding chamber **161** communicates with the external environment via the fourth communication hole

162. The second smoke guiding chamber **161** communicates with the second smoke inlet channel **11.** One end of the metal heating body **16** is detachably connected to the first end **211** of the smoke filtration component **20**, and the other end of the metal heating body **16** is disposed in the induction coil **203.** The induction coil **203** is independent from the smoke generation and filtration device. The fourth communication hole **162** is disposed at the other end of the metal heating body **16.**

[0060] In FIGS. **13-15**, the one end of the metal heating body **16** is closer to the smoke filtration component **20** and comprises a notch **163** for shielding electromagnetic interference. The heating component **10** further comprises a ceramic insulating member **17** with a hollow cavity. The ceramic insulating member **17** is disposed in the second smoke guiding chamber **161.** The second smoke guiding chamber **161** comprises a chamber wall, and the ceramic insulating member **17** is attached to the chamber wall to prevent the smoke from escaping through the notch **163.**

[0061] Additionally, in this example, the contact part **213** is different from that in Examples **1** to **3.** Referring to FIG. **15**, the smoke filtration component **20** comprises a third smoke outlet tube **238** having a smaller diameter than the outer diameter of the outer tube **231.** One end of the third smoke outlet tube **238** is connected to the closure plate **235**, and the other end of the third smoke outlet tube **238** extends outside the second cavity **2312.** The one end of the third smoke outlet tube **238** is enclosed by a sidewall comprising a second passage hole **2381.** The inner cavity of the third smoke outlet tube **238** functions as the second smoke guide channel **223.** The smoke filtration chamber **221** communicates with the second smoke guide channel **223** via the second passage hole **2381.** The third smoke outlet tube **238** comprises a section extending outside the second cavity **2312**, and the section functions as the contact part **213.**

[0062] Referring to FIGS. **7**, **16** to **18**, in the hookah **1000,** the smoke generation and filtration device **100** is disposed in the second chamber **2012** and extends outside the second chamber **2012.** In Example **1**, the smoke generation and filtration device **100** is completely disposed in the second chamber **2012.**

[0063] In addition to the above differences, the smoke generation and filtration device **100**, the hookah **1000**, and the components described herein can be further improved by referring to Examples **1-3.**

[0064] It will be obvious to those skilled in the art that changes and modifications may be made, and therefore, the aim in the appended claims is to cover all such changes and modifications.

Claims

1. A smoke generation and filtration device, comprising:

a heating component, configured to heat a tobacco material to generate smoke; and
a smoke filtration component comprising water, configured to filter toxins out from the generated smoke passing through the water;

wherein:

the smoke filtration component comprises a first end and a second end opposite to the first end; and
the heating component is detachably connected to the first end, and the second end comprises a contact part through which a user inhales the smoke.

2. The device of claim 1, wherein

the smoke filtration component comprises a smoke filtration chamber, a first smoke guide channel, and a second smoke guide channel;
one end of the first smoke guide channel is connected to the heating component, and the other end of the first smoke guide channel is connected to the smoke filtration chamber; and
one end of the second smoke guide channel is connected to the smoke filtration chamber, and the other end of the second smoke guide channel is connected to the contact part.

3. The device of claim 2, wherein

the first smoke guide channel comprises a first smoke inlet channel and a reflux channel;
the reflux channel is disposed between and connected to both the first smoke inlet channel and the smoke filtration chamber; the first smoke inlet channel is connected to the heating component; the first smoke inlet channel, the reflux channel, and the smoke filtration chamber are sequentially disposed from inside to outside in the smoke filtration component; and
when in use, the generated smoke from the heating component passes through the first smoke inlet channel and the reflux channel sequentially, and enters the smoke filtration chamber for smoke filtration.

4. The device of claim 2, wherein

the smoke filtration component comprises an outer tube and an isolation plate; the isolation plate comprises a first communication hole; the outer tube comprises an inner wall and an inner cavity; and
the isolation plate is radially connected to the inner wall of the outer tube, to separate the inner cavity of the outer tube into a first cavity and a

second cavity; the heating component is disposed inside the first cavity and extends out of the first cavity; the smoke filtration chamber, the first smoke guide channel, and the second smoke guide channel are disposed in the second cavity; and the heating component is connected to the first smoke guide channel via the first communication hole.

5. The device of any one of claims 1-4, wherein the smoke filtration component comprises glass, quartz or crystal.

6. The device of any one of claims 1-4, wherein the heating component comprises a second smoke inlet channel connected to the smoke filtration component; the generated smoke flows through the second smoke inlet channel and enters the smoke filtration component.

7. The device of claim 6, wherein

the heating component comprises a heating body and a metal heating unit;
the heating body comprises a first smoke guiding chamber and a second communication hole; the first smoke guiding chamber is connected to external environment via the second communication hole; and the first smoke guiding chamber communicates with the second smoke inlet channel; and
the metal heating unit is disposed around the heating body; or, the heating body further comprises a sidewall enclosing the first smoke guiding chamber, and the metal heating unit is embedded in the sidewall.

8. The device of claim 7, wherein

the heating body comprises a connecting portion and a heating portion connected to the connecting portion; and
the connecting portion is detachably connected to the first end of the smoke filtration component;
the heating portion extends outward from the connecting portion and is away from the second end of the smoke filtration component; the heating portion is disposed in an induction coil disposed outside the smoke generation and filtration device; and both the metal heating unit and the second communication hole are disposed on the heating portion.

9. The device of claim 7, wherein the heating body comprises glass, quartz, agate, or crystal.

10. The device of claim 6, wherein:

the heating component comprises a connecting pipe and a metal container for holding the tobacco material; the metal container is detachably connected to the connecting pipe and is disposed inside an induction coil disposed outside the smoke generation and filtration device; and the connecting pipe comprises an inner cavity communicating with the second smoke inlet channel; the metal container comprises a third communication hole; and the inner cavity of the connecting pipe communicates with external environment via the third communication hole.

11. The device of claim 6, wherein

the heating component comprises a metal heating body; the metal heating body comprises a second smoke guiding chamber and a fourth communication hole; the second smoke guiding chamber communicates with external environment via the fourth communication hole; and the second smoke guiding chamber communicates with the second smoke inlet channel; and
one end of the metal heating body is detachably connected to the first end of the smoke filtration component, and the other end of the metal heating body is disposed in an induction coil disposed outside the smoke generation and filtration device; and the fourth communication hole is disposed at the other end of the metal heating body.

12. The device of claim 11, wherein the one end of the metal heating body close to the smoke filtration component comprises a notch for shielding electromagnetic interference; the heating component further comprises a ceramic insulating member with a hollow cavity; the ceramic insulating member is disposed in the second smoke guiding chamber; the second smoke guiding chamber comprises a chamber wall, and the ceramic insulating member is attached to the chamber wall to prevent the smoke from escaping through the notch.

13. The device of claim 1, further comprising a connecting member disposed between the smoke filtration component and the heating component.

14. A hookah, comprising:

the smoke generation and filtration device of any one of claims 1-13, and
a heater;

wherein:
the smoke generation and filtration device is detachably disposed in the heater; and the heater is configured to heat the heating component.

15. The hookah of claim 14, wherein the heater comprises:

a housing, comprising a first chamber and a second chamber;
a power supply, disposed in the first chamber; and
an induction coil, electrically connected to the power supply and disposed in the second chamber; and
the smoke generation and filtration device is disposed inside the second chamber, and the induction coil is disposed around the heating component.

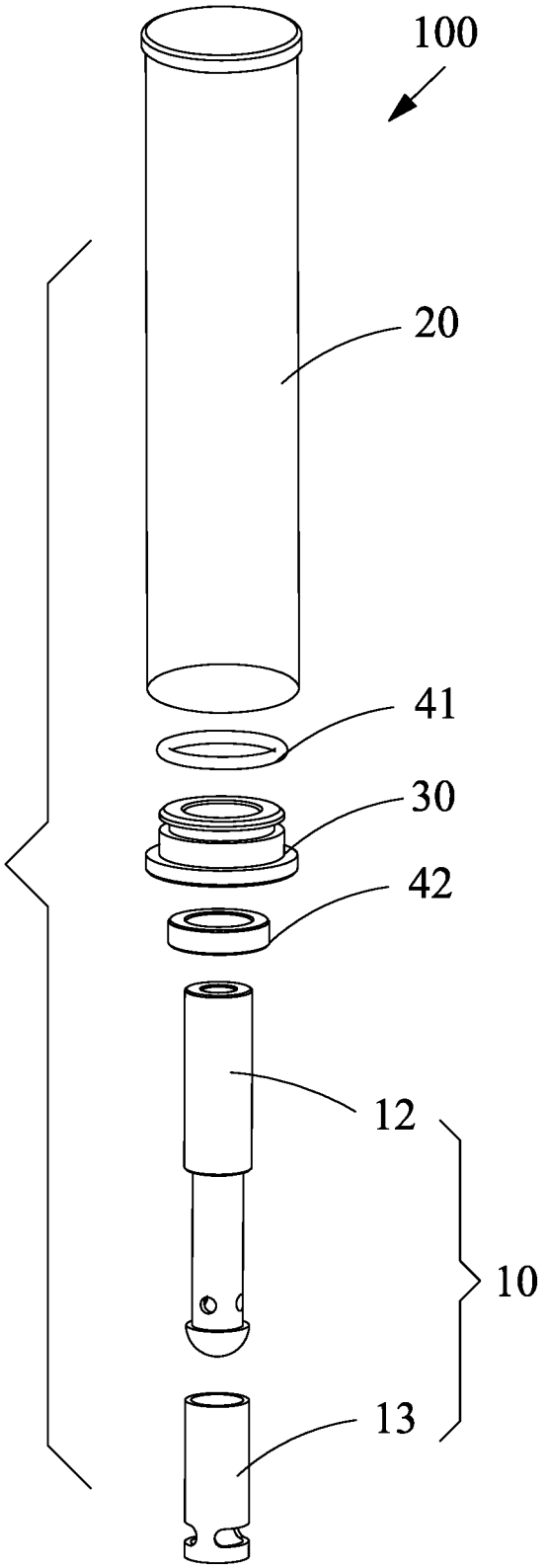

FIG. 1

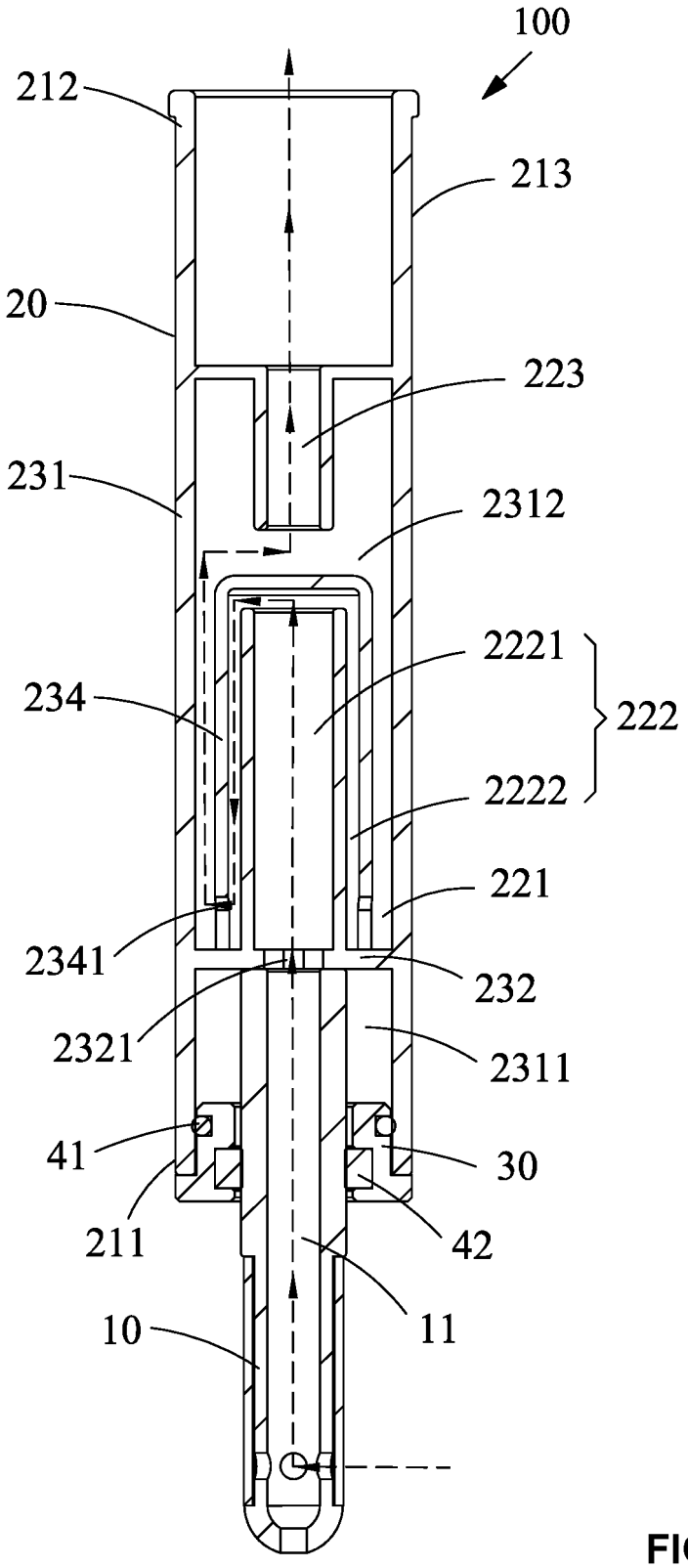
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FIG. 2

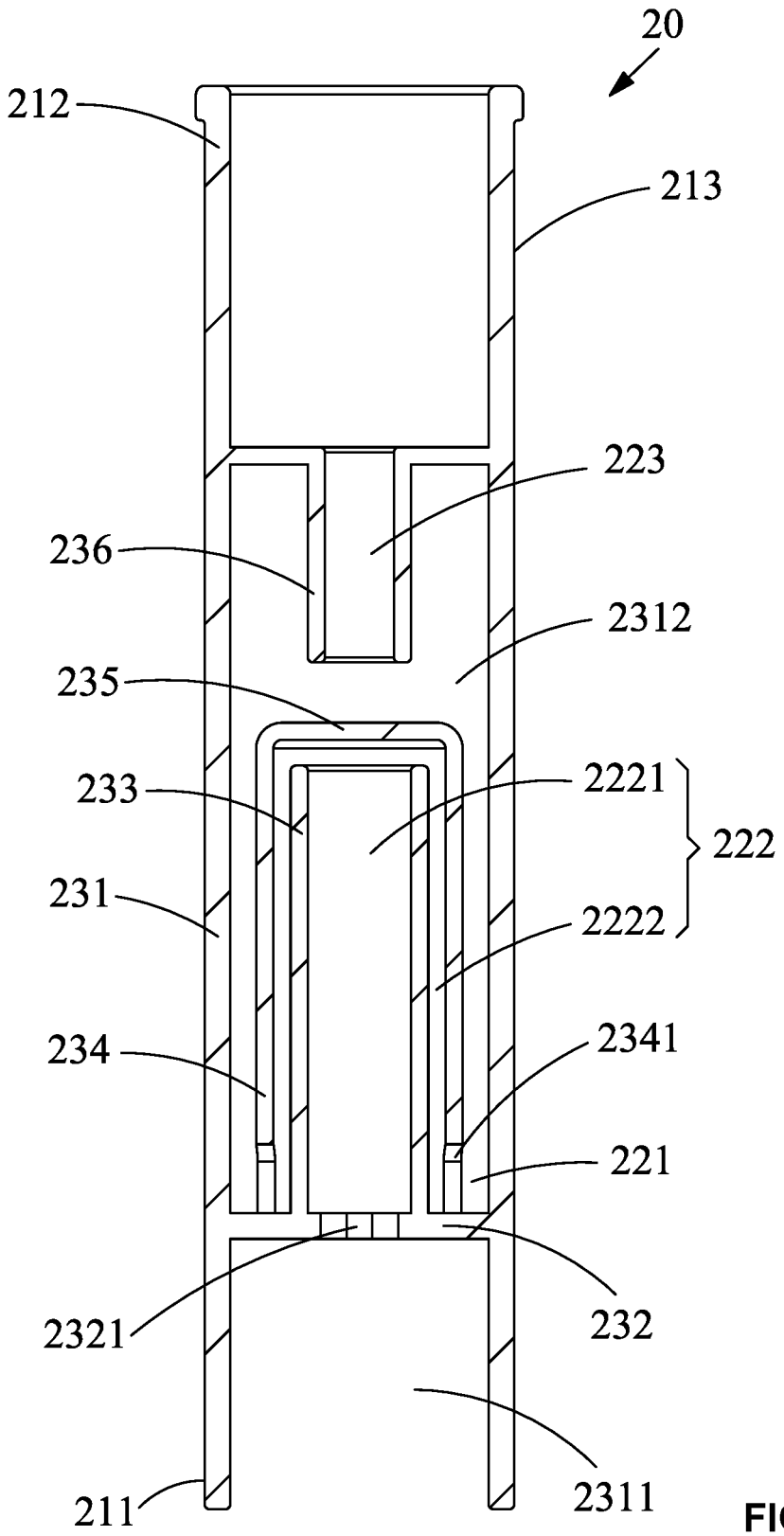
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FIG. 3

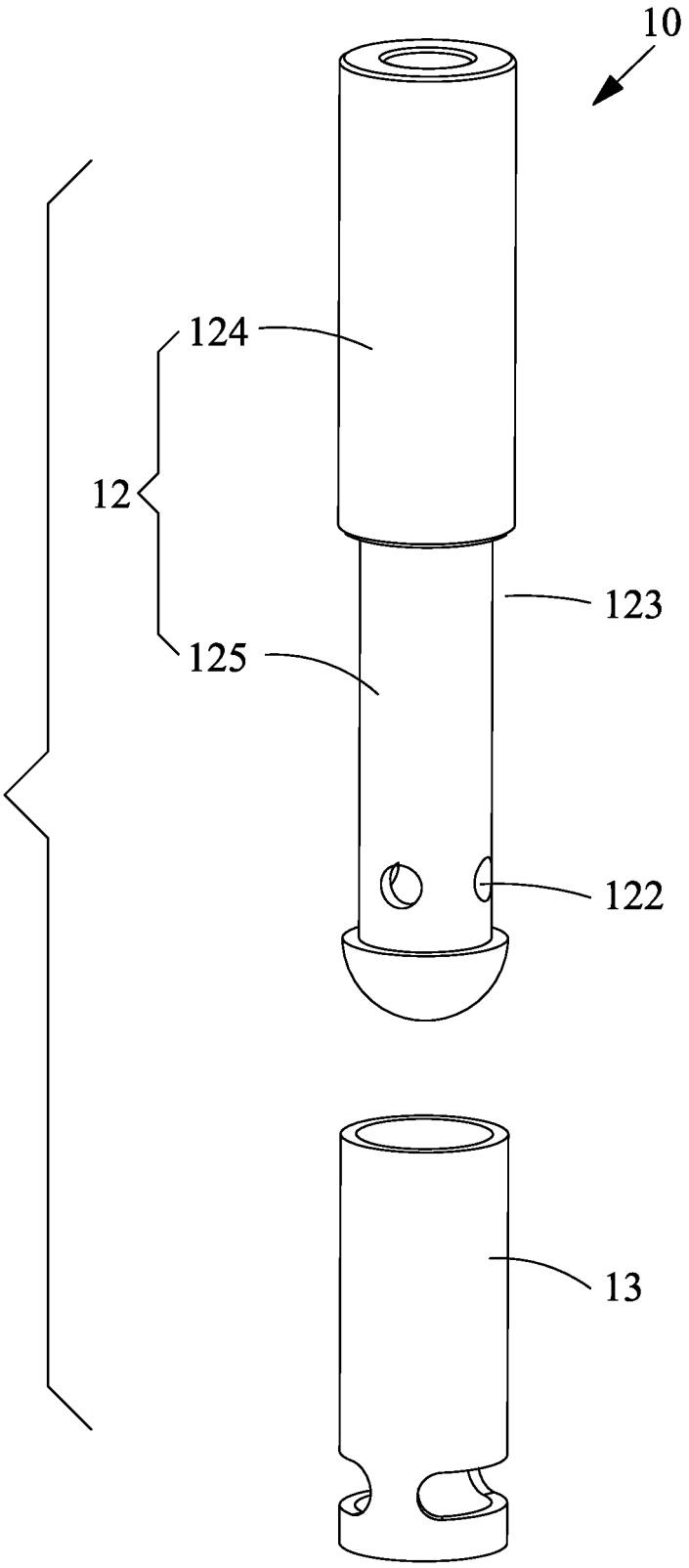

FIG. 4

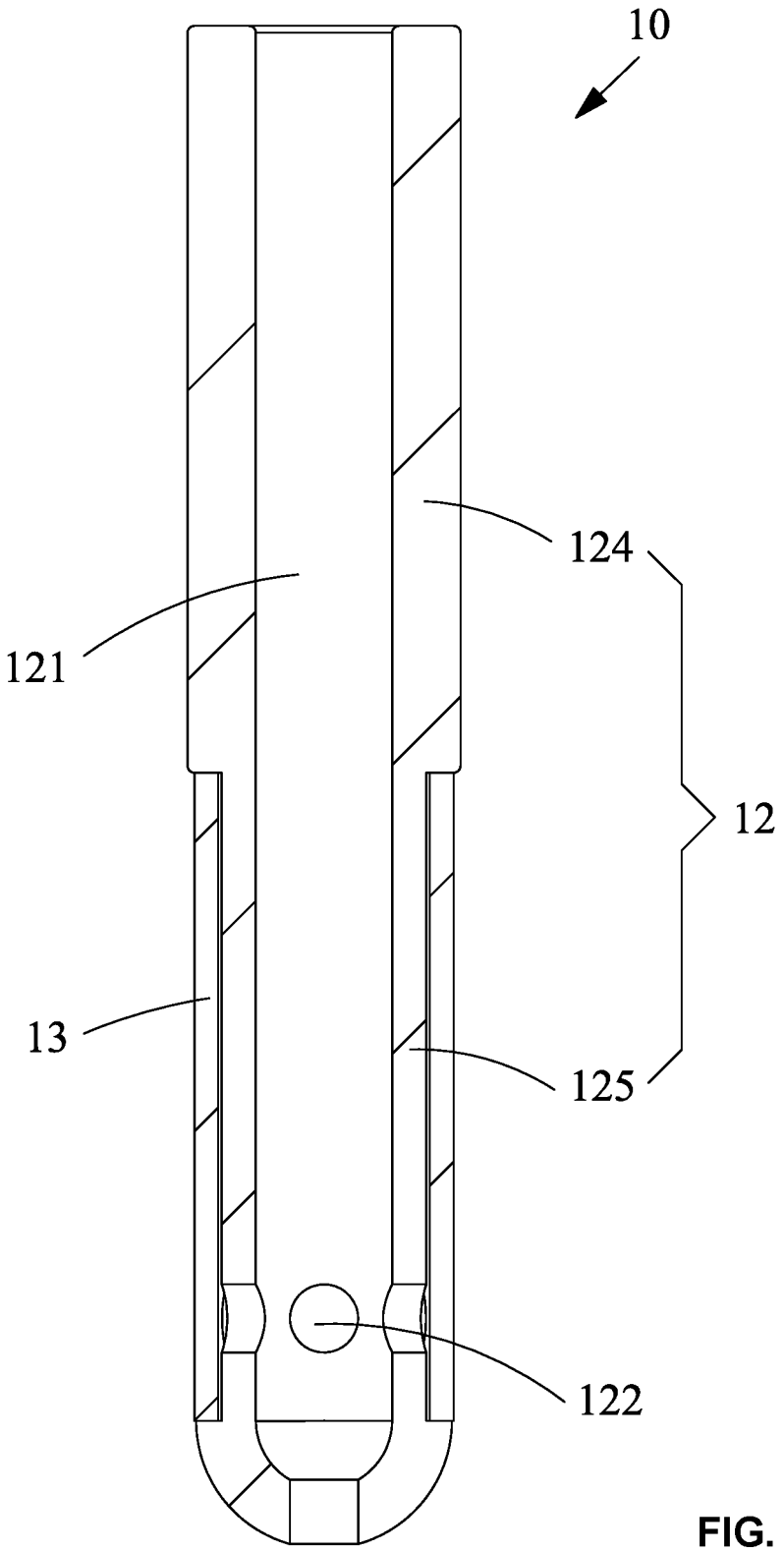

FIG. 5

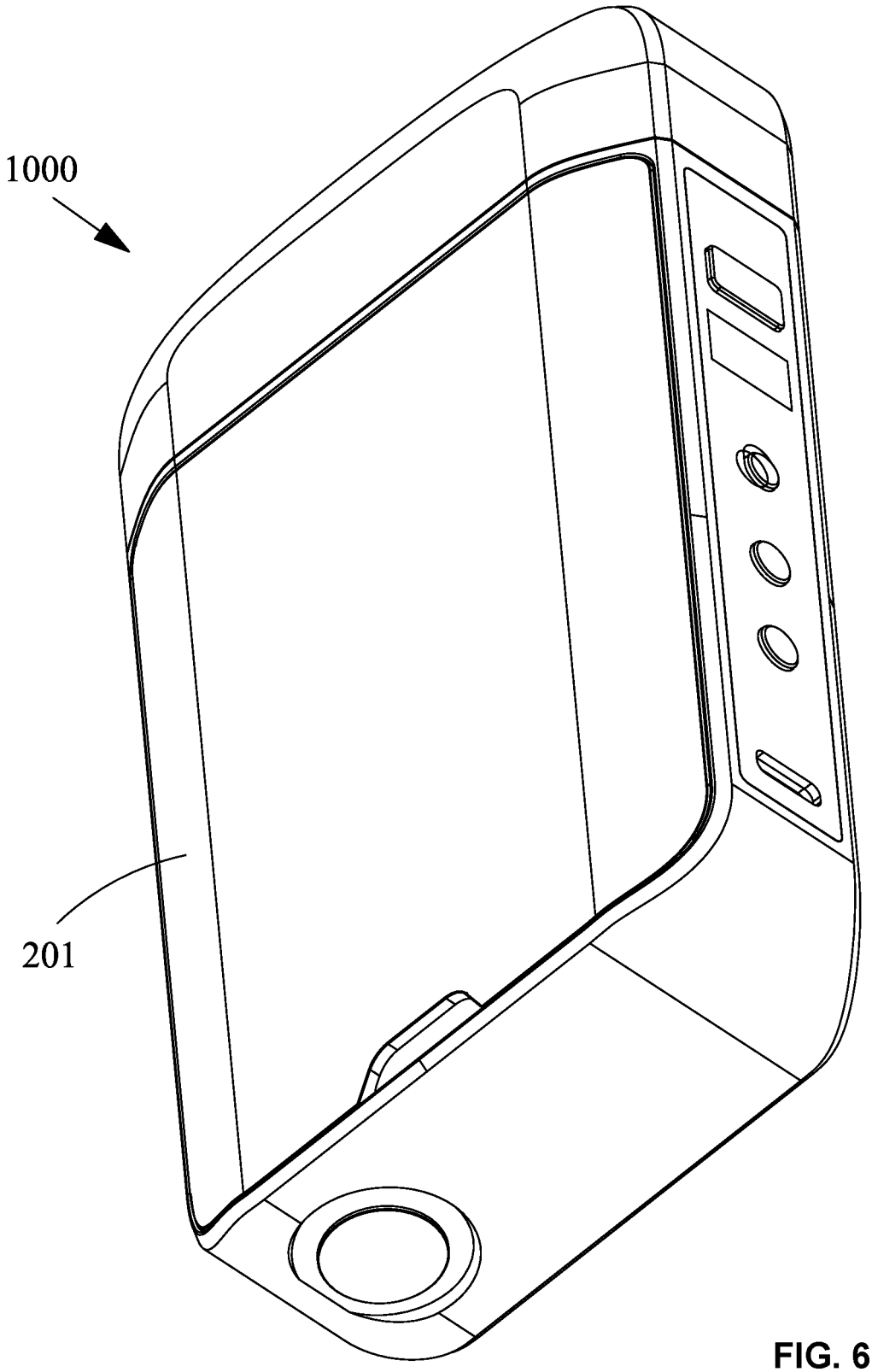

FIG. 6

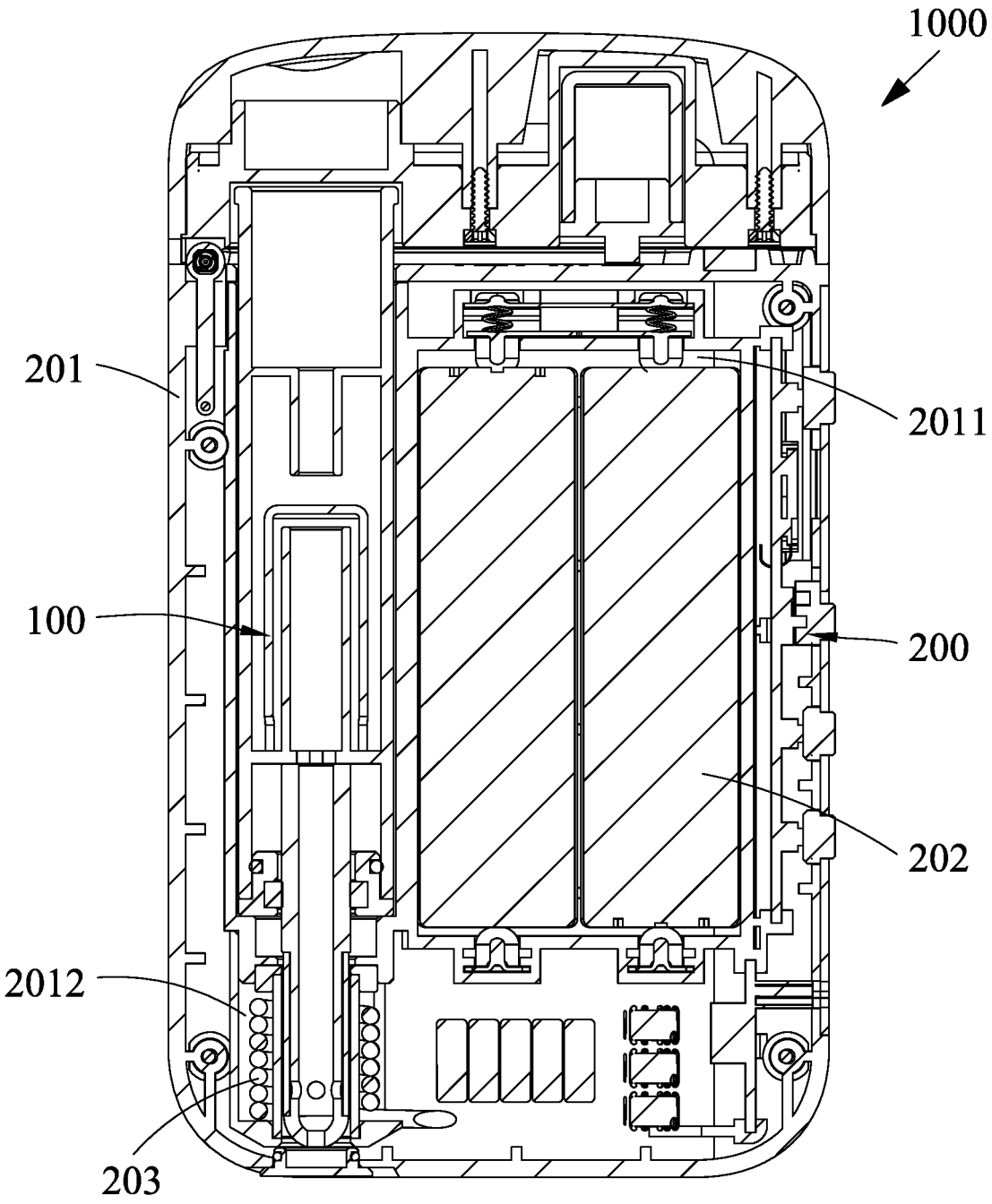

FIG. 7

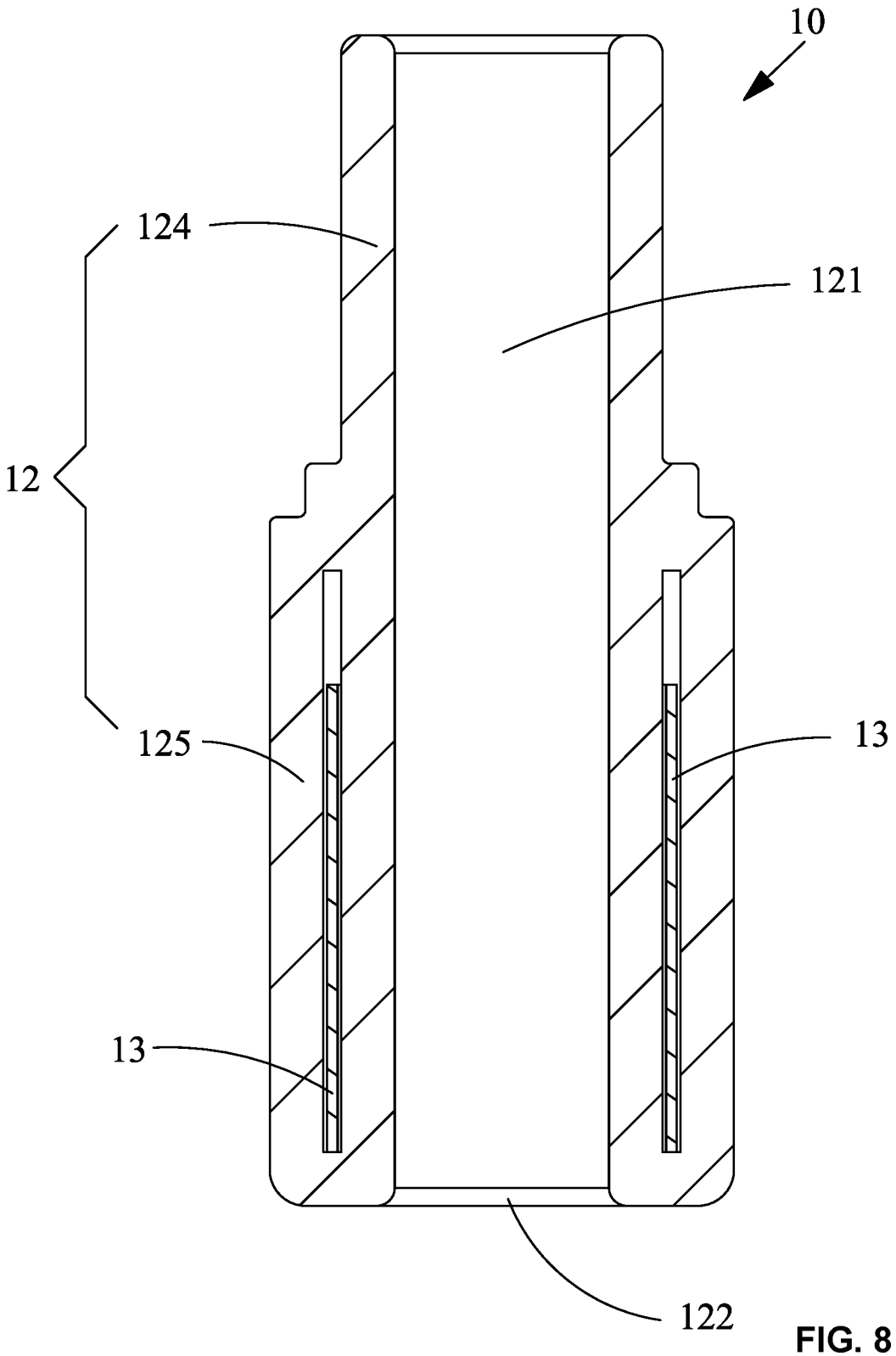

FIG. 8

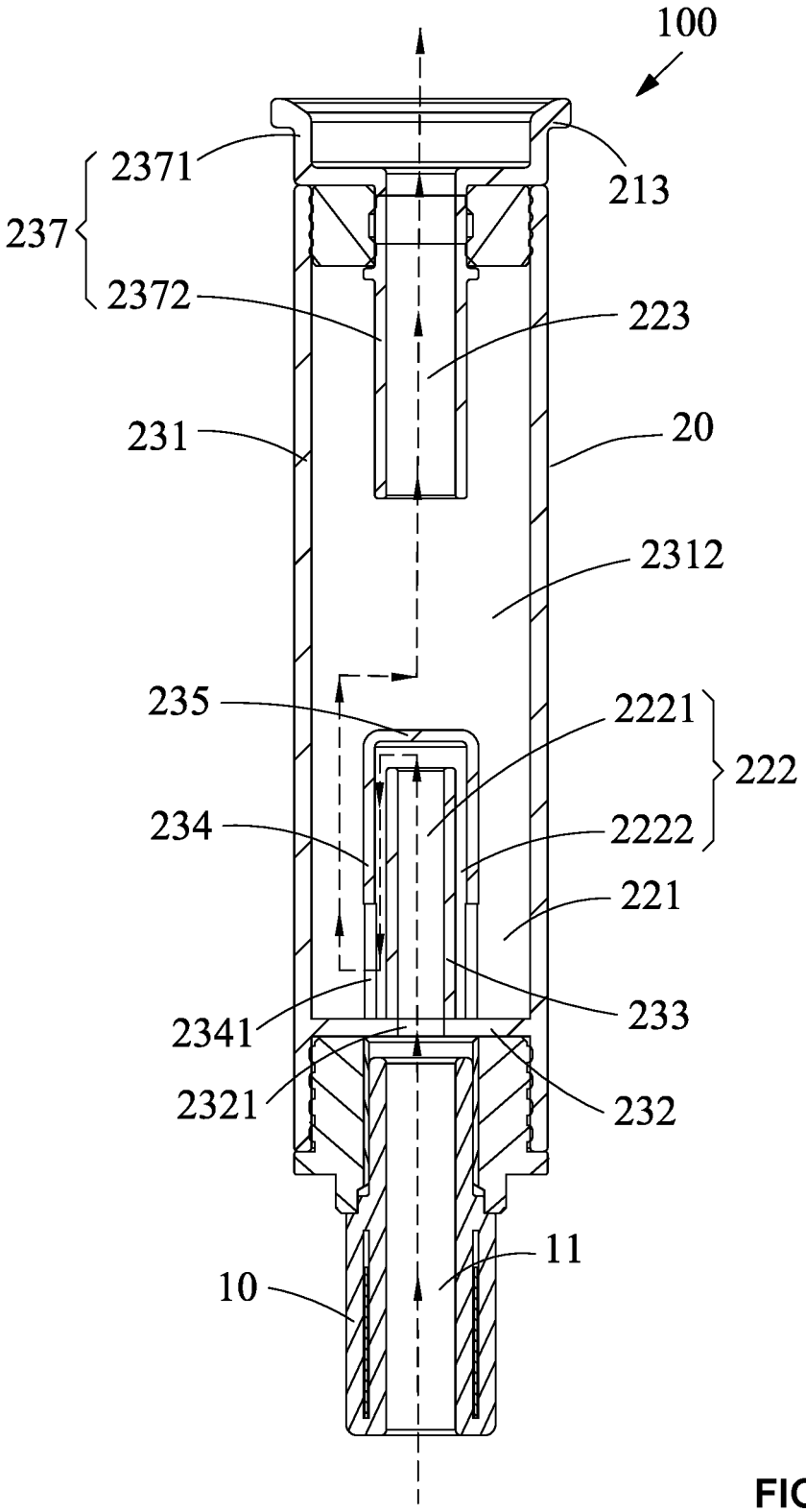
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FIG. 9

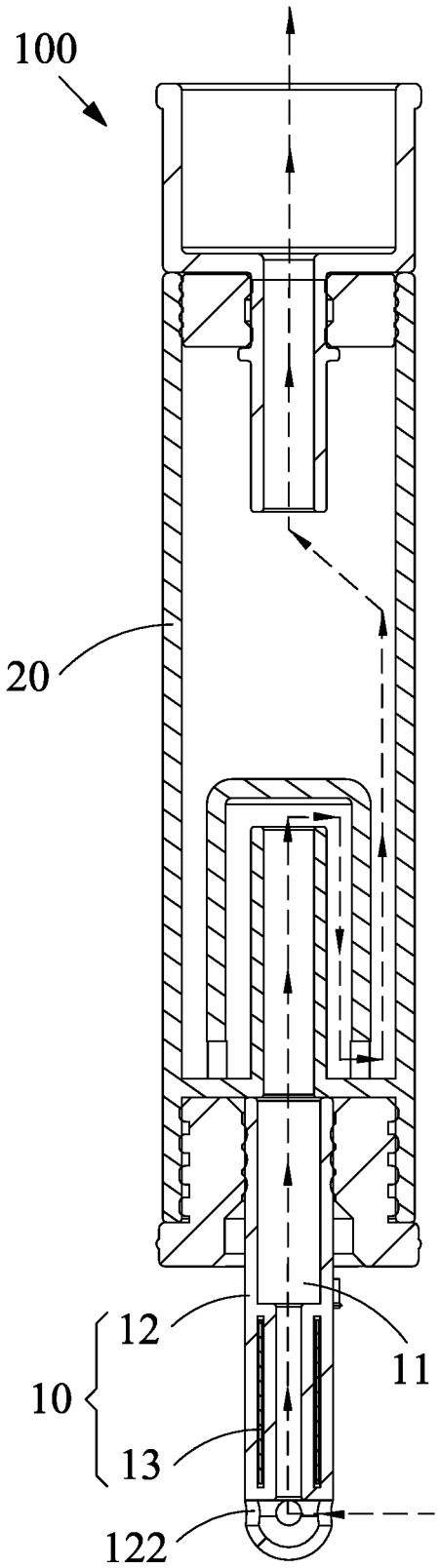

FIG. 10

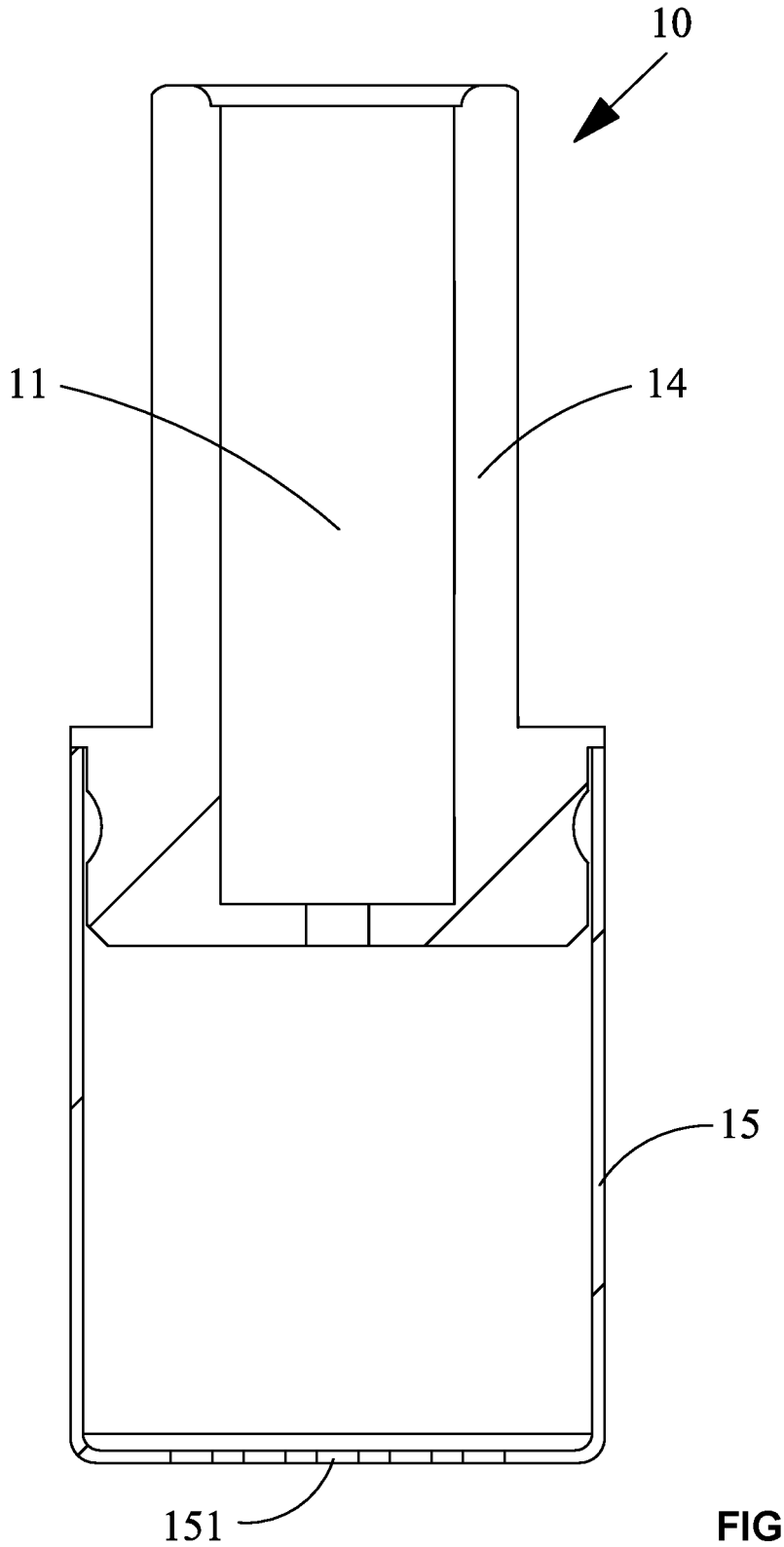

FIG. 11

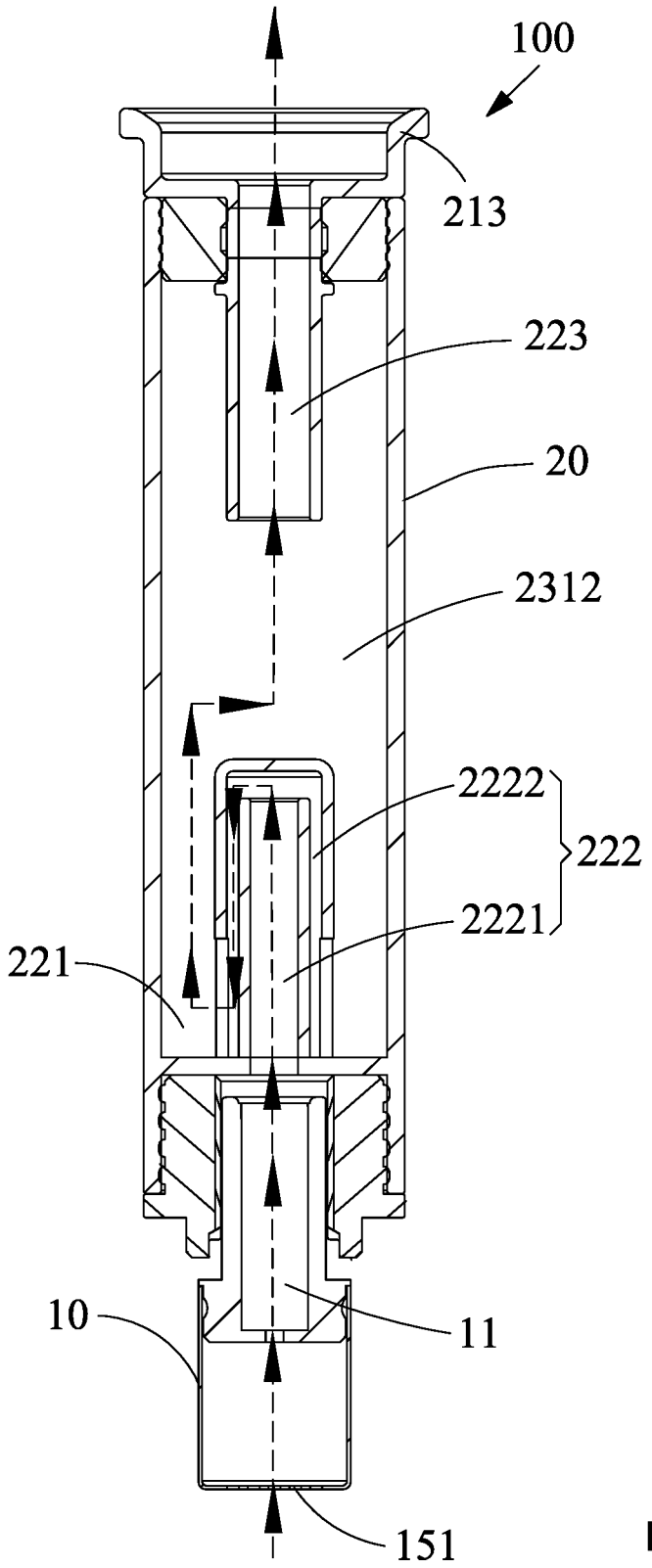

FIG. 12

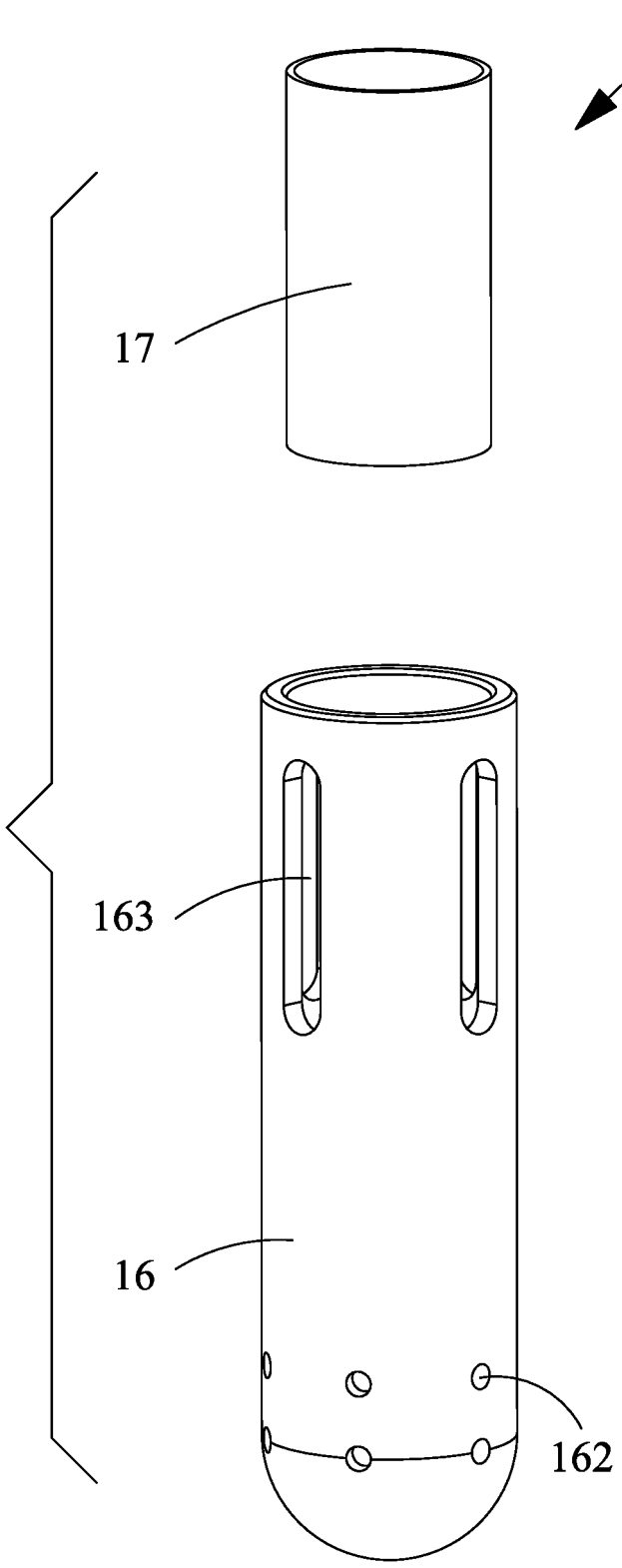

FIG. 13

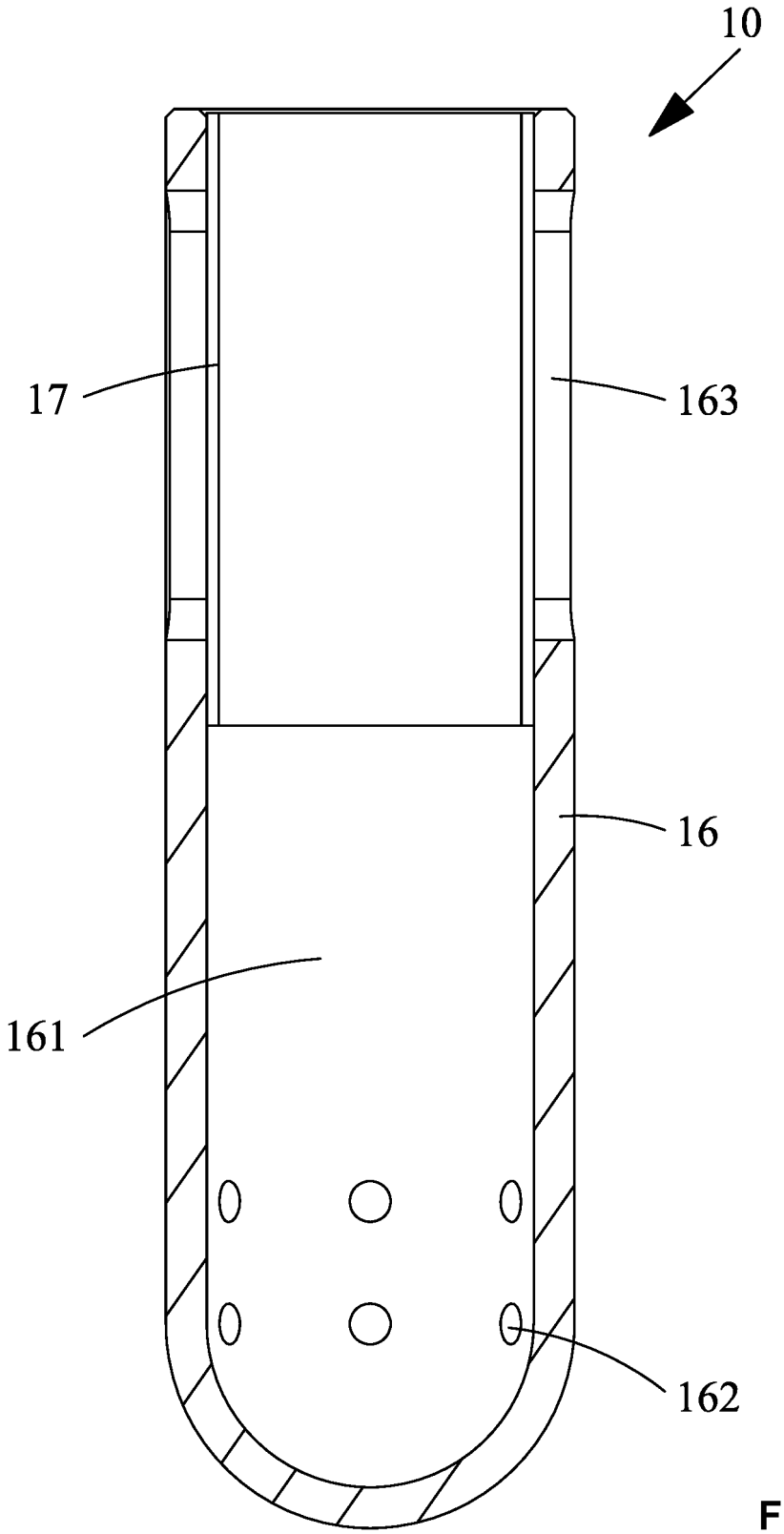

FIG. 14

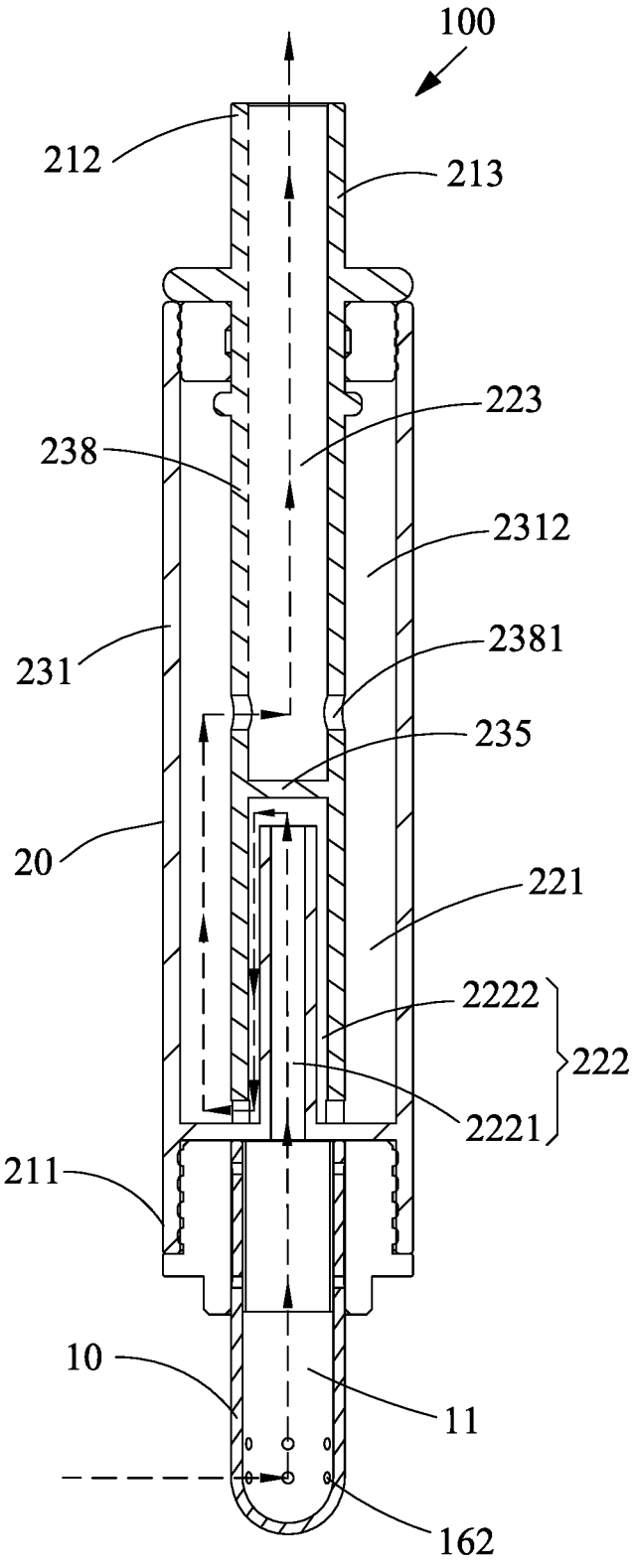
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FIG. 15

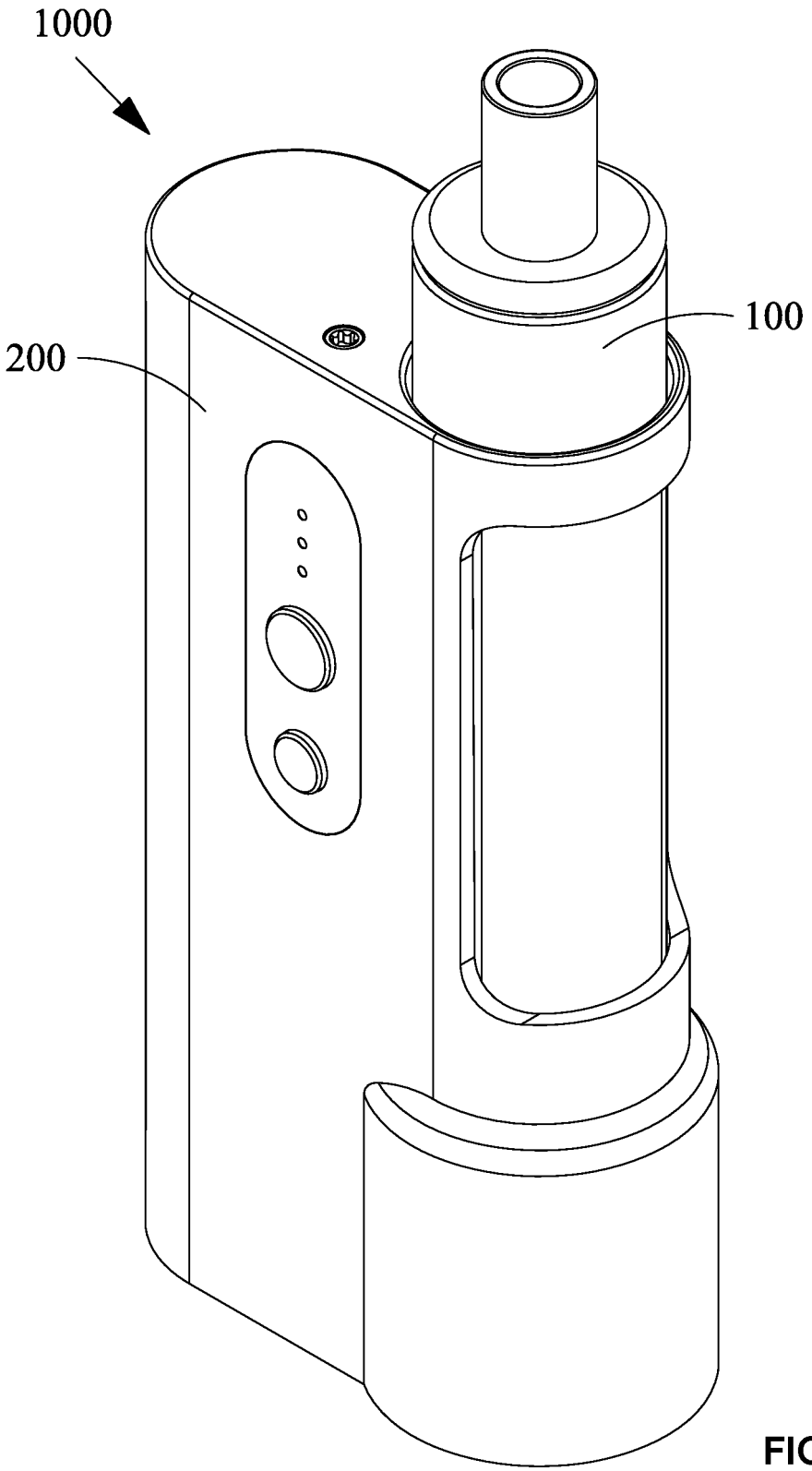

FIG. 16

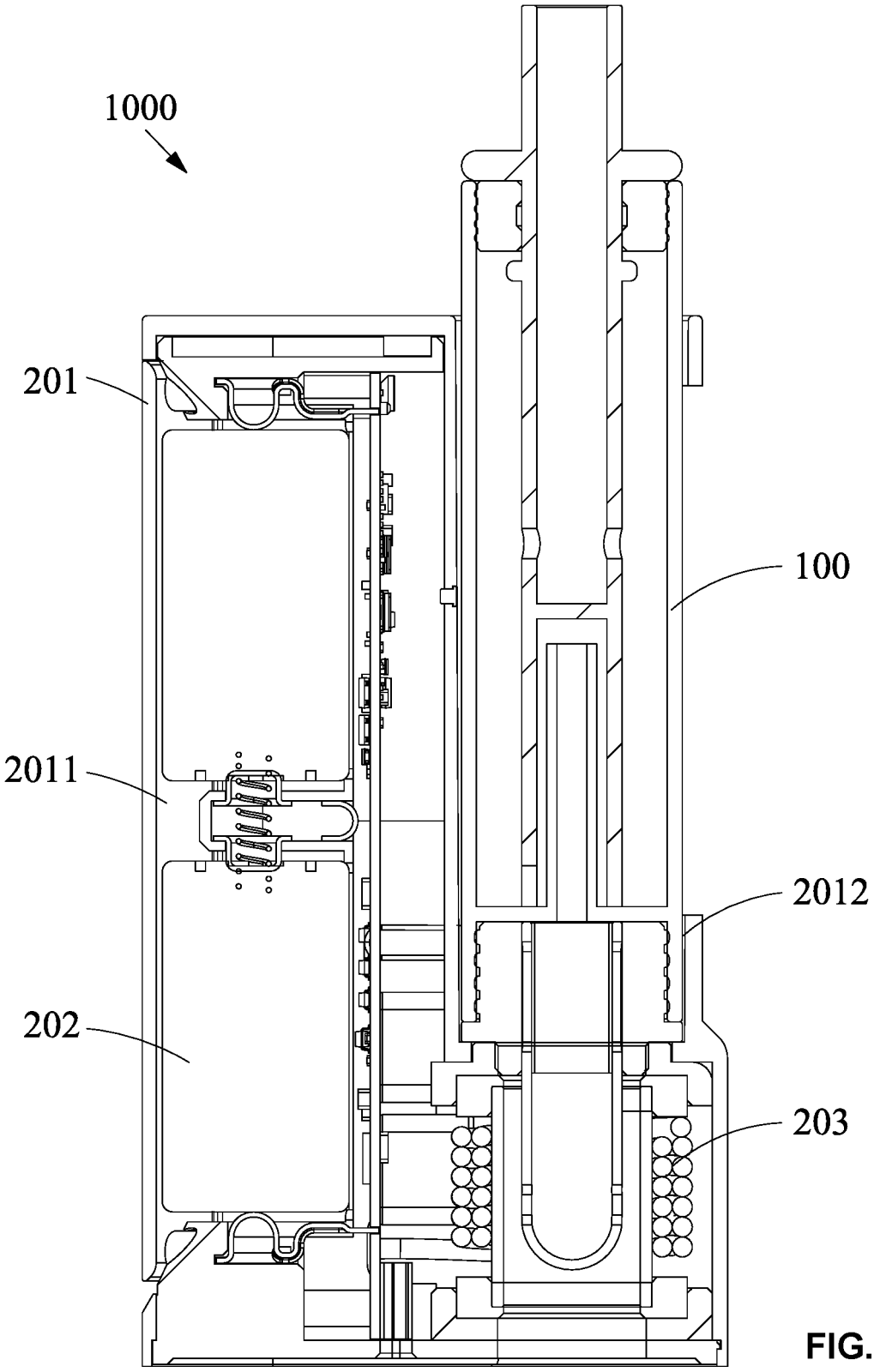

FIG. 17

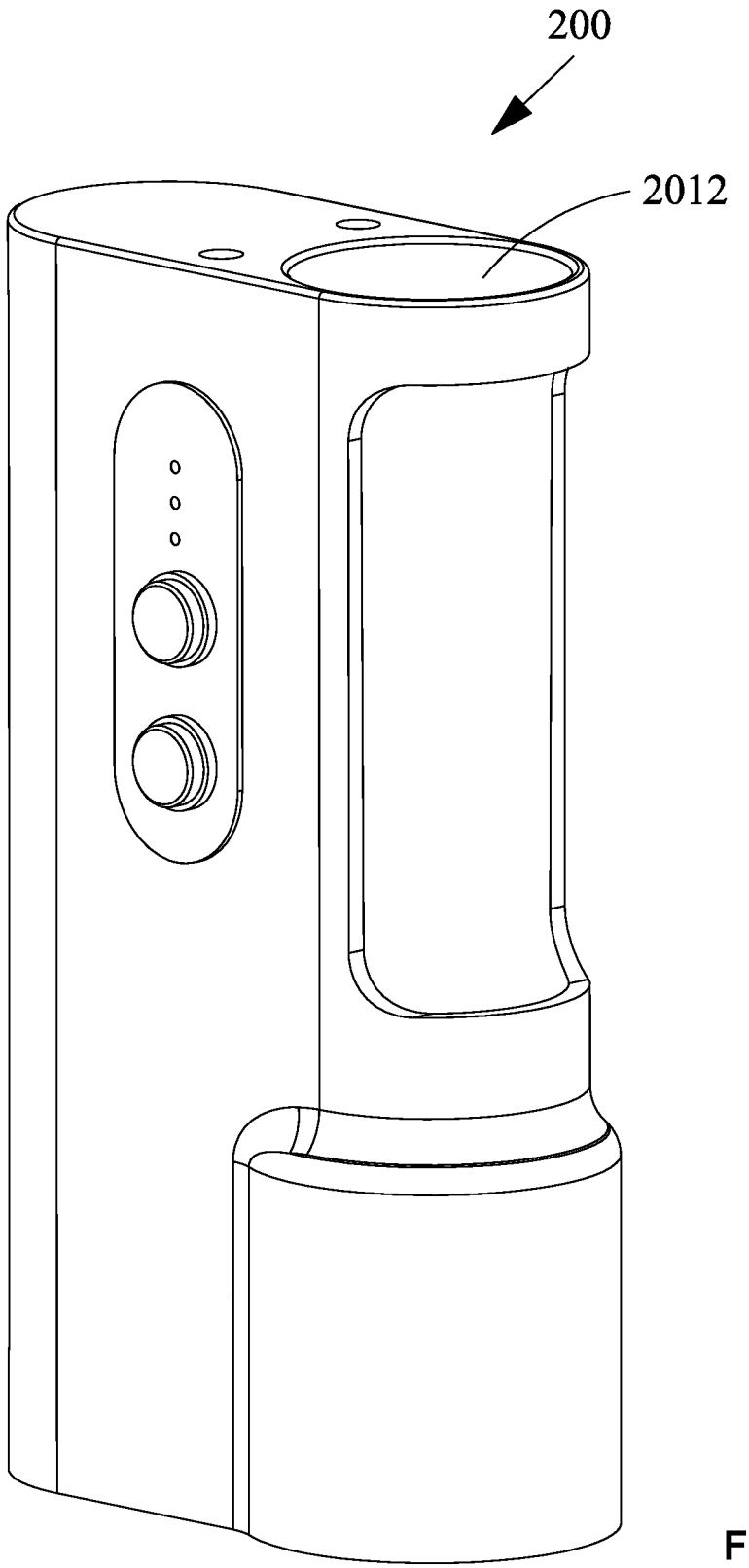

FIG. 18

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2021/137898

A. CLASSIFICATION OF SUBJECT MATTER

A24F 1/30(2006.01)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

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, CNKI, WPI, EPODOC: 电子烟, 水烟, 发热, 加热, 过滤, 可拆卸, 分离, 连接, 下方, 底端, 回流, 磁感应, 线圈, 电池, electronical, cigarette, water, smoke, heat, filtrate, separable, disassembly, connect, bottom, under, circumfluence, magnetic, loop, wind, battery

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 112493537 A (SHENZHEN YIJIATE TECHNOLOGY CO., LTD.) 16 March 2021 (2021-03-16) description, paragraphs [0007]-[0030], and figures 1-5	1-9, 13-15
PX	CN 112790426 A (SHENZHEN YIJIATE TECHNOLOGY CO., LTD.) 14 May 2021 (2021-05-14) description, paragraphs [0009]-[0032], and figures 1-6	1-9, 13-15
Y	CN 108201170 A (SHENZHEN SMISS TECHNOLOGY CO., LTD.) 26 June 2018 (2018-06-26) description, paragraphs [0005]-[0093], and figures 1-13	1-15
Y	CN 205682426 U (SHENZHEN DNS INDUSTRIES CO., LTD.) 16 November 2016 (2016-11-16) description, paragraphs [0005]-[0033], and figures 1-3	1-15
A	WO 2015131401 A1 (KIMREE HI-TECH INC.) 11 September 2015 (2015-09-11) entire document	1-15

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

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"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
17 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/CN2021/137898

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 105559149 A (SHENZHEN SMISS TECHNOLOGY CO., LTD.) 11 May 2016 (2016-05-11) entire document	1-15
A	CN 204335820 U (HUIZHOU KIMREE TECHNOLOGY CO., LTD.) 20 May 2015 (2015-05-20) entire document	1-15
A	US 2014048085 A1 (BOREALIS TECHNICAL LIMITED) 20 February 2014 (2014-02-20) entire document	1-15
A	CN 209573239 U (SHENZHEN YINGFEITE TECHNOLOGY CO., LTD.) 05 November 2019 (2019-11-05) entire document	1-15
A	CN 211510569 U (SHENZHEN YOUME NETWORK TECHNOLOGY CO., LTD.) 18 September 2020 (2020-09-18) entire document	1-15

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2021/137898

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 112493537 A	16 March 2021	None	
CN 112790426 A	14 May 2021	None	
CN 108201170 A	26 June 2018	None	
CN 205682426 U	16 November 2016	WO 2017210967 A1	14 December 2017
WO 2015131401 A1	11 September 2015	US 2017013882 A1	19 January 2017
		US 10004263 B2	26 June 2018
CN 105559149 A	11 May 2016	WO 2017152481 A1	14 September 2017
CN 204335820 U	20 May 2015	WO 2015161553 A1	29 October 2015
US 2014048085 A1	20 February 2014	None	
CN 209573239 U	05 November 2019	None	
CN 211510569 U	18 September 2020	None	

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