



(11) **EP 3 632 241 A1**

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

(43) Date of publication:
08.04.2020 Bulletin 2020/15

(51) Int Cl.:
A24F 47/00 (2020.01)

(21) Application number: **18809187.0**

(86) International application number:
PCT/CN2018/088912

(22) Date of filing: **30.05.2018**

(87) International publication number:
WO 2018/219277 (06.12.2018 Gazette 2018/49)

(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

- **DONG, Aijun**
Wuhan
Hubei 430040 (CN)
- **KE, Weichang**
Wuhan
Hubei 430040 (CN)
- **LIU, Bing**
Wuhan
Hubei 430040 (CN)
- **LUO, Chenghao**
Wuhan
Hubei 430040 (CN)

(30) Priority: **01.06.2017 CN 201710402122**

(71) Applicant: **Hubei China Tobacco Industry Co., Ltd.**
Wuhan, Hubei 430040 (CN)

(72) Inventors:

- **LIU, Huachen**
Wuhan
Hubei 430040 (CN)
- **CHEN, Yikun**
Wuhan
Hubei 430040 (CN)

(74) Representative: **Dantz, Jan Henning et al**
Loesenbeck - Specht - Dantz
Patent- und Rechtsanwälte
Am Zwinger 2
33602 Bielefeld (DE)

(54) **ELECTRIC HEATING DEVICE EASY FOR TAKING CIGARETTES OUT**

(57) The present invention provides an electric heating device easy for taking a cigarette out. The electric heating device comprises: a heating assembly and a cigarette taking-out assembly. The heating assembly comprises a heating cavity and a heating element located in the heating cavity; the heating cavity is used for accommodating a fuming product; the cigarette taking-out assembly comprises a sliding part and a push-and-pull part which is in linkage with the sliding part; the sliding part can be driven by the push-and-pull part to move in a direction away from the heating element along the axial direction of the heating cavity, so that the fuming product

in the heating cavity can be moved out of the heating cavity. In the present invention, the sliding part is driven by means of the push-and-pull part to move, and then the fuming product is driven by using the movement of the sliding part to move out of the heating cavity. Compared with the prior art, the present invention achieves taking out tobacco after a low-temperature tobacco product is inserted and consumed, and is easy for cleaning residual tobacco in the heating cavity.

EP 3 632 241 A1

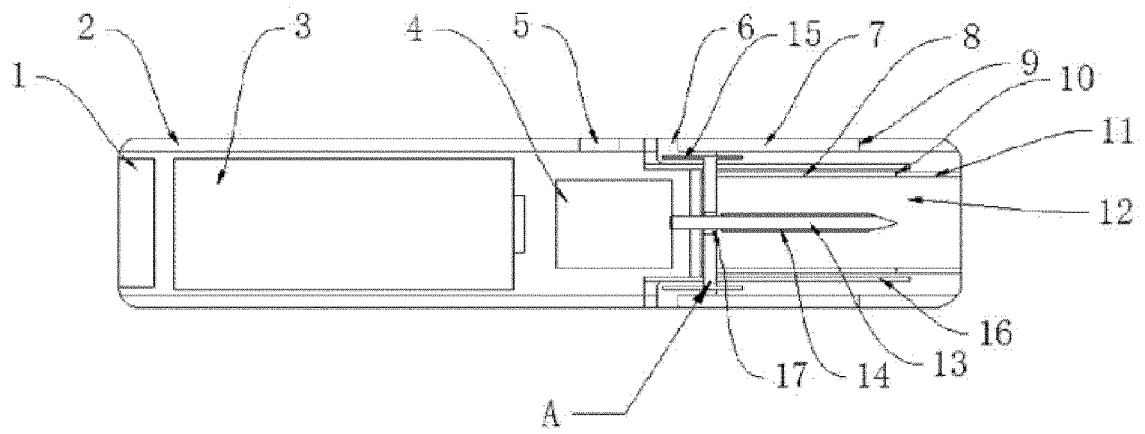


Fig.1

Description

FIELD OF THE INVENTION

[0001] The present invention relates to the field of novel cigarette technologies, and in particular, to an electric heating device facilitating removal of a cigarette therefrom.

BACKGROUND OF THE INVENTION

[0002] The tobacco may be heated by an external heat source, and the heating temperature of the external heat source is much lower than the combustion temperature of the cigarette. Thus, a large number of harmful substances generated via cigarette combustion can be significantly lowered by heating a low-temperature cigarette, and the harm of the secondhand smoke to non-smokers can be reduced. For the novel cigarette in which the tobacco product is heated by an external heat source, the tobacco product is heated to an atomizing temperature to achieve a tobacco smoke effect.

[0003] However, in the existing electric heating cigarette, after a tobacco product is consumed with heat by an electric heater in the form of a cigarette, a part of the tobacco resides in the heating chamber of the electric heater, and thus it is difficult to clean the electric heater and is inconvenient for subsequent use.

SUMMARY OF THE INVENTION

[0004] To overcome the disadvantage of the prior art, the present invention provides an electric heating device facilitating removal of a cigarette therefrom, which can address the problem of taking tobacco out of the electric heating device after a low-temperature tobacco product is inserted and consumed in the electric heating device, and is easy for removing the residual tobacco in the heating chamber.

[0005] An electric heating device facilitating removal of a cigarette therefrom, comprising a heating assembly, which comprises a heating chamber and a heating element located in the heating chamber, the heating chamber is configured to accommodate a fuming product, characterized in that: further comprising a cigarette removing assembly, which comprises a sliding part and a push-and-pull part that is movable jointly with the sliding part, the sliding part is configured to be driven by the push-and-pull part to move in a direction away from the heating element along an axial direction of the heating chamber, so that the fuming product in the heating chamber is moved out of the heating chamber.

[0006] Moreover, the electric heating device further comprises an outer casing, in which both of the heating assembly and the cigarette removing assembly are provided.

[0007] Moreover, the sliding part comprises a circular push plate and a fixing member for push-and-pull part

connected with the circular push plate, the circular push plate is located in the heating chamber and is, in its initial position, located on the bottom of the heating chamber, the fixing member for push-and-pull part is connected with the push-and-pull part, the outer casing is provided along the axial direction with a sliding rail for the sliding of the push-and-pull part, and the push-and-pull part is configured to slide along the sliding rail so as to drive the fixing member for push-and-pull part and the circular push plate to move, so that the circular push plate moves from the initial position in a direction away from the heating element, till the fuming product is moved out of the heating chamber.

[0008] Moreover, the fixing member for push-and-pull part is a rod-shaped structure symmetrically provided on the circular push plate, and correspondingly, a housing for heating chamber is provided with a sliding chute in the axial direction, the fixing member for push-and-pull part is extended out of the sliding chute and connected with the push-and-pull part, and may be driven by the push-and-pull part to move along the sliding chute.

[0009] Moreover, the electric heating device further comprises a power supply assembly provided in the outer casing, which is configured to provide power to the heating element of the heating assembly.

[0010] Moreover, the power supply assembly comprises a charging module, a battery, a control module and a control button, wherein the control button is connected with the control module and is provided on a sidewall of the outer casing, the charging module, the battery and the control module are sequentially connected, and a power output of the control module is connected with the heating element for providing the power of the battery to the heating element.

[0011] Moreover, the heating chamber is surrounded by a housing for heating chamber, which is a hollow cylindrical housing with an open end and is located at the front end of the heating assembly.

[0012] Moreover, a cavity layer is formed between the outer casing and the housing for heating chamber, the cavity layer is provided with a heater-protecting layer for protecting the heating assembly, and the heater-protecting layer (16) has a length longer than the heating element.

[0013] Moreover, the heating chamber is surrounded by a heater-protecting layer and a housing for heating chamber which are connected and have the same diameter, and the heating element is located in a chamber surrounded by the heater-protecting layer.

[0014] Moreover, one push-and-pull part is provided, or two push-and-pull parts are provided symmetrically

[0015] The present invention has the following beneficial effects: the sliding part is driven by the push-and-pull part to move, and the fuming product is driven to move out of the heating chamber by the movement of the sliding part, and thus in comparison with the prior art, the present invention achieves the taking out of tobacco after a low-temperature tobacco product is inserted and consumed,

and it is easy for removing the residual tobacco in the heating chamber.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016]

Fig.1 is a schematic sectional view of Embodiment 1 of the electric heating device facilitating removal of a cigarette therefrom according to the invention, which includes a sliding part A;

Fig.2 is a structural representation of Fig.1 when the sliding part A slides to take out a cigarette;

Fig.3 is a schematic exploded view of Embodiment 1 of the electric heating device facilitating removal of a cigarette therefrom according to the invention; Fig.4 is a top view of the sliding part A according to the invention;

Fig.5 is a schematic sectional view of Embodiment 2 of the electric heating device facilitating removal of a cigarette therefrom according to the invention; Fig.6 is a schematic sectional view of Embodiment 3 of the electric heating device facilitating removal of a cigarette therefrom according to the invention; and

Fig.7 is a schematic sectional view of Embodiment 4 of the electric heating device facilitating removal of a cigarette therefrom according to the invention.

[0017] In the drawings: 1-Charging Module, 2-Outer Casing, 3-Battery, 4-Control Module, 5-Control Button, A-Sliding Part, 6-Push-And-Pull Part, 7-Sliding Rail, 8-Inner Layer Sliding Rail, 9-Stopper for Sliding rail, 10-Stopper for Inner Layer Sliding rail, 11 - Housing for Heating chamber, 12-Heating chamber, 13-Heating Stylus, 14- Heating Layer for Heating Stylus, 15-Fixing Member for Push-And-Pull Part, 16-Heater-Protecting Layer, 17-Through Hole, 18-Circular Push Plate.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0018] The technical solutions in the invention will be described clearly and fully below in conjunction with the drawings of the invention.

Embodiment 1

[0019] Fig.1, Fig.2 and Fig.3 show an electric heating device facilitating removal of a cigarette therefrom according to the invention, which includes a sliding part A. Fig.2 shows a structural representation when the sliding part A slides to take out a cigarette, and Fig.3 shows an schematic exploded view.

[0020] The heating device shown in Fig.1 may be placed in a main power box. The heating device includes a heating assembly and a cigarette removing assembly, where the heating assembly is configured to heat a cigarette, which is a fuming product that generates aerosol

via heating, rather than combusting. The aerosol generated by the fuming product may be inhaled into the lung of a consumer by sucking via the mouth. The heating assembly includes a heating chamber 12 and a heating element located in the heating chamber 12, where the heating chamber 12 is configured to accommodate the fuming product. The cigarette removing assembly includes a sliding part A and a push-and-pull part 6 that is movable jointly with the sliding part A, a part of the structure of the sliding part A is located in the heating chamber and may be driven by the push-and-pull part 6 to move in a direction away from the heating element along an axial direction of the heating chamber 12, so that the fuming product in the heating chamber 12 is moved out of the heating chamber 12.

[0021] The heating device further includes an outer casing 2 and a power supply assembly provided in the outer casing 2, and both of the heating assembly and the cigarette removing assembly are located in the outer casing 2, where the power supply assembly is configured to provide power to the heating element of the heating assembly. The power supply assembly includes a charging module 1, a battery 3, a control module 4 and a control button 5, where the charging module 1, the battery 3 and the control module 4 are provided in the outer casing 2, the control button 5 is connected with the control module 4 and is provided on the sidewall of the outer casing 2, the charging module 1, the battery 3 and the control module 4 are sequentially connected, and the charging module 1 may charge the battery 3 via the main power box or via an external power. The heating element includes a heating stylus 13 and a heating layer for heating stylus 14 provided on the heating stylus 13, and the power output of the control module 4 is connected with the heating layer for heating stylus 14 so as to provide the power of the battery 3 to the heating layer for heating stylus 14, so that the heating layer for heating stylus 14 is heated up so as to heat the fuming product. The control button 5 is connected with the control end of the control module 4 and is configured to control the on-off or the magnitude of the power provided by the control module 4 to the heating layer for heating stylus 14 so as to control the temperature of the heating layer for heating stylus 14 on the heating stylus 13. The control button 5 may be designed as a switch control button or a voltage regulation button, etc. The battery 3 is a rechargeable battery, the control module 4 controls power output of the battery 2 to the heating stylus 13 and can output a power according to the linear variation relation between the resistance and temperature of the heating element, thereby adjusting the temperature of the heating stylus 13, when the temperature of the heating stylus 13 is higher than a preset temperature, the power output is lowered, and when the temperature of the heating stylus 13 is lower than the preset temperature, the power output is increased for temperature compensation. The working temperature of the heating stylus 13 is preset as 250-330°C.

[0022] The heating chamber 12 is surrounded by a

housing for heating chamber 11. As shown in Fig.1, the housing for heating chamber 11 is a hollow cylindrical housing with an open end and is located at the front end of the heating assembly. As shown in Fig.4, the sliding part A includes a circular push plate 18 and a fixing member for push-and-pull part 15 connected with the circular push plate 18. The circular push plate 18 is located in the heating chamber 12, and in its initial position it is located on the bottom of the heating chamber 12. One end of the fixing member for push-and-pull part 15 is connected with the circular push plate 18, and the other end is connected with the push-and-pull part 6. The fixing member for push-and-pull part 15 may be a rod-shaped structure symmetrically provided on the circular push plate 18, and correspondingly, the housing for heating chamber 11 is provided with a sliding chute in the axial direction, the fixing member for push-and-pull part 15 may be extended out of the sliding chute and connected with the push-and-pull part 6, and the fixing member for push-and-pull part 15 may be driven by the push-and-pull part 6 to move along the sliding chute. The middle part of the circular push plate 18 is provided with a through hole 17, which the heating stylus 13 may pass through. Thus, when the fuming product is loaded into the heating chamber 12, the heating stylus 13 may penetrate into the fuming product for easily heating the fuming product. The outer casing 2 is provided with a sliding rail 7 along the axial direction, and the push-and-pull part 6 may slide in the sliding rail 7 so as to drive the fixing member for push-and-pull part 15 and the circular push plate 18 to move, so that the circular push plate 18 can move from the initial position to the direction away from the heating stylus 13, till the combusted fuming product is moved out of the heating chamber 12. Preferably, the tail end of the sliding rail 7 is provided with a stopper for sliding rail 9 for limiting the traveling distance of the push-and-pull part 6 in the sliding rail 7.

[0023] A cavity layer is formed between the outer casing 2 and the housing for heating chamber 11. The cavity layer may be configured for accommodating a heater-protecting layer 16 inserted from one end of the heating device. The heater-protecting layer 16 has a length longer than the heating stylus 13 for protecting the heating assembly. If the heating stylus 13 is too long, it tends to be broken during additional cleaning; when the heater-protecting layer 16 is longer than the heating stylus 13, the heating stylus 13 may be protected by the heater-protecting layer 16 during cleaning or being applied with an external force.

[0024] In this example, two push-and-pull parts 6 are provided in a bilaterally symmetric manner. The push-and-pull parts 6 may move the sliding part A and push out the cigarette located in the heating chamber 12, without the need to move the whole removing device. The dashed part of Fig.2 shows a structural representation when the sliding part A moves to the stopper for sliding rail 9.

Embodiment 2

[0025] Fig.5 shows another unilaterally-sliding electric heating device according to the invention. In comparison with Embodiment 1, only one push-and-pull part 6 is provided, and the rest structure is basically the same as that of Fig.1.

Embodiment 3

[0026] Fig.6 shows another bilaterally-sliding electric heating device according to the invention, the basic structure thereof is basically the same as that of Fig.1.

[0027] In order to reduce a diameter of the heating device, the housing for heating chamber 11 and the heater-protecting layer 16 in Fig.1 are set to have the same diameters, that is, the combination of the heater-protecting layer 16 and the housing for heating chamber 11 forms the heating chamber 12, and the housing for heating chamber 11 and the outer casing 2 are connected via screw-threaded joint or socket joint. The heater-protecting layer 16 has a length longer than the heating stylus 13, that is, the heating stylus 13 is located in a chamber surrounded by the heater-protecting layer 16. When the outer casing 2 is taken off, the housing for heating chamber 11 may be separated from the heater-protecting layer 16 together with the outer casing 2. At this point, the heating stylus 13 is still completely located in the housing for heating chamber 11, thereby preventing a consumer from being punctured or scalded by the heating stylus 13.

Embodiment 4

[0028] Fig.7 shows another unilaterally-sliding electric heating device according to the invention. In comparison with Embodiment 3, only one push-and-pull part 6 is provided, and the rest structure is basically the same as that of Fig.6.

[0029] In the above embodiment, the heating element has a length of 8mm-35mm and a diameter of 0.8mm-2.2mm. Glass encapsulation may be performed on surface thereof to improve the heating efficiency.

[0030] The above description only shows some specific implementation modes of the invention. However, the protection scope of the invention will not be limited thereto, and all variations or substitutions easily made by one skilled in the art will pertain to the protection scope of the invention.

Claims

1. An electric heating device facilitating removal of a cigarette therefrom, comprising a heating assembly, which comprises a heating chamber (12) and a heating element located in the heating chamber (12), the heating chamber (12) is configured to accommodate

a fuming product, **characterized in that**, the electrical heating device further comprises a cigarette removing assembly, which comprises a sliding part (A) and a push-and-pull part (6) that is movable jointly with the sliding part (A), and the sliding part (A) is configured to be driven by the push-and-pull part (6) to move in a direction away from the heating element along an axial direction of the heating chamber (12), so that the fuming product in the heating chamber (12) is moved out of the heating chamber (12).

2. The electric heating device facilitating removal of a cigarette therefrom of claim 1, **characterized by** further comprising an outer casing (2), in which both of the heating assembly and the cigarette removing assembly are provided.

3. The electric heating device facilitating removal of a cigarette therefrom of claim 2, **characterized in that**, the sliding part (A) comprises a circular push plate (18) and a fixing member for push-and-pull part (15) connected with the circular push plate (18), the circular push plate (18) is located in the heating chamber (12) and is, in its initial position, located on the bottom of the heating chamber (12), the fixing member for push-and-pull part (15) is connected with the push-and-pull part (6), the outer casing (2) is provided along the axial direction with a sliding rail (7) for the sliding of the push-and-pull part (6), and the push-and-pull part (6) is configured to slide along the sliding rail (7) so as to drive the fixing member for push-and-pull part (15) and the circular push plate (18) to move, so that the circular push plate (18) moves from the initial position in a direction away from the heating element, till the fuming product is moved out of the heating chamber (12).

4. The electric heating device facilitating removal of a cigarette therefrom of claim 3, **characterized in that**, the fixing member for push-and-pull part (15) is a rod-shaped structure symmetrically provided on the circular push plate (18), and correspondingly, a housing for heating chamber (11) is provided with a sliding chute in the axial direction, and the fixing member for push-and-pull part (15) is extended out of the sliding chute and connected with the push-and-pull part (6), and is configured to be driven by the push-and-pull part (6) to move along the sliding chute.

5. The electric heating device facilitating removal of a cigarette therefrom of claim 2, **characterized by** further comprising a power supply assembly which is provided in the outer casing (2) and configured to provide power to the heating element of the heating assembly.

6. The electric heating device facilitating removal of a

cigarette therefrom of claim 5, **characterized in that**, the power supply assembly comprises a charging module (1), a battery (3), a control module (4) and a control button (5), wherein the control button (5) is connected with the control module (4) and is provided on a sidewall of the outer casing (2), the charging module (1), the battery (3) and the control module (4) are sequentially connected, and a power output of the control module (4) is connected with the heating element for providing the power of the battery (3) to the heating element.

7. The electric heating device facilitating removal of a cigarette therefrom of claim 1, **characterized in that**, the heating chamber (12) is surrounded by a housing for heating chamber (11), which is a hollow cylindrical housing with an open end and is located at the front end of the heating assembly.

8. The electric heating device facilitating removal of a cigarette therefrom of claim 7, **characterized in that**, a cavity layer is formed between the outer casing (2) and the housing for heating chamber (11), the cavity layer is provided with a heater-protecting layer (16) for protecting the heating assembly, and the heater-protecting layer (16) has a length longer than the heating element.

9. The electric heating device facilitating removal of a cigarette therefrom of claim 1, **characterized in that**, the heating chamber (12) is surrounded by a heater-protecting layer (16) and a housing for heating chamber (11) which are connected and have the same diameter, and the heating element is located in a chamber surrounded by the heater-protecting layer (16).

10. The electric heating device facilitating removal of a cigarette therefrom of claim 1 or 3, **characterized in that**, one push-and-pull part (6) is provided, or two push-and-pull parts (6) are provided symmetrically.

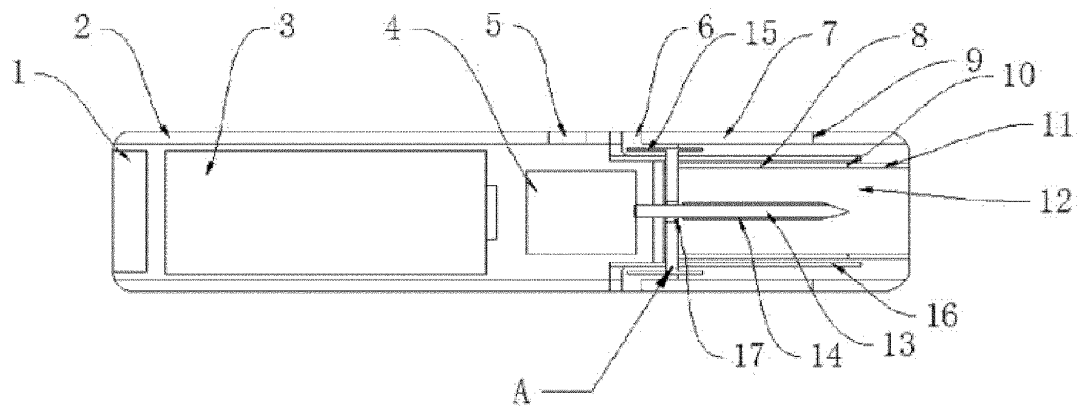


Fig.1

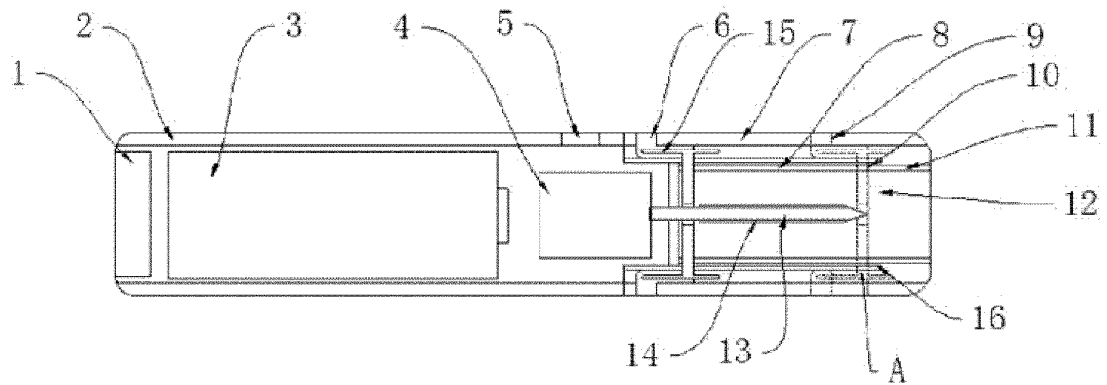


Fig.2

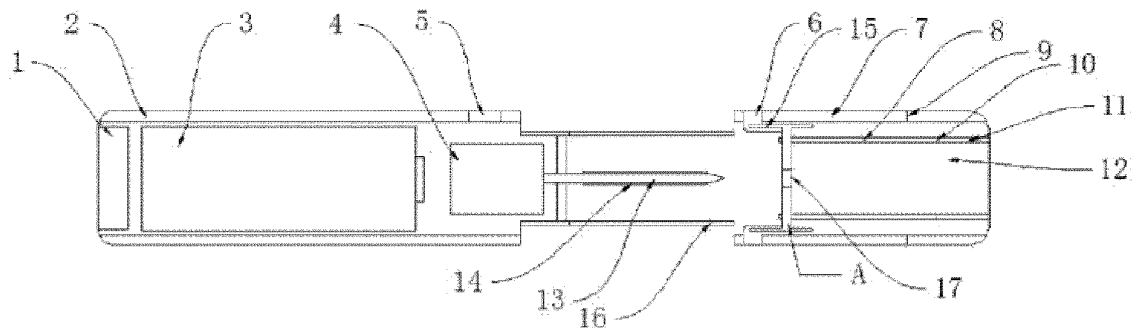


Fig.3

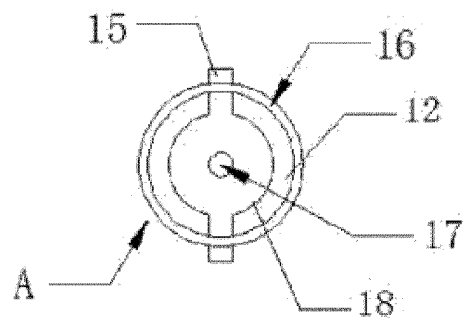


Fig.4

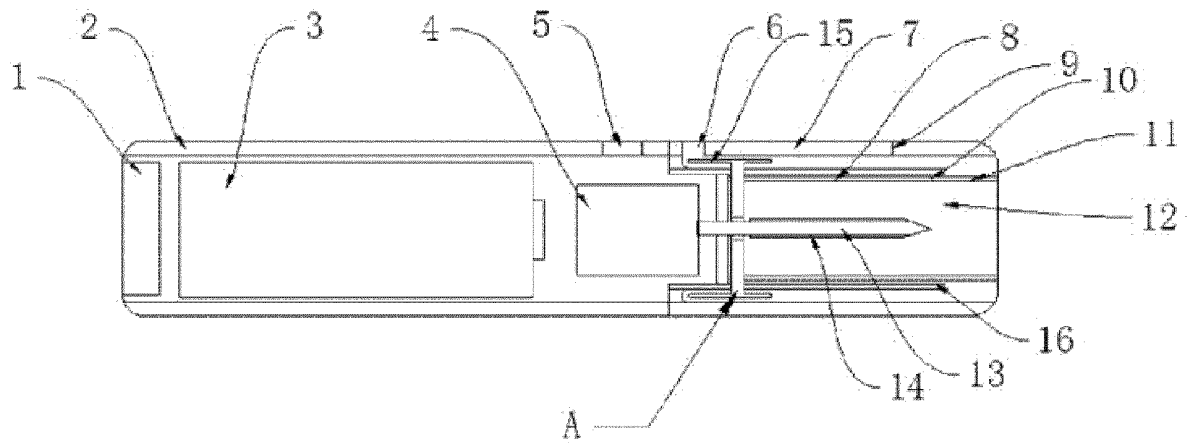


Fig.5

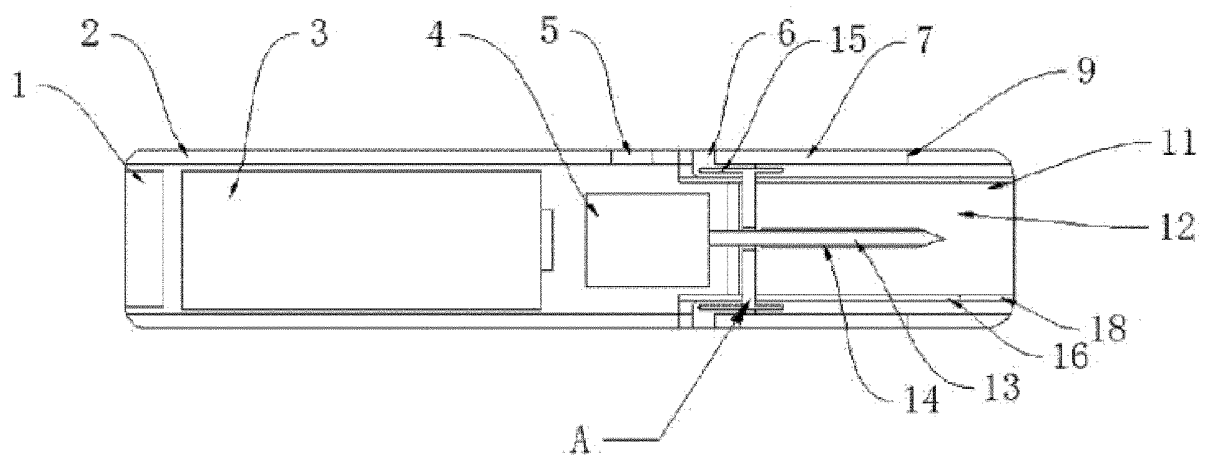


Fig.6

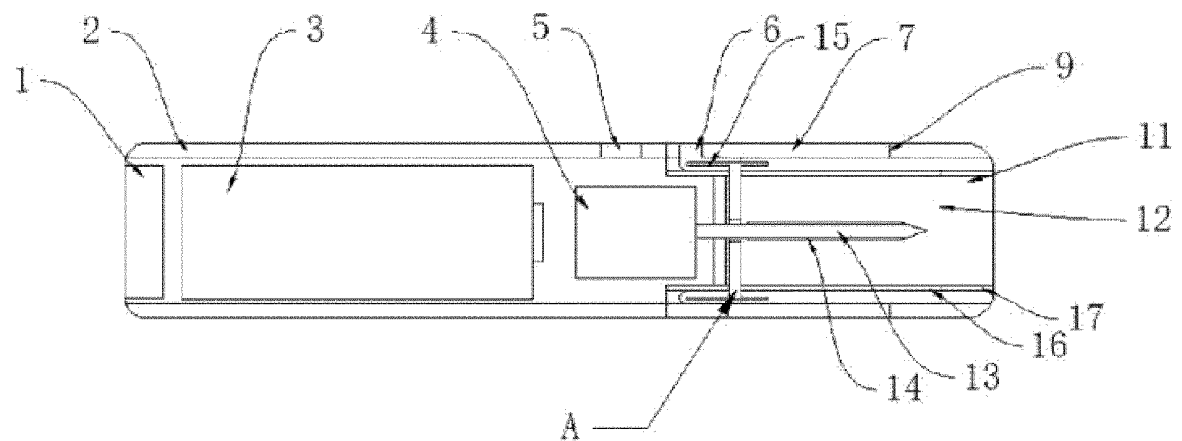


Fig.7

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2018/088912

A. CLASSIFICATION OF SUBJECT MATTER A24F 47/00(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) CNTXT; CNABS; CNKI; WOTXT; EPTXT; USTXT: 加热元件, 湖北中烟, 湖南中烟, 保护, 加热针, 加热器, 推, 拉, 滑动, 移动, 移出, 取出, heat+, protect+, push, pull, slide, glide, move																			
C. DOCUMENTS CONSIDERED TO BE RELEVANT																			
<table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>PX</td> <td>CN 107095344 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD.) 29 August 2017 (2017-08-29) entire document</td> <td>1-10</td> </tr> <tr> <td>X</td> <td>CN 105595422 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD.) 25 May 2016 (2016-05-25) description, paragraphs [0028], [0030], [0033], [0034] and [0039]-[0041], and figures 6 and 7</td> <td>1-7, 10</td> </tr> <tr> <td>A</td> <td>CN 104382235 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD. ET AL.) 04 March 2015 (2015-03-04) entire document</td> <td>1-10</td> </tr> <tr> <td>A</td> <td>CN 105029712 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD. ET AL.) 11 November 2015 (2015-11-11) entire document</td> <td>1-10</td> </tr> <tr> <td>A</td> <td>CN 105831812 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD.) 10 August 2016 (2016-08-10) entire document</td> <td>1-10</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	PX	CN 107095344 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD.) 29 August 2017 (2017-08-29) entire document	1-10	X	CN 105595422 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD.) 25 May 2016 (2016-05-25) description, paragraphs [0028], [0030], [0033], [0034] and [0039]-[0041], and figures 6 and 7	1-7, 10	A	CN 104382235 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD. ET AL.) 04 March 2015 (2015-03-04) entire document	1-10	A	CN 105029712 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD. ET AL.) 11 November 2015 (2015-11-11) entire document	1-10	A	CN 105831812 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD.) 10 August 2016 (2016-08-10) entire document	1-10	
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.																	
PX	CN 107095344 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD.) 29 August 2017 (2017-08-29) entire document	1-10																	
X	CN 105595422 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD.) 25 May 2016 (2016-05-25) description, paragraphs [0028], [0030], [0033], [0034] and [0039]-[0041], and figures 6 and 7	1-7, 10																	
A	CN 104382235 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD. ET AL.) 04 March 2015 (2015-03-04) entire document	1-10																	
A	CN 105029712 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD. ET AL.) 11 November 2015 (2015-11-11) entire document	1-10																	
A	CN 105831812 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD.) 10 August 2016 (2016-08-10) entire document	1-10																	
☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.																			
* Special categories of cited documents: “A” document defining the general state of the art which is not considered to be of particular relevance “E” earlier application or patent but published on or after the international filing date “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 22 June 2018	Date of mailing of the international search report 15 August 2018																		
Name and mailing address of the ISA/CN State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088 China Facsimile No. (86-10)62019451	Authorized officer Telephone No.																		

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2018/088912

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 107095344 A	29 August 2017	CN 206821989 U	02 January 2018
CN 105595422 A	25 May 2016	CN 105595422 B	27 February 2018
CN 104382235 A	04 March 2015	None	
CN 105029712 A	11 November 2015	CN 105029712 B	23 March 2018
CN 105831812 A	10 August 2016	WO 2017193958 A1	16 November 2017

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