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(54) **HEATING ASSEMBLY FOR USE IN SMOKING APPARATUS**

(57) Embodiments provide a heating assembly for a smoking device. In the embodiments, the heating assembly includes a first electrically insulating base part and a second electrically insulating base part connected therewith; the first electrically insulating base part is covered with a heat generating layer in an outside, the heat generating layer is provided with a current path for generating heat when a current passes, and the second electrically insulating base part is a non-conductive and non-heat-generating zone. The second electrically insulating base part is sleeved with a mounting seat in the outside, and the mounting seat is used for connecting the heating assembly to the smoking device. An electrode connection zone is provided on the heat generating layer close to the mounting seat, and the electrode connection zone includes a plurality of electrodes for connecting to a power source. The present disclosure can improve energy utilization rate and heating effect, reduce energy loss, and is durable and economical.

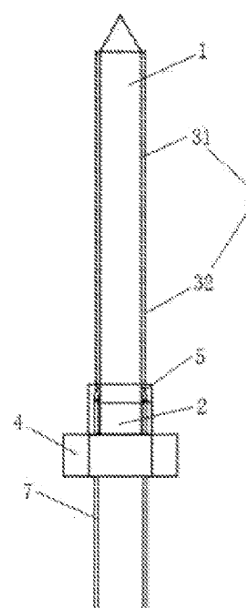


FIG. 3

Description

TECHNICAL FIELD

[0001] The present disclosure belongs to the technical field of novel tobacco products, and in particular, to a heating assembly for a smoking device.

BACKGROUND

[0002] In the prior art, the heating assembly is the key component of the smoking device. However, due to the heating assembly has many technical challenges including durability, low production cost, heat release, slow heat transfer to the housing, and low heat loss, there is a need to provide a heating assembly with high energy efficiency, good heating effect and low energy loss, to provide a heat source for heating tobacco material.

SUMMARY

[0003] The present disclosure is intended to provide a heating assembly for a smoking device, which can improve energy utilization rate and heating effect, reduce energy loss, and be durable and economical in view of the shortcomings of the prior art.

[0004] In order to solve the above-mentioned technical problems, the present disclosure adopts the following technical solutions: a heating assembly for a smoking device, comprising a first electrically insulating base part and a second electrically insulating base part connected with the first electrically insulating base part; the first electrically insulating base part being covered with a heat generating layer in an outside, the heat generating layer being provided with a current path for generating heat when a current passes, and the second electrically insulating base part being a non-conductive and non-heat-generating zone.

[0005] In an embodiment, the second electrically insulating base part is sleeved with a mounting seat in an outside, and the mounting seat is configured for connecting the heating assembly to the smoking device.

[0006] In an embodiment, the heat generating layer is provided with an electrode connection zone close to an end of the mounting seat, and the electrode connection zone comprises a plurality of electrodes configured for connecting to a power source.

[0007] In an embodiment, the electrode connection zone and outsides of the plurality of electrodes are jointly provided with a protecting part for preventing the electrode connection zone and the plurality of electrodes falling off and being damaged.

[0008] In an embodiment, the protecting part is made of glass, ceramics, enamel material or anti-oxidation metal.

[0009] In an embodiment, each of the plurality of electrodes is connected to a first end of the electrode lead; a second end of the electrode lead passes through the

mounting seat and is configured for connecting the power source.

[0010] In an embodiment, a top of the mounting seat extends in a direction of the electrode connection zone and is connected to the protecting part; or

the top of the mounting seat extends to a bottom of the electrode connection zone; or

the top of the mounting seat extends to the bottom of the electrode connection zone, and a certain distance is kept from the bottom of the electrode connection zone.

[0011] In an embodiment, the electrode connection zone and the heat generating layer are made of a same material; or the electrode connection zone is made of one or more selected from a group consisting of gold, silver, copper and palladium.

[0012] In an embodiment, the heat generating layer comprises one or more heating zones.

[0013] In an embodiment, when the heat generating layer comprises a plurality of heating zones, resistance values of the heating zones are all different, such that the resistance values is controlled to generate different amounts of heat, to control a temperature distribution of the heat generating layer.

[0014] In an embodiment, the heat generating layer comprises a first heating zone and a second heating zone connected to the first heating zone; the second heating zone has a resistance value smaller than a resistance value of the first heating zone, and the second heating zone is provided close to the mounting seat.

[0015] In an embodiment, the first heating zone is made of a first material, and the second heating zone is made of a second material; the first material has a resistivity coefficient greater than a resistivity coefficient of the second material.

[0016] In an embodiment, the first heating zone has a resistance per unit length greater than a resistance per unit length of the second heating zone.

[0017] In an embodiment, the heat generating layer comprises a third heating zone and a fourth heating zone connected to the third heating zone; the fourth heating zone has a thermal conductivity smaller than a thermal conductivity of the third heating zone, and the fourth heating zone is provided at a position close to the mounting seat.

[0018] In an embodiment, the heat generating layer is made of one or more selected from a group consisting of platinum, tungsten, nickel, chromium, iron, manganese, molybdenum, palladium, ruthenium and an alloy thereof.

[0019] In an embodiment, the mounting seat is made of one or more selected from a group consisting of ceramics, glass, zirconia, alumina, metal, alloy, inorganic porous material and polymer.

[0020] In an embodiment, the first electrically insulat-

ing base part and the second electrically insulating base part are made of ceramic materials or insulating materials, respectively; the ceramic material comprises zirconia and/or alumina.

[0021] In an embodiment, each of the first electrically insulating base part and the second electrically insulating base part has a cross-section with a shape of round, oval, rhombus, cube, cuboid or polygon; a top of the heating assembly is set as a tapered end.

[0022] In an embodiment, the heat generating layer is configured to be capable to reach a temperature of 250-400 °C during operation.

[0023] Compared with the prior art, the beneficial effects of the present disclosure are:

1. The heating assembly of the present disclosure is provided with a first electrically insulating base part and a second electrically insulating base part, the outside of the first electrically insulating base part is covered with a heat generating layer, and the second electrically insulating base part is a non-conductive and non-heating zone, such that it can achieve sufficient resistance heating while preventing heat transfer to the outer wall of the smoking device, and can effectively improve energy utilization and heating effect, reduce energy loss, and provide a good user experience.

2. The heating assembly of the present disclosure is provided with a mounting seat, such that it can effectively block the heat transferred from the heat generating layer when the heating assembly is operating, thereby further improving the energy utilization rate and heating effect, reducing energy loss, and further preventing the outer wall of the smoking device from overheating.

3. The heating assembly of the present disclosure is provided with a protecting part, such that it can prevent the exposed electrode connection zone and the plurality of electrodes from falling off after being directly contacted by the aerosol-generating substrate for a long time, thereby prolonging the service life of the electrode connection zone and the plurality of electrodes.

4. The top of the mounting seat of the heating assembly according to the present disclosure extends in the direction of the electrode connection zone, and is connected to the protecting part, extends to the bottom of the electrode connection zone, or maintains a certain distance from the bottom of the electrode connection zone, such that it can effectively prevent the exposed electrode lead from falling off after being directly contacted by the aerosol-generating substrate for a long time, thereby prolonging the service life of the electrode lead.

5. When the heat generating layer of the heating assembly of the present disclosure includes a plurality of heating zones, the resistance value of each heating zone is different, so that the resistance value is used to generate different heat to control the temperature distribution of the heat generating layer, which can prevent overheating or underheating of the aerosol-generating substrate, allowing it to satisfy aspiration requirements.

6. The resistance value of the second heating zone of the heating assembly of the present disclosure is smaller than the resistance value of the first heating zone, so that heat can be concentrated in the first heating zone. The second heating zone is configured to have a lower resistance, such that it can provide a relatively less Joule heat, the heat transferred to the mounting seat through the second heating zone is greatly reduced, which can further improve energy utilization and heating effect, reduce energy loss, and effectively prevent the outer wall temperature of the smoking device from being too high.

7. The thermal conductivity of the fourth heating zone of the heating assembly of the present disclosure is smaller than that of the third heating zone, such that it can greatly reduce the heat transferred to the mounting seat through the fourth heating zone, and can reduce the heat transferred to the mounting seat through the third heating zone, so that the energy utilization rate and heating effect can be further improved, the energy loss can be reduced, and the outer wall temperature of the smoking device can be effectively avoided from being too high.

8. The heating assembly of the present disclosure has a simple structure, is convenient to use, and has broad market prospects.

BRIEF DESCRIPTION OF DRAWINGS

[0024]

FIG. 1 shows a schematic top view showing a first embodiment of a heating assembly for a smoking device according to the present disclosure;

FIG. 2 shows a schematic structural diagram showing a second embodiment of a heating assembly for a smoking device according to the present disclosure;

FIG. 3 shows a schematic structural diagram showing a third embodiment of a heating assembly for a smoking device according to the present disclosure.

[0025] 1, first electrically insulating base part; 2, second electrically insulating base part; 3, heat generating

layer; 4, mounting seat; 5, electrode connection zone; 6, protecting part; 7, electrode lead.

DESCRIPTION OF EMBODIMENTS

[0026] The present disclosure will be further described below with reference to the embodiments shown in the accompanying drawings.

[0027] As shown in FIGS. 1 to 3, the present disclosure includes a first electrically insulating base part 1 and a second electrically insulating base part 2 connected to the first electrically insulating base part 1. The outside of the first electrically insulating base part 1 is covered with a heat generating layer 3, and a current path is provided on the heat generating layer 3 to generate heat when the current passes through. The second electrically insulating base part 2 is a non-conductive and non-heating area, which can not only achieve sufficient resistance heating, but also effectively prevent heat transfer to the outer wall of the smoking device, thereby improving energy utilization and heating effect and reducing energy loss.

[0028] In a specific embodiment, as shown in FIGS. 1-3, a mounting seat 4 is sleeved on the outside of the second electrically insulating base part 2, and the mounting seat 4 is used for connecting the heating assembly to the smoking device. When in use, since the mounting seat 4 itself has no current passing through it, no heat is generated, and the mounting seat 4 is sleeved on the outside of the second electrical insulating base part 2, which can effectively block the heat (heat cannot be transmitted to the mounting seat 4) transferred from the heat generating layer 3 when the heating assembly works, such that the energy utilization rate and heating effect can be further improved, the energy loss can be reduced, and the temperature of the outer wall of the smoking device can be further prevented from being too high.

[0029] In a specific embodiment, the heat generating layer 3 is coated on the outer surface of the first electrically insulating base part 1 by means of coating and/or printing, the process is simple and efficient.

[0030] In a specific embodiment, as shown in FIGS. 1 to 3, an electrode connection zone 5 is provided on the heat generating layer 3 near the end of the mounting seat 4. The electrode connection zone 5 includes a plurality of electrodes for connection to a power source. Preferably, the electrode connection zone 5 includes a plurality of sections, and each section is connected to a circuit together formed by the sections of the heat generating layer 3.

[0031] In a specific embodiment, as shown in FIG. 1, the outside of the electrode connection zone 5 is provided with a protecting part 6 for preventing the electrode connection zone 5 and the plurality of electrodes from falling off and being damaged. The protecting part 6 can prevent the exposed electrode connection zone 5 and the plurality of electrodes from falling off after being directly contacted by the aerosol-generating substrate for a long

time, thereby prolonging the service life of the electrode connection zone 5 and the plurality of electrodes.

[0032] In a specific embodiment, the protecting part 6 is made of glass, ceramic, enamel material or anti-oxidation metal.

[0033] In a specific embodiment, as shown in FIGS. 1 to 3, the electrode is connected to the first end of the electrode lead 7. The second end of the electrode lead 7 passes through the mounting seat 4 and is used to connect the power source. Therein, the external electrode leads 7 can be fixed to the connection zones using solder paste or other connection techniques.

[0034] In a preferred embodiment, the electrode connection zone 5 includes a plurality of parts, and the electrodes located in each part are connected to a control circuit through the electrode lead 7, and are connected to the power source through the control circuit.

[0035] In a specific embodiment, as shown in FIGS. 2 and 3, the top of the mounting seat 4 extends in the direction of the electrode connection zone 5 and is connected to the protecting part 6, which can effectively prevent the exposed electrode leads 7, part of which is located between the bottom of the electrode connection zone 5 and the mounting seat 4, falling off and being damaged after being directly contacted by the aerosol-generating substrate for a long time, so that the service life of the electrode lead 7 can be prolonged.

[0036] In a specific embodiment, the top of the mounting seat 4 extends to the bottom of the electrode connection zone 5 and covers the electrode lead 7 (the part between the bottom of the electrode connection zone 5 and the mounting seat 4), which can effectively prevent the exposed electrode lead 7 being damaged by falling off after being directly contacted by the aerosol-generating substrate for a long time, so that the service life of the electrode lead 7 can be prolonged.

[0037] In a specific embodiment, the top of the mounting seat 4 extends to the bottom of the electrode connection zone 5 and covers part of the length of the electrode lead 7, and maintains a certain distance from the bottom of the electrode connection zone 5, so as to avoid the exposed part of the length of the electrode lead 7 being damaged after being directly contacted by the aerosol-generating substrate for a long time, so that the service life of the electrode lead 7 can be prolonged.

[0038] In a specific embodiment, the electrode connection zone 5 and the heat generating layer 3 are made of the same material.

[0039] In a specific embodiment, the electrode connection zone 5 is made of one or more of gold, silver, copper and palladium.

[0040] In a specific embodiment, the electrode connection zone 5 is made of one or more heat-generating pastes selected from gold, silver, copper and palladium.

[0041] In a specific embodiment, the heat generating layer 3 includes one or more heating zones.

[0042] In a specific embodiment, when the heat generating layer 3 includes a plurality of heating zones, the

resistance values of the heating zones are all different, so that the resistance value can be controlled to generate different heat and the temperature distribution of the heat generating layer 3 can be controlled, which can prevent the temperature of the aerosol-generating substrate from being too high or insufficiently heated, so as to satisfy the suction requirement.

[0043] In a specific embodiment, the heat generating layer 3 is configured to be able to reach a temperature of 250-400 °C during operation, which can prevent the temperature of the aerosol-generating substrate from being too high or insufficiently heated, so as to provide a good suction experience.

[0044] In a specific embodiment, as shown in FIG. 3, the heat generating layer 3 includes a first heating zone 31 and a second heating zone 32 connected to the first heating zone 31. The resistance value of the second heating zone 32 is smaller than that of the first heating zone 31, the second heating zone 32 is provided close to the mounting seat 4. When the current passes through the heat generating layer 3, the heat generated by the first heating zone 31 is greater than the heat generated by the second heating zone 32, so that the heat can be concentrated in the first heating zone, and the second heating zone is configured to have a lower resistance, which can provide less Joule heat, so that the heat transferred to the mounting seat 4 via the second heating zone 32 is greatly reduced, thereby improving energy utilization and reducing energy loss, thereby effectively avoiding excessive temperature of the outer wall of the smoking device.

[0045] In a specific embodiment, the first heating zone 31 is made of a first material. The second heating zone 32 is made of a second material. Wherein, the resistivity coefficient of the first material is greater than that of the second material.

[0046] In a specific embodiment, the first heating zone 31 is made of nickel-chromium alloy, platinum, tungsten or alloy wire. The second heating zone is made of gold, silver or copper.

[0047] In a specific embodiment, the resistance per unit length of the first heating zone 31 is greater than the resistance per unit length of the second heating zone 32.

[0048] In a specific embodiment, the heat generating layer 3 includes a third heating zone and a fourth heating zone connected to the third heating zone. The thermal conductivity of the fourth heating zone is smaller than that of the third heating zone, and the fourth heating zone is provided close to the mounting seat 4, so that the heat transferred to the mounting seat 4 via the fourth heating zone is greatly reduced, and the heat transferred to the mounting seat 4 via the third heating zone can be reduced, such that the energy utilization rate can be improved, the energy loss can be reduced, and the outer wall temperature of the smoking device can be effectively prevented from being too high.

[0049] In a specific embodiment, the heat generating layer 3 is made of one or more selected from a group

consisting of platinum, tungsten, nickel, chromium, iron, manganese, molybdenum, palladium, ruthenium and an alloy thereof, so that the heat generating layer 3 can both be used for heating the aerosol-generating substrate, but also be used to monitor temperature during use.

[0050] In a specific embodiment, the heat generating layer 3 is made of one or more heating pastes selected from a group consisting of platinum, tungsten, nickel, chromium, iron, manganese, molybdenum, palladium, ruthenium and an alloy thereof, so that the heat generating layer 3 can both be used for heating the aerosol-generating substrate, but also be used to monitor the temperature during use.

[0051] In a specific embodiment, the mounting seat 4 is made of one or more selected from a group consisting of ceramics, glass, zirconia, alumina, metals, alloy, inorganic porous material and polymers.

[0052] In a specific embodiment, the first electrically insulating base part 1 and the second electrically insulating base part 2 are respectively made of ceramic material or insulating metal.

[0053] In a specific embodiment, the ceramic material includes zirconia and/or alumina.

[0054] In a specific embodiment, the cross-sections of the first electrically insulating base part 1 and the second electrically insulating base part 2 are set in a circle, an ellipse, a diamond, a cube, a cuboid or a polygon.

[0055] In a specific embodiment, the cross-section of the mounting seat 4 is provided in a circular shape, which can quickly engage the cylindrical second electrically insulating base part 2.

[0056] In a specific embodiment, the mounting seat 4 and the second electrically insulating base part 2 are male-female mating plug-in or snap-fit or screw-type fixing.

[0057] In a specific embodiment, the top of the heating assembly is provided with a tapered end to facilitate insertion into the aerosol-generating substrate.

[0058] As shown in FIGS. 1 to 3, when the present disclosure is adopted, the heating assembly is first fixed in the smoking device through the mounting seat 4, and then the second end of the electrode lead 7 is connected to the power source. The heat generating layer 3 generates heat after being energized, which can heat the aerosol-generating substrate.

[0059] The protection scope of the present disclosure is not limited to the above-mentioned embodiments. Obviously, those skilled in the art can make various changes and modifications to the present disclosure without departing from the scope and spirit of the present disclosure. If these changes and modifications belong to the scope of the claims of the present disclosure and their equivalents, the present disclosure is intended to include these changes and modifications.

Claims

1. A heating assembly for a smoking device, comprising a first electrically insulating base part (1) and a second electrically insulating base part (2) connected with the first electrically insulating base part (1); the first electrically insulating base part (1) being covered with a heat generating layer (3) in an outside, the heat generating layer (3) being provided with a current path for generating heat when a current passes, and the second electrically insulating base part (2) being a non-conductive and non-heat-generating zone.
2. The heating assembly for a smoking device according to claim 1, wherein the second electrically insulating base part (2) is sleeved with a mounting seat (4) in an outside, and the mounting seat (4) is configured for connecting the heating assembly to the smoking device.
3. The heating assembly for a smoking device according to claim 2, wherein the heat generating layer (3) is provided with an electrode connection zone (5) close to an end of the mounting seat (4), and the electrode connection zone (5) comprises a plurality of electrodes configured for connecting to a power source.
4. The heating assembly for a smoking device according to claim 3, wherein the electrode connection zone (5) and outsides of the plurality of electrodes are jointly provided with a protecting part (6) for preventing the electrode connection zone and the plurality of electrodes falling off and being damaged.
5. The heating assembly for a smoking device according to claim 4, wherein the protecting part (6) is made of glass, ceramics, enamel material or anti-oxidation metal.
6. The heating assembly for a smoking device according to claim 4, wherein each of the plurality of electrodes is connected to a first end of the electrode lead (7); a second end of the electrode lead (7) passes through the mounting seat (4) and is configured for connecting the power source.
7. The heating assembly for a smoking device according to claim 6, wherein a top of the mounting seat (4) extends in a direction of the electrode connection zone (5) and is connected to the protecting part (6); or the top of the mounting seat (4) extends to a bottom of the electrode connection zone (5); or the top of the mounting seat (4) extends to the bottom of the electrode connection zone (5), and a certain distance is kept from the bottom of the
8. The heating assembly for a smoking device according to claim 3, wherein the electrode connection zone (5) and the heat generating layer (3) are made of a same material; or the electrode connection zone (5) is made of one or more selected from a group consisting of gold, silver, copper and palladium.
9. The heating assembly for a smoking device according to claim 1, wherein the heat generating layer (3) comprises one or more heating zones.
10. The heating assembly for a smoking device according to claim 9, wherein when the heat generating layer (3) comprises a plurality of heating zones, resistance values of the heating zones are all different, such that the resistance values is controlled to generate different amounts of heat, to control a temperature distribution of the heat generating layer.
11. The heating assembly for a smoking device according to claim 10, wherein the heat generating layer (3) comprises a first heating zone (31) and a second heating zone (32) connected to the first heating zone (31); the second heating zone (32) has a resistance value smaller than a resistance value of the first heating zone (31), and the second heating zone (32) is provided close to the mounting seat (4).
12. The heating assembly for a smoking device according to claim 11, wherein the first heating zone (31) is made of a first material, and the second heating zone (32) is made of a second material; the first material has a resistivity coefficient greater than a resistivity coefficient of the second material.
13. The heating assembly for a smoking device according to claim 11, wherein the first heating zone (31) has a resistance per unit length greater than a resistance per unit length of the second heating zone (32).
14. The heating assembly for a smoking device according to claim 9, wherein the heat generating layer (3) comprises a third heating zone and a fourth heating zone connected to the third heating zone; the fourth heating zone has a thermal conductivity smaller than a thermal conductivity of the third heating zone, and the fourth heating zone is provided at a position close to the mounting seat (4).
15. The heating assembly for a smoking device according to claim 1, wherein the heat generating layer (3) is made of one or more selected from a group consisting of platinum, tungsten, nickel, chromium, iron, manganese, molybdenum, palladium, ruthenium and an alloy thereof.

16. The heating assembly for a smoking device according to claim 2, wherein the mounting seat (4) is made of one or more selected from a group consisting of ceramics, glass, zirconia, alumina, metal, alloy, inorganic porous material and polymer. 5
17. The heating assembly for a smoking device according to claim 1, wherein the first electrically insulating base part (1) and the second electrically insulating base part (2) are made of ceramic materials or insulating materials, respectively; the ceramic material comprises zirconia and/or alumina. 10
18. The heating assembly for a smoking device according to claim 1, wherein each of the first electrically insulating base part (1) and the second electrically insulating base part (2) has a cross-section with a shape of round, oval, rhombus, cube, cuboid or polygon; a top of the heating assembly is set as a tapered end. 15 20
19. The heating assembly for a smoking device according to claim 1, wherein the heat generating layer (3) is configured to be capable to reach a temperature of 250-400 °C during operation. 25

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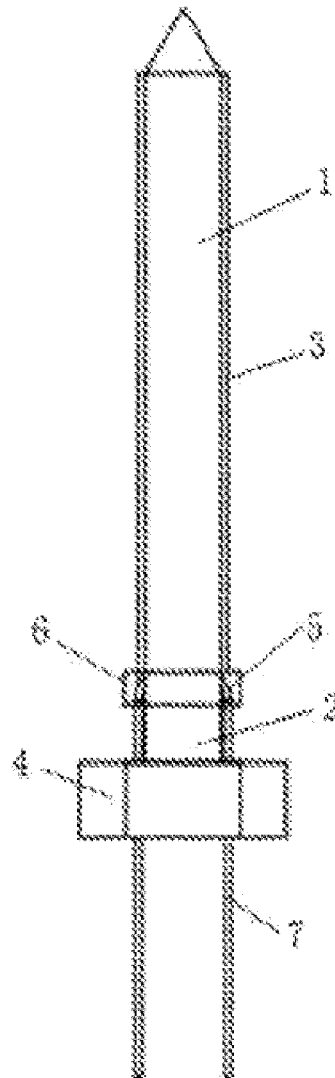


FIG. 1

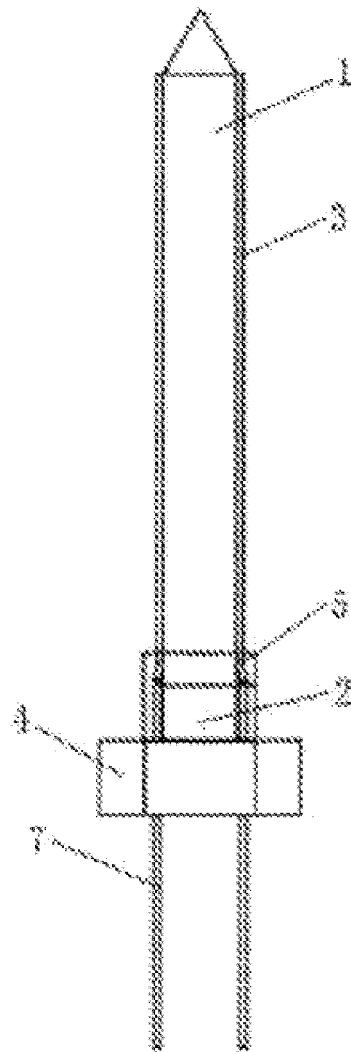


FIG. 2

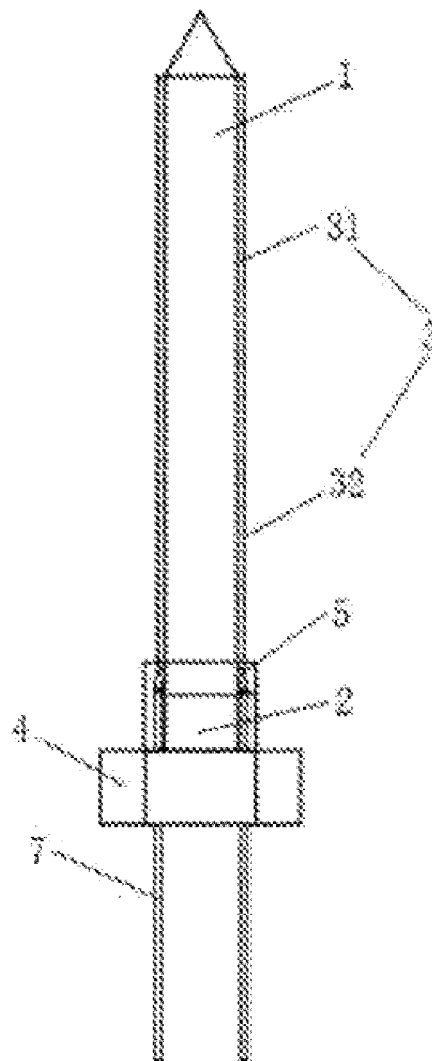


FIG. 3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2021/099164

A. CLASSIFICATION OF SUBJECT MATTER A24F 40/40(2020.01)i; A24F 40/46(2020.01)i; H05B 3/10(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 40/-; H05B 3/- Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) CNABS; CNTXT; DWPI; SIPOABS; USTXT; CNKI: 湖北中烟工业有限责任公司, 黄婷, 刘华臣, 陈义坤, 谭健, 王昊, 抽烟, 电子烟, 香烟, 烟草, 加热, 发热, 绝缘, 导电, 电流, 区域, 电阻, smoking, cigarette, heating, insulation, electric, conductor, current, area, resistance, resistor																		
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 112369694 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD.) 19 February 2021 (2021-02-19) claims 1-19, description paragraphs 0037-0068, figures 1-3</td> <td>1-19</td> </tr> <tr> <td>PX</td> <td>CN 213188067 U (HUBEI CHINA TOBACCO INDUSTRY CO., LTD.) 14 May 2021 (2021-05-14) claims 1-20, description paragraphs 0037-0068, figures 1-3</td> <td>1-19</td> </tr> <tr> <td>X</td> <td>CN 110959918 A (SHENZHEN MAISHI TECHNOLOGY CO., LTD.) 07 April 2020 (2020-04-07) description, paragraphs 0027-0049, and figures 1-8</td> <td>1-19</td> </tr> <tr> <td>A</td> <td>CN 111227314 A (SHENZHEN BUDDY TECHNOLOGY DEVELOPMENT CO., LTD.) 05 June 2020 (2020-06-05) entire description</td> <td>1-19</td> </tr> <tr> <td>A</td> <td>CN 110742321 A (CHINA TOBACCO HUNAN INDUSTRIAL CO., LTD.) 04 February 2020 (2020-02-04) entire description</td> <td>1-19</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	PX	CN 112369694 A (HUBEI CHINA TOBACCO INDUSTRY CO., LTD.) 19 February 2021 (2021-02-19) claims 1-19, description paragraphs 0037-0068, figures 1-3	1-19	PX	CN 213188067 U (HUBEI CHINA TOBACCO INDUSTRY CO., LTD.) 14 May 2021 (2021-05-14) claims 1-20, description paragraphs 0037-0068, figures 1-3	1-19	X	CN 110959918 A (SHENZHEN MAISHI TECHNOLOGY CO., LTD.) 07 April 2020 (2020-04-07) description, paragraphs 0027-0049, and figures 1-8	1-19	A	CN 111227314 A (SHENZHEN BUDDY TECHNOLOGY DEVELOPMENT CO., LTD.) 05 June 2020 (2020-06-05) entire description	1-19	A	CN 110742321 A (CHINA TOBACCO HUNAN INDUSTRIAL CO., LTD.) 04 February 2020 (2020-02-04) entire description	1-19
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Date of the actual completion of the international search 25 August 2021	Date of mailing of the international search report 07 September 2021																	
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

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