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(54) **PLUG-IN-TYPE LOW-OXYGEN HEATING SMOKING SET AND CIGARETTE SYSTEM INCLUDING SAME, AND SMOKING METHOD**

(57) The present disclosure relates to the field of heating non-combustion smoking set, and in particular, to a plug-in oxygen-deficient heating smoking set, as well as a cigarette system and smoking method containing the smoking set. The smoking set includes a smoke extraction element (6) that can be detached from the smoking set or fixed in a cigarette accommodating cavity (3); the smoke extraction element (6) includes a hollow smoke extraction cone (6-1) and a mainstream smoke forming tube (6-2) that can be fixedly or detachably

sleeved on the periphery of a cone body (6-1-1) of the smoke extraction cone (6-1); the mainstream smoke forming tube (6-2) has an internal cavity (6-2-1), and the outline of the cavity (6-2-1) has a Venturi tube structure. The mainstream smoke forming tube of the present disclosure has an internal cavity, and the outline of the cavity has a Venturi tube structure, the smoke extraction effect is enhanced, and the oxygen content of the tobacco section can be reduced while the fresh smoke generated in the enclosed space can be extracted, which can meet

the requirements of smoke concentration.

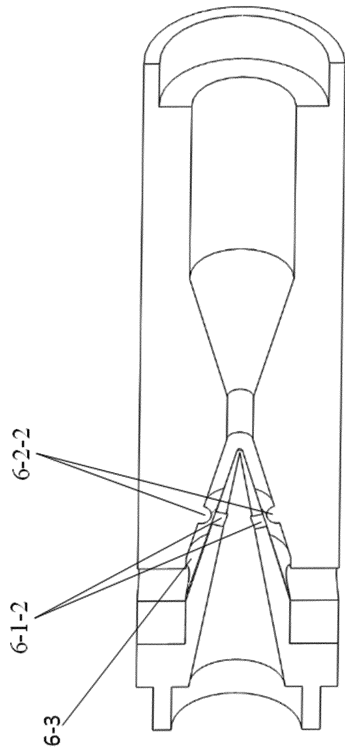


FIG.2

Description

TECHNICAL FIELD

[0001] The present disclosure relates to the field of heating non-combustion smoking set, and in particular, to a plug-in oxygen-deficient heating smoking set, as well as a cigarette system and smoking method containing the smoking set.

BACKGROUND

[0002] Traditional tobacco, with a history of hundreds of years, has been integrated into the lives of most smokers. With the improvement of people's living standards in recent years, people are paying increasing attention to the problems of smoking and health, and the harm of second-hand smoke, the harm caused by traditional tobacco products is becoming increasingly prominent. Meanwhile, with the implementation of *World Health Organization Framework Convention on Tobacco Control (WHO FCTC)*, especially the gradual expansion of smoking bans in public places around the world, the development environment of tobacco products has undergone major and profound changes, and the structure of tobacco products is accelerating adjustments in the direction of diversification and smoke-free. New tobacco products have gradually become a realistic choice for major multinational tobacco companies to cope with the declining sales of traditional tobacco products.

[0003] At present, most heated cigarettes use air as the carrier of smoke, in order to ensure that the tobacco does not burn, the heating temperature applied is usually low, generally not exceeding 300°C; compared with traditional cigarettes, the tobacco aroma components of new heating non-combustion cigarettes are difficult to completely release, and the amount of smoke is insufficient, thus, such cigarettes are more difficult to be accepted by traditional smokers. In addition, in order to ensure air circulation, the tobacco end of most heating non-combustion cigarettes has an open structure, namely, shredded tobacco or reconstituted tobacco are directly exposed, or connected to the outside through a certain airflow channel, in the process of pulling out the cartridge after smoking, the tobacco residue may fall off, which is easy to cause pollution to the smoking set, thus, after using such type of tobacco for a period of time, it takes time to clean the smoking set.

[0004] In case a closed cigarette structure is used, the oxygen content may decrease in the heating process (due to the replacement effect of the formed fresh smoke on the internal atmosphere), at this time, there may be no burning even if the heating temperature is increased, and the tobacco residue may not fall and contaminate the smoking set. However, as there is no carrier gas flowing through the tobacco, the migration of the smoke from the closed cigarette may become difficult.

[0005] The above problems will be solved if a device

for extracting smoke from closed cigarettes is designed.

SUMMARY

[0006] The present disclosure is proposed to solve the above-mentioned problems.

[0007] A first aspect of the present disclosure provides a plug-in oxygen-deficient heating smoking set, including a cigarette accommodating cavity 3, as well as a smoke extraction element 6 that can be detached from the smoking set or fixed in the cigarette accommodating cavity 3;

[0008] The smoke extraction element 6 includes a hollow smoke extraction cone 6-1 and a mainstream smoke forming tube 6-2 that is fixed or detachably sleeved on the periphery of the cone body 6-1-1 of the smoke extraction cone 6-1;

[0009] The hollow part of the hollow smoke extraction cone 6-1 has a tapered structure, the top and/or the side wall of the hollow smoke extraction cone 6-1 are provided with cone holes 6-1-2, and there is at least one cone hole 6-1-2;

[0010] The mainstream smoke forming tube 6-2 has an internal cavity 6-2-1, and the outline of the cavity 6-2-1 has a Venturi tube structure, namely, the cavity 6-2-1 has a tapered cavity and a gradual expansion cavity, the tapered cavity and the gradual expansion cavity are connected by a cylindrical cavity with a small inner diameter, at least one through hole 6-2-3 is disposed on the circumferential side wall of the mainstream smoke forming tube 6-2, the through hole 6-2-3 is located upstream of the tapered cavity of the mainstream smoke forming tube 6-2, the axial distance between the through hole 6-2-3 and the bottom surface of the cone body 6-1-1 is less than that between the cone hole 6-1-2 and the bottom surface of the cone body 6-1-1;

[0011] The inner diameter of the cigarette accommodating cavity 3 is larger than the outer diameter of the smoke extraction element 6;

[0012] There is an airflow channel 6-3 that is in airflow communication with the cavity 6-2-1 between the inner wall of the tapered cavity of the mainstream smoke forming tube 6-2 and the outer wall of the cone body 6-1-1.

[0013] Preferably, an annular boss 6-2-2 is provided on the circumferential side wall of the tapered cavity of the mainstream smoke forming tube 6-2 at a position corresponding to the cone hole 6-1-2.

[0014] Preferably, toward one side of the mainstream smoke forming tube 6-2, the airflow channel 6-3 becomes narrower. Namely, the airflow channel 6-3 becomes narrower from upstream to downstream. As airflow velocity gradually increases, Coanda effect and Venturi phenomenon are more significant, and smoke extraction effect is enhanced. In this disclosure, the airflow direction in the smoking set is recorded as from upstream to downstream.

[0015] Preferably, the bottom end of the cone of the smoke extraction cone 6-1 is provided with an axially extending sleeve section 6-1-3, and one end of the main-

stream smoke forming tube 6-2 away from the cone body 6-1-1 has an axially extending inner diameter enlarged section 6-2-4.

[0016] Preferably, a heating element 5 is provided on the circumferential side wall and/or bottom surface of the cigarette accommodating cavity 3.

[0017] Preferably, when the smoke extraction element 6 and the smoking set are disposed detachably, the shape of the smoke extraction element 6 is suitable for being accommodated in the cigarette accommodating cavity 3.

[0018] Preferably, when the smoke extraction element 6 is fixed in the cigarette accommodating cavity 3, a door 4 is provided at the bottom of the cigarette accommodating cavity 3, the door 4 includes a boss 4-1, a fixing and limiting mechanism 7 is disposed between the smoke extraction element 6 and the cigarette accommodating cavity 3.

[0019] Preferably, the fixing and limiting mechanism 7 includes a limiting member connected with the smoke extraction element 6 and a groove for axial sliding of the limiting member. The limiting member is clamped in the groove, when the limiting member axially slides in the groove, the smoke extraction element 6 is driven to move axially. The limiting member can also be clamped and fixed at a certain position in the groove to keep the smoke extraction element 6 fixed to the smoking set.

[0020] A second aspect of the present disclosure provides a plug-in oxygen-deficient heating cigarette system, which includes the plug-in oxygen-deficient heating cigarette set and segmented cigarette illustrated in the first aspect;

[0021] The segmented cigarette includes a tobacco section 1 and a filter section 2 which are detachably connected to each other, wherein one end surface and/or circumferential side surface of the tobacco section 1 is sealed by airtight foil, the unsealed end of the tobacco section 1 has an axially extending unfilled section 1-1, the filter section 2 has a bare section 2-1 that is not wrapped by tipping paper, the shapes of the unfilled section 1-1 and the exposed section 2-1 match each other, so that, when the tobacco section 1 and the filter section 2 are connected together, the bare section 2-1 is inserted into the unfilled section 1-1;

[0022] Moreover, the shape of the unfilled section 1-1 of the tobacco section 1 is also suitable for plugging with a sleeve section 6-1-3 of the smoke extraction cone 6-1, the shape of the exposed section 2-1 of the filter section 2 is also suitable for plugging with an inner diameter enlarged section 6-2-4 of the mainstream smoke forming tube 6-2.

[0023] A third aspect of the present disclosure provides a plug-in three-section cigarette, including the smoke extraction element 6 provided detachably from the smoking set in the first aspect and the segmented cigarette in the second aspect, the tobacco section 1 of the segmented cigarette is plugged in the sleeve sections 6-1-3 at both ends of the smoke extraction element 6, and the filter

section 2 is plugged in the inner diameter enlarged section 6-2-4 of the smoke extraction element 6.

[0024] A fourth aspect of the present disclosure provides a plug-in oxygen-deficient heating cigarette system smoking method, which applies the plug-in oxygen-deficient heating cigarette system of the second aspect, when the smoke extraction element 6 and its smoking set are disposed detachably, the smoking method is as follows:

When smoking, separate the tobacco section 1 and the filter section 2 of the segmented cigarette, and respectively assemble them to the sleeve section 6-1-3 and the inner diameter enlarged section 6-2-4 at both ends of the smoke extraction element 6, so as to form a segmented cigarette A; then insert the tobacco section 1 of the segmented cigarette A into the cigarette accommodating cavity 3, activate the heating element 5 to smoke;

When the smoke extraction element 6 is fixed in the cigarette accommodating cavity 3, the smoking method is as follows:

When smoking, separate the tobacco section 1 and the filter section 2 of the segmented cigarette, open the door 4 at the bottom of the cigarette accommodating cavity 3, and move the extraction element 6 through the fixing and limiting mechanism 7, assemble the tobacco section 1 and the filter section 2 to the sleeve section 6-1-3 and the inner diameter enlarged section 6-2-4 at both ends of the smoke extraction element 6 through the door 4 and the entrance of the cigarette accommodating cavity 3 respectively, after completing the assembly, move the smoke extraction element 6 back to the limited position, close the door 4, activate the heating element 5 to smoke;

After smoking, directly pull out the filter section 2, open the door 4, move the smoke extraction element 6 through the fixing and limiting mechanism 7 so that the door 4 at least partially exposes from the tobacco section 1, pull out the tobacco section 1;

Wherein, when the door 4 is closed, the boss 4-1 can compress the tobacco section 1 to achieve sealing effect. At this time, the circumferential heating element 5 partially or completely covers the tobacco section 1;

Activate the heating element 5 for smoking, there is a gap 8 between the cigarette accommodating cavity 3, the filter section 2, and the smoke extraction element 6, when smoking, the air does not flow through the tobacco section, but enters through the gap 8 and through holes 6-2-3, a negative pressure is generated in the internal cavity 6-2-1 of the smoke extraction element 6 due to Venturi effect, and the smoke

generated by the tobacco section 1 is extracted, the smoke is mixed with air to form mainstream smoke, which enters the consumer's mouth through the filter section 2;

Wherein, the tobacco section 1 and the filter section 2 are assembled to the sleeve section 6-1-3 and the inner diameter enlarged section 6-2-4 at both ends of the smoke extraction element 6 through the door 4 and the entrance of the cigarette accommodating cavity 3 respectively, namely, the tobacco section 1 is inserted from one end of the door 4, and the filter section 2 is inserted from the entrance of the cigarette accommodating cavity 3.

[0025] The above technical solutions can be freely combined without contradiction.

[0026] The principle of the present disclosure is as follows:

Coanda effect, also known as the wall-attachment

effect or Coanda effect, refers to when fluid flows over the surface of an object, due to surface friction, the fluid water flow or air flow has a tendency to depart from the original flow direction and change to flow along the surface of the protruding object.

Venturi phenomenon means that low pressure may be generated near the fluid flowing at high speed, causing adsorption. By utilizing Coanda effect, the air entering the small holes can flow along the surface of the smoke extraction cone; due to Venturi phenomenon, the gas flowing at high speed along the surface of the extraction cone may form a negative pressure area at the mouth of the extraction cone, due to the existence of pressure difference, the smoke generated by the closed tobacco section can be extracted.

[0027] By utilizing Coanda effect, Venturi phenomenon, and natural pressurization of the smoke generated when the shredded tobacco is heated, the fresh smoke generated in the enclosed space can be extracted.

[0028] The present disclosure has the following beneficial effects:

1. In the present disclosure, the air does not flow through the tobacco section, but a smoke extraction element is designed by utilizing Venturi effect and Coanda effect to extract the fresh smoke generated in the enclosed space, which can reduce oxygen content, thus the heating temperature can be appropriately increased, the cigarettes may not burn, and it is easier to achieve the diversity of the tobacco section formulas, aroma components in tobacco can be released fully and continuously, making the taste closer to traditional tobacco, thus it is easier to be accepted by traditional smokers. In particular, the

mainstream smoke forming tube has an internal cavity, the outline of the cavity has a Venturi tube structure, the smoke extraction effect is enhanced, which can reduce the oxygen content of the tobacco section while extracting the fresh smoke generated in the enclosed space, thus, while the cigarette does not burn, the temperature of the heated cigarette can be appropriately increased to meet the requirements of smoke concentration.

2. In the preferred technical solution, the smoke extraction element is kept inside the cigarette accommodating cavity by means of a fixing and limiting mechanism, so that it is not easy to fall and lose. There is a door at the bottom of the cigarette accommodating cavity in order to move the smoke extraction element, the tobacco section and the filter section are respectively inserted/disassembled at both ends of the cigarette accommodating cavity, which is convenient for operation. In the prior art, the bottom of the cigarette accommodating cavity is sealed, the cigarette can only be pulled out from the end of the filter after the cigarette is smoked. At this time, the cigarette is heated to expand and becomes more brittle, making it more difficult to take out.

3. In the preferred technical solution, when heating, the boss on the door presses the tobacco section to form a closed structure, so that no tobacco residue will fall, there is no need to clean the smoking set frequently.

4. In the preferred technical solution, toward one side of the mainstream smoke forming tube, the airflow channel becomes narrower. As airflow velocity gradually increases, Coanda effect and Venturi phenomenon are more significant, and the smoke extraction effect is enhanced.

5. In the preferred technical solution, an annular boss is provided on the circumferential side wall of the tapered cavity of the Venturi structure of the mainstream smoke forming tube of the smoke extraction element at a position corresponding to the cone hole, the annular boss reduces the flow area of the airflow channel at the cone hole, further increasing the gas flow rate while reducing the pressure, making Venturi phenomenon more significant and further enhancing the effect of smoke extraction.

BRIEF DESCRIPTION OF THE DRAWINGS

[0029]

FIG. 1 is an axial cross-sectional view of the parts of the split smoke extraction element of Embodiment 1.

FIG.2 is an axial cross-sectional view of the integrated smoke extraction element in Embodiment 1.

FIG.3 is an axial cross-sectional view of a plug-in oxygen-deficient heating smoking set of Embodiment 2.

FIG.4 is an axial cross-sectional view of the plug-in oxygen-deficient heating cigarette system of Embodiment 3.

FIG.5 is a schematic view of the overall structure of the segmented cigarette of Embodiment 3.

FIG.6 is an axial cross-sectional view of the parts of the segmented cigarette of Embodiment 3.

FIG.7 is an axial cross-sectional view of the parts of the split smoke extraction element of Embodiment 6.

FIG.8 is an axial cross-sectional view of the plug-in three-section cigarette-segmented cigarette A of Embodiment 7.

List of signs in the drawings:

[0030] 1. Tobacco section, 1-1. Unfilled section, 2. Filter section, 2-1. Bare section, 3. Cigarette accommodating cavity, 4. Door, 4-1. Boss, 5. Heating element, 6. Smoke extraction element, 6-1. Smoke extraction cone, 6-1-1. Cone body, 6-1-2. Cone hole, 6-1-3. Sleeve section, 6-2. Smoke transmission tube, 6-2-1. Internal cavity, 6-2-2. Annular boss, 6-2-3. Through hole, 6-2-4. Inner diameter enlarged section, 6-3. Airflow channel, 7. Fixing and limiting mechanism, 8. Gap.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0031] The present disclosure will be further explained below through specific embodiments.

Embodiment 1

[0032] A plug-in oxygen-deficient heating smoking set, including a cigarette accommodating cavity 3, as well as a smoke extraction element 6 that can be detached from the smoking set;

[0033] The smoke extraction element 6 includes a hollow smoke extraction cone 6-1 and a mainstream smoke forming tube 6-2 that is fixed or detachably sleeved on the periphery of the cone body 6-1-1 of the smoke extraction cone 6-1;

[0034] The hollow part of the hollow smoke extraction cone 6-1 has a tapered structure, and the side wall of the hollow smoke extraction cone 6-1 has two cone holes 6-1-2;

[0035] The mainstream smoke forming tube 6-2 has an internal cavity 6-2-1, and the outline of the cavity 6-2-1 has a Venturi tube structure, namely, the tapered structure and the gradual expansion structure are connected by a cylindrical cavity with a small inner diameter, at least one through hole 6-2-3 is disposed on the circumferential side wall of the mainstream smoke forming tube 6-2, the through hole 6-2-3 is located upstream of the tapered cavity of the mainstream smoke forming tube 6-2, the axial distance between the through hole 6-2-3 and the bottom surface of the cone body 6-1-1 is less than that between the cone hole 6-1-2 and the bottom surface of the cone body 6-1-1;

[0036] The inner diameter of the cigarette accommodating cavity 3 is larger than the outer diameter of the smoke extraction element 6;

[0037] There is an airflow channel 6-3 that is in airflow communication with the cavity 6-2-1 between the inner wall of the tapered cavity of the mainstream smoke forming tube 6-2 and the outer wall of the cone body 6-1-1.

[0038] An annular boss 6-2-2 is provided on the circumferential side wall of the tapered cavity of the mainstream smoke forming tube 6-2 at a position corresponding to the cone hole 6-1-2.

[0039] Toward one side of the mainstream smoke forming tube 6-2, the airflow channel 6-3 becomes narrower. As airflow velocity gradually increases, Coanda effect and Venturi phenomenon are more significant, and the smoke extraction effect is enhanced.

[0040] The bottom end of the cone of the smoke extraction cone 6-1 is provided with an axially extending sleeve section 6-1-3, and one end of the mainstream smoke forming tube 6-2 away from the cone body 6-1-1 has an axially extending inner diameter enlarged section 6-2-4.

[0041] A heating element 5 is provided on the bottom surface and the circumferential side wall of the cigarette accommodating cavity 3;

[0042] The shape of the smoke extraction element 6 is suitable for being accommodated in the cigarette accommodating cavity 3.

[0043] The axial cross-sectional view of the parts when the smoke extraction element 6 has a split structure is shown in FIG. 1, at this time, the mainstream smoke forming tube 6-2 is fixedly sleeved on the outer periphery of the cone body 6-1-1 of the smoke extraction cone 6-1.

[0044] The axial cross-sectional view of the smoke extraction element 6 when it has an integrated structure is shown in FIG. 2, at this time, the mainstream smoke forming tube 6-2 is fixedly sleeved on the outer periphery of the cone body 6-1-1 of the smoke extraction cone 6-1, and the cone hole 6-1-2 is located on the side wall of the cone body 6-1-1.

Embodiment 2

[0045] As shown in FIG. 3, a plug-in oxygen-deficient heating smoking set, including a cigarette accommodating cavity 3, as well as a smoke extraction element 6 that can be fixed in the cigarette accommodating cavity 3;

[0046] The smoke extraction element 6 includes a hollow smoke extraction cone 6-1 and a mainstream smoke forming tube 6-2 that is fixed or detachably sleeved on the periphery of the cone body 6-1-1 of the smoke extraction cone 6-1;

[0047] The hollow part of the hollow smoke extraction cone 6-1 has a tapered structure, the top of the hollow smoke extraction cone 6-1 is provided with cone holes 6-1-2, and there is at least one cone hole 6-1-2;

[0048] The mainstream smoke forming tube 6-2 has an internal cavity 6-2-1, and the outline of the cavity 6-2-1

has a Venturi tube structure, namely, the tapered cavity and the gradual expansion cavity are connected by a cylindrical cavity with a small inner diameter, at least one through hole 6-2-3 is disposed on the circumferential side wall of the mainstream smoke forming tube 6-2, the through hole 6-2-3 is located upstream of the tapered cavity of the mainstream smoke forming tube 6-2, the axial distance between the through hole 6-2-3 and the bottom surface of the cone body 6-1-1 is less than that between the cone hole 6-1-2 and the bottom surface of the cone body 6-1-1;

[0049] The inner diameter of the cigarette accommodating cavity 3 is larger than the outer diameter of the smoke extraction element 6. A door 4 is provided at the bottom of the cigarette accommodating cavity 3, and the door 4 includes a boss 4-1, a fixing and limiting mechanism 7 is provided between the smoke extraction element 6 and the cigarette accommodating cavity 3, the fixing and limiting mechanism 7 can fix the position of the smoke extraction element 6 relative to the smoking set, it can also drive the smoke extraction element 6 to move axially. An airflow channel 6-3 is in airflow communication with the cavity 6-2-1 between the inner wall of the tapered cavity of the mainstream smoke forming tube 6-2 and the outer wall of the cone body 6-1-1, toward one side of the mainstream smoke forming tube 6-2, the airflow channel 6-3 becomes narrower. At this time, as airflow velocity gradually increases, Coanda effect and Venturi phenomenon are more significant, and the smoke extraction effect is enhanced.

[0050] The bottom end of the cone of the smoke extraction cone 6-1 is provided with an axially extending sleeve section 6-1-3, and one end of the mainstream smoke forming tube 6-2 away from the cone body 6-1-1 has an axially extending inner diameter enlarged section 6-2-4.

[0051] A heating element 5 is provided on the circumferential side wall of the cigarette accommodating cavity 3.

[0052] An annular boss 6-2-2 is provided on the circumferential side wall of the tapered cavity of the mainstream smoke forming tube 6-2 at a position corresponding to the cone hole 6-1-2.

[0053] Certainly, in other solutions of Embodiment 2, the smoke extraction element 6 may also have a split structure, as shown in FIG. 1.

Embodiment 3

[0054] As shown in FIGS. 4, 5, and 6, a plug-in oxygen-deficient heating cigarette system, including the oxygen-deficient heating smoking set and the segmented cigarette illustrated in Embodiment 2;

[0055] The segmented cigarette includes a tobacco section 1 and a filter section 2 which are detachably connected to each other, wherein one end surface and/or circumferential side surface of the tobacco section 1 is sealed by an airtight foil, the unsealed end of the tobacco

section 1 has an axially extending unfilled section 1-1, the filter section 2 has a bare section 2-1 that is not wrapped by tipping paper, the shapes of the unfilled section 1-1 and the exposed section 2-1 match each other, so that, when the tobacco section 1 and the filter section 2 are connected together, the bare section 2-1 is inserted into the unfilled section 1-1;

[0056] Moreover, the shape of the unfilled section 1-1 of the tobacco section 1 is also suitable for plugging with the sleeve section 6-1-3 of the smoke extraction cone 6-1, the shape of the exposed section 2-1 of the filter section 2 is also suitable for plugging with the inner diameter enlarged section 6-2-4 of the mainstream smoke forming tube 6-2.

[0057] FIG.4 is an axial cross-sectional view of the plug-in oxygen-deficient heating cigarette system of Embodiment 3, and the arrow direction in the figure is the airflow direction during smoking. FIG.5 is a schematic view of the overall structure of the segmented cigarette of Embodiment 3. FIG.6 is an axial cross-sectional view of the parts of the segmented cigarette of Embodiment 3.

Embodiment 4

[0058] A plug-in oxygen-deficient heating cigarette smoking method, which applies the plug-in oxygen-deficient heating non-combustion cigarette system of Embodiment 1, when the smoke extraction element 6 and its smoking set are disposed detachably, the smoking method is as follows:

When smoking, separate the tobacco section 1 and the filter section 2 of the segmented cigarette, and respectively assemble them to the sleeve section 6-1-3 and the inner diameter enlarged section 6-2-4 at both ends of the smoke extraction element 6, so as to form a segmented cigarette A; insert the tobacco section 1 of the segmented cigarette A into the cigarette accommodating cavity 3, activate the heating element 5 to smoke.

Embodiment 5

[0059] A plug-in oxygen-deficient heating cigarette smoking method applies the oxygen-deficient heating non-combustion cigarette system illustrated in Embodiment 2, the smoke extraction element 6 is fixed in the cigarette accommodating cavity 3, the smoking method is as follows:

When smoking, separate the tobacco section 1 and the filter section 2 of the segmented cigarette, open the door 4 at the bottom of the cigarette accommodating cavity 3, and move the extraction element 6 through the fixing and limiting mechanism 7, assemble the tobacco section 1 and the filter section 2 to the sleeve section 6-1-3 and the inner diameter enlarged section 6-2-4 at both ends of the smoke extraction element 6 through the door 4 and the entrance of the cigarette accommodating cavity 3 re-

spectively, after completing the assembly, move the smoke extraction element 6 back to the limited position, close the door 4, activate the heating element 5 to smoke;

After smoking, directly pull out the filter section 2, 5
open the door 4, move the smoke extraction element 6 through the fixing and limiting mechanism 7 so that the door 4 at least partially exposes from the tobacco section 1, pull out the tobacco section 1;
Wherein, when the door 4 is closed, the boss 4-1 10
can compress the tobacco section 1 to achieve sealing effect. At this time, the circumferential heating element 5 completely covers the tobacco section 1;
Activate the heating element 5 for smoking, there is a gap 8 between the cigarette accommodating cavity 3, the filter section 2, and the smoke extraction element 6, when smoking, the air does not flow through the tobacco section, but enters through the gap 8 15
and through holes 6-2-3, a negative pressure is generated in the internal cavity 6-2-1 of the smoke extraction element 6 due to Venturi effect, and the smoke generated by the tobacco section 1 is extracted, the smoke is mixed with air to form mainstream smoke, which enters the consumer's mouth through the filter section 2; 20

Wherein, the tobacco section 1 and the filter section 2 are assembled to the sleeve section 6-1-3 and the inner diameter enlarged section 6-2-4 at both ends of the smoke extraction element 6 through the door 4 and the entrance of the cigarette accommodating cavity 3 respectively, namely, the tobacco section 1 is inserted from one end of the door 4, and the filter section 2 is inserted from the entrance of the cigarette accommodating cavity 3; 25

When smoking, the airflow direction is shown in FIG. 4. There is a gap 8 between the cigarette accommodating cavity 3, the filter section 2, and the smoke extraction element 6, when smoking, the air does not flow through the tobacco section, but enters through the gap 8 and through hole 6-2-3, a negative pressure is generated in the internal cavity 6-2-1 of the smoke extraction element 6 due to Venturi effect, and the smoke generated by the tobacco section 1 is extracted, the smoke is mixed with air to form mainstream smoke, entering the consumer's mouth through the filter section. 30

Embodiment 6

[0060] The differences from Embodiment 1 are as follows: 35

An annular boss 6-2-2 is not provided on the circumferential side wall of the tapered cavity of the mainstream smoke forming tube 6-2 at a position corresponding to the cone hole 6-1-2. There is one cone hole 6-1-2 disposed at the top of the hollow smoke extraction cone 6-1. An axial cross-sectional view of 40

the parts when the smoke extraction element 6 has a split structure is shown in FIG.7. Namely,

A plug-in oxygen-deficient heating smoking set, including a cigarette accommodating cavity 3, as well as a smoke extraction element 6 that can be detached from the smoking set;

The smoke extraction element 6 includes a hollow smoke extraction cone 6-1 and a mainstream smoke forming tube 6-2 that can be fixedly or detachably sleeved on the periphery of the cone body 6-1-1 of the smoke extraction cone 6-1;

The hollow part of the hollow smoke extraction cone 6-1 has a tapered structure, and the top of the hollow smoke extraction cone 6-1 has a cone hole 6-1-2, The mainstream smoke forming tube 6-2 has an internal cavity 6-2-1, and the outline of the cavity 6-2-1 has a Venturi tube structure, namely, the tapered cavity and the gradual expansion cavity are connected by a cylindrical cavity with a small inner diameter, at least one through hole 6-2-3 is disposed on the circumferential side wall of the mainstream smoke forming tube 6-2, the through hole 6-2-3 is located upstream of the tapered cavity of the mainstream smoke forming tube 6-2, the axial distance between the through hole 6-2-3 and the bottom surface of the cone body 6-1-1 is less than that between the cone hole 6-1-2 and the bottom surface of the cone body 6-1-1; 45

The inner diameter of the cigarette accommodating cavity 3 is larger than the outer diameter of the smoke extraction element 6; 50

[0061] There is an airflow channel 6-3 that is in airflow communication with the cavity 6-2-1 between the inner wall of the tapered cavity of the mainstream smoke forming tube 6-2 and the outer wall of the cone body 6-1-1. 55

[0062] Toward one side of the mainstream smoke forming tube 6-2, the airflow channel 6-3 becomes narrower. As airflow velocity gradually increases, Coanda effect and the Venturi phenomenon are more significant, and the smoke extraction effect is enhanced.

[0063] The bottom end of the cone of the smoke extraction cone 6-1 is provided with an axially extending sleeve section 6-1-3, and one end of the mainstream smoke forming tube 6-2 away from the cone body 6-1-1 has an axially extending inner diameter enlarged section 6-2-3; 60

[0064] A heating element 5 is provided on the bottom surface and the circumferential side wall of the cigarette accommodating cavity 3; 65

[0065] The shape of the smoke extraction element 6 is suitable for being accommodated in the cigarette accommodating cavity 3.

Embodiment 7

[0066] As shown in FIG.8, a plug-in three-section cigarette, including the smoke extraction element 6 of Em-

bodiment 6 and that can be detached from the smoking set, and the segmented cigarette of Embodiment 3, the tobacco section 1 of the segmented cigarette is plugged in the sleeve sections 6-1-3 at both ends of the smoke extraction element 6, the filter section 2 is plugged in the inner diameter enlarged section 6-2-4 of the smoke extraction element 6. An axial cross-sectional view of a plug-in three-section cigarette in case the smoke extraction element 6 has a split structure as shown in FIG.8.

[0067] The above are only specific embodiments of the present disclosure, the protection scope of the present disclosure is not limited thereto, any person skilled in the art can easily think of changes or substitutions within the technical scope disclosed by the present disclosure, and they shall be covered by the protection scope of the present disclosure. Thus, the protection scope of the present disclosure shall be subject to the protection scope of the claims.

Claims

1. A plug-in oxygen-deficient heating smoking set, comprising a cigarette accommodating cavity (3), wherein the smoking set also comprises a smoke extraction element (6) that can be detached from the smoking set or fixed in a cigarette accommodating cavity (3);

The smoke extraction element (6) comprises a hollow smoke extraction cone (6-1) and a mainstream smoke forming tube (6-2) that can be fixedly or detachably sleeved on the peripheral of a cone body (6-1-1) of the smoke extraction cone (6-1);

The hollow part of the hollow smoke extraction cone (6-1) has a tapered structure, and the top and/or the side wall of the hollow smoke extraction cone (6-1) has a cone hole (6-1-2), there is at least one cone hole (6-1-2);

The mainstream smoke forming tube (6-2) has an internal cavity (6-2-1), and the outline of the cavity (6-2-1) has a Venturi tube structure, namely, the tapered structure and the gradual expansion structure are connected by a cylindrical cavity with a small inner diameter, at least one through hole (6-2-3) is disposed on the circumferential side wall of the mainstream smoke forming tube (6-2), the through hole (6-2-3) is located upstream of the tapered cavity of the mainstream smoke forming tube (6-2), the axial distance between the through hole (6-2-3) and the bottom surface of the cone body (6-1-1) is less than that between the cone hole (6-1-2) and the bottom surface of the cone body (6-1-1);

The inner diameter of the cigarette accommodating cavity (3) is greater than the outer diameter of the smoke extraction element (6);

An airflow channel (6-3) connected to the cavity (6-2-1) is located between the inner wall of the tapered cavity of the mainstream smoke forming tube (6-2) and the outer wall of the cone body (6-1-1).

2. The plug-in oxygen-deficient heating smoking set of claim 1, wherein an annular boss (6-2-2) is disposed on the circumferential side wall of the tapered cavity of the mainstream smoke forming tube (6-2) at a position corresponding to the cone hole (6-1-2).
3. The plug-in oxygen-deficient heating smoking set of claim 1 or 2, wherein the airflow channel (6-3) becomes narrower toward the side of the mainstream smoke forming tube (6-2).
4. The plug-in oxygen-deficient heating smoking set of claim 1 or 2, wherein one bottom end of the cone of the smoke extraction cone (6-1) is provided with an axially extending sleeve section (6-1-3), one end of the mainstream smoke forming tube (6-2) away from the cone body (6-1-1) has an axially extending inner diameter enlarged section (6-2-4).
5. The plug-in oxygen-deficient heating smoking set of claim 1 or 2, wherein a heating element (5) is disposed on the circumferential side wall and/or bottom surface of the cigarette accommodating cavity (3).
6. The plug-in oxygen-deficient heating smoking set of claim 1 or 2, wherein, when the smoke extraction element (6) and the smoking set are disposed detachably, the shape of the smoke extraction element (6) is suitable for being accommodated in the cigarette accommodating cavity (3).
7. The plug-in oxygen-deficient heating smoking set of claim 1 or 2, wherein when the smoke extraction element (6) is fixed in the cigarette accommodating cavity (3), a door (4) is disposed at the bottom of the cigarette accommodating cavity (3), the door (4) comprises a boss (4-1), a fixing and limiting mechanism (7) is disposed between the smoke extraction element (6) and the cigarette accommodating cavity (3).
8. A plug-in oxygen-deficient heating cigarette system, wherein the system includes the plug-in oxygen-deficient heating cigarette set and segmented cigarette of any one of claims 1-5;

The segmented cigarette comprises a tobacco section (1) and a filter section (2) which are detachably connected to each other, wherein one end surface and/or circumferential side surface of the tobacco section (1) is sealed by airtight foil, the unsealed end of the tobacco section (1)

has an axially extending unfilled section (1-1), the filter section (2) has a bare section (2-1) that is not wrapped by tipping paper, the shapes of the unfilled section (1-1) and the exposed section (2-1) match each other, so that, when the tobacco section (1) and the filter section (2) are connected together, the bare section (2-1) is inserted into the unfilled section (1-1); Moreover, the shape of an unfilled section (1-1) of the tobacco section (1) is also suitable for plugging with the sleeve section (6-1-3) of the smoke extraction cone (6-1), the shape of an exposed section (2-1) of the filter section (2) is also suitable for plugging with the inner diameter enlarged section (6-2-4) of the mainstream smoke forming tube (6-2).

9. A plug-in three-section cigarette, wherein it comprises the smoke extraction element (6) disposed detachably from the smoking set of any one of claims 1-6 and the segmented cigarette of claim 8, the tobacco section (1) of the segmented cigarette is plugged in the sleeve sections (6-1-3) at both ends of the smoke extraction element (6), and the filter section (2) is plugged in the inner diameter enlarged section (6-2-4) of the element (6).
10. A plug-in oxygen-deficient heating cigarette smoking method, wherein the method applies the plug-in oxygen-deficient heating cigarette system of claim 8, when the smoke extraction element (6) and its smoking set are disposed detachably, the smoking method is as follows:

When smoking, separate the tobacco section (1) and the filter section (2) of the segmented cigarette, and respectively assemble them to the sleeve section (6-1-3) and the inner diameter enlarged section (6-2-4) at both ends of the smoke extraction element (6), so as to form a segmented cigarette A; then insert the tobacco section (1) of the segmented cigarette A into the cigarette accommodating cavity (3), activate the heating element (5) to smoke; When the smoke extraction element (6) is fixed in the cigarette accommodating cavity (3), the smoking method is as follows:

When smoking, separate the tobacco section (1) and the filter section (2) of the segmented cigarette, open the door (4) at the bottom of the cigarette accommodating cavity (3), and move the extraction element (6) through the fixing and limiting mechanism (7), assemble the tobacco section (1) and the filter section (2) to the sleeve section (6-1-3) and the inner diameter enlarged section (6-2-4) at both ends of the smoke

extraction element (6) through the door (4) and the entrance of the cigarette accommodating cavity (3) respectively, after completing the assembly, move the smoke extraction element (6) back to the limited position, close the door (4), activate the heating element (5) to smoke; After smoking, pull out the filter section (2) directly, open the door (4), move the smoke extraction element (6) through the fixing and limiting mechanism (7) so that the door (4) at least partially exposes from the tobacco section (1), so as to pull out the tobacco section (1).

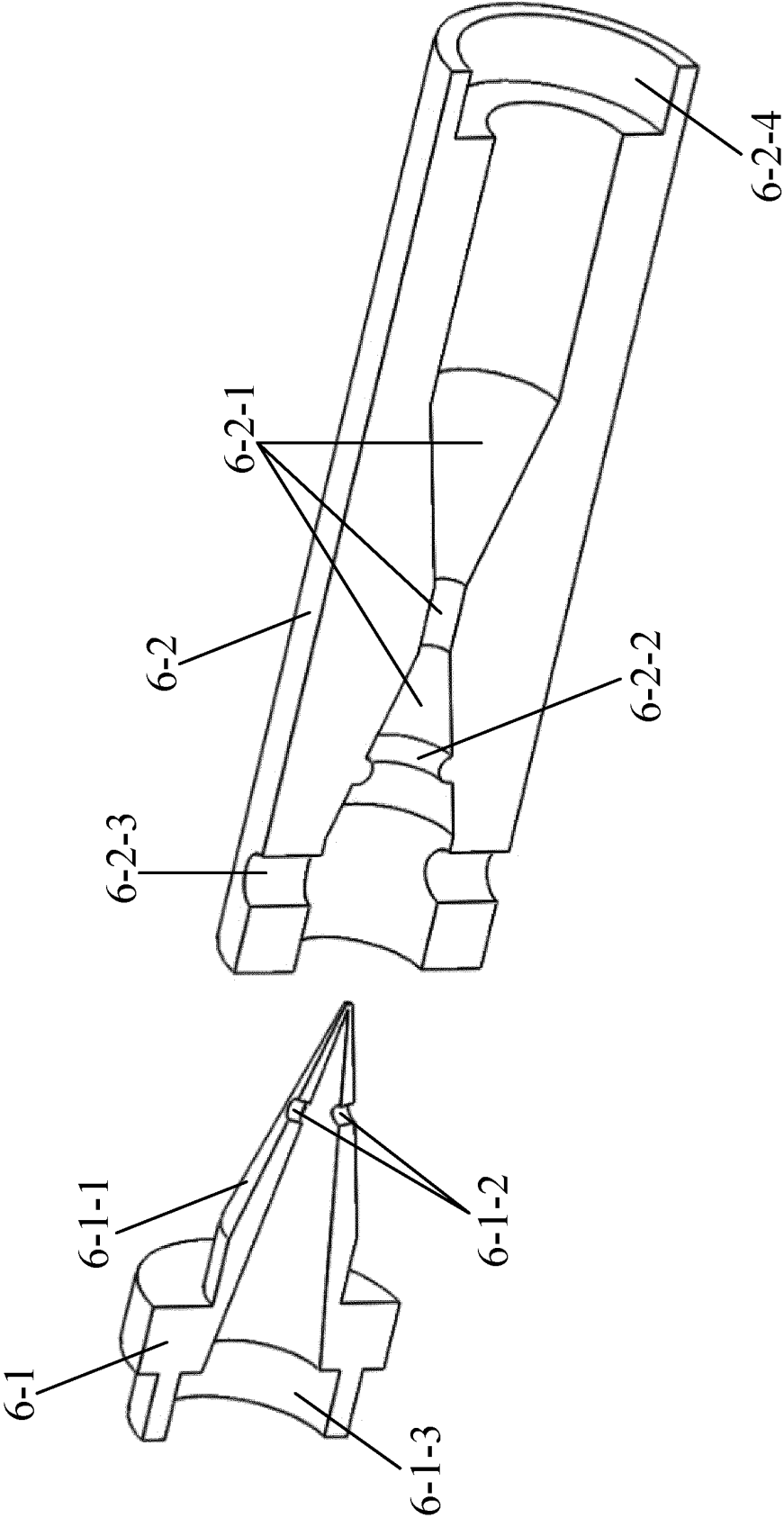


FIG.1

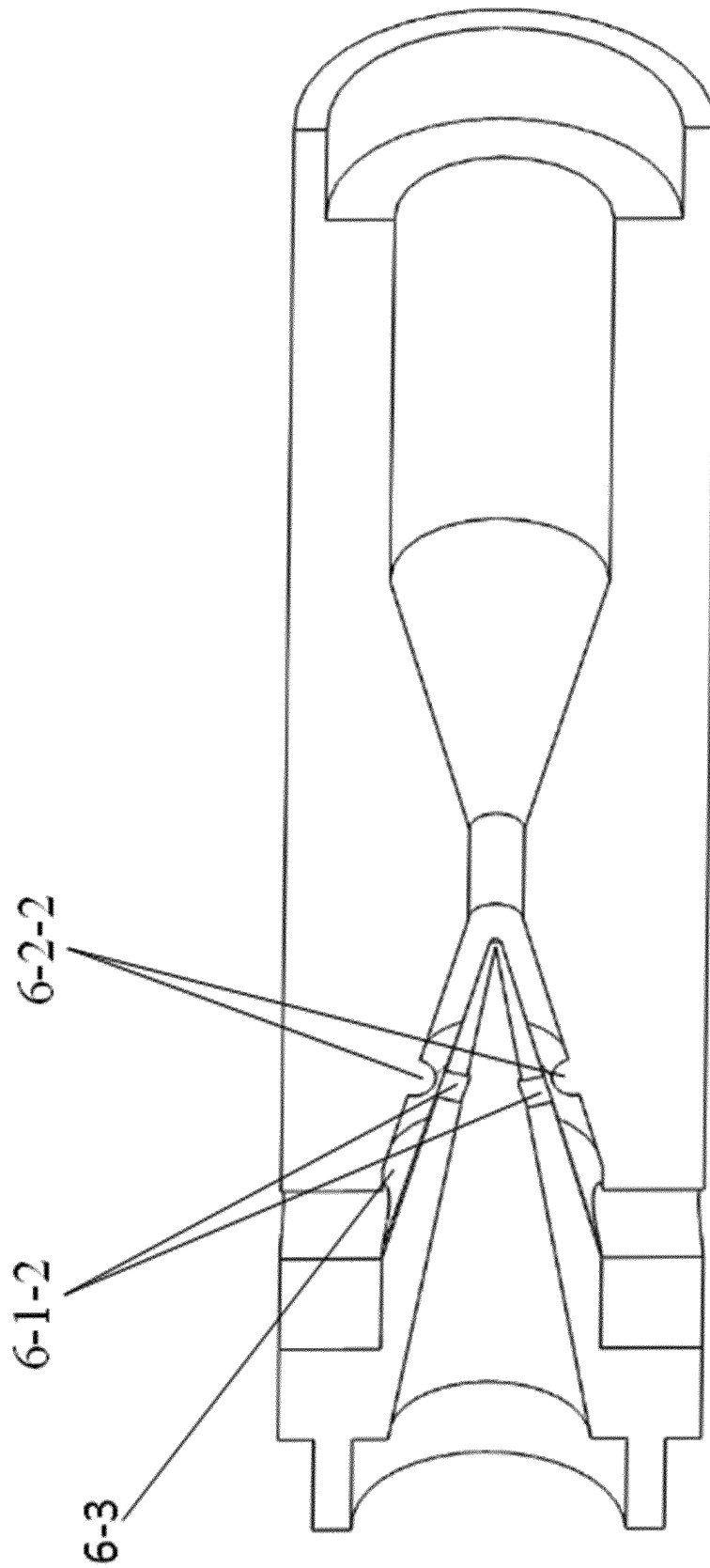


FIG.2

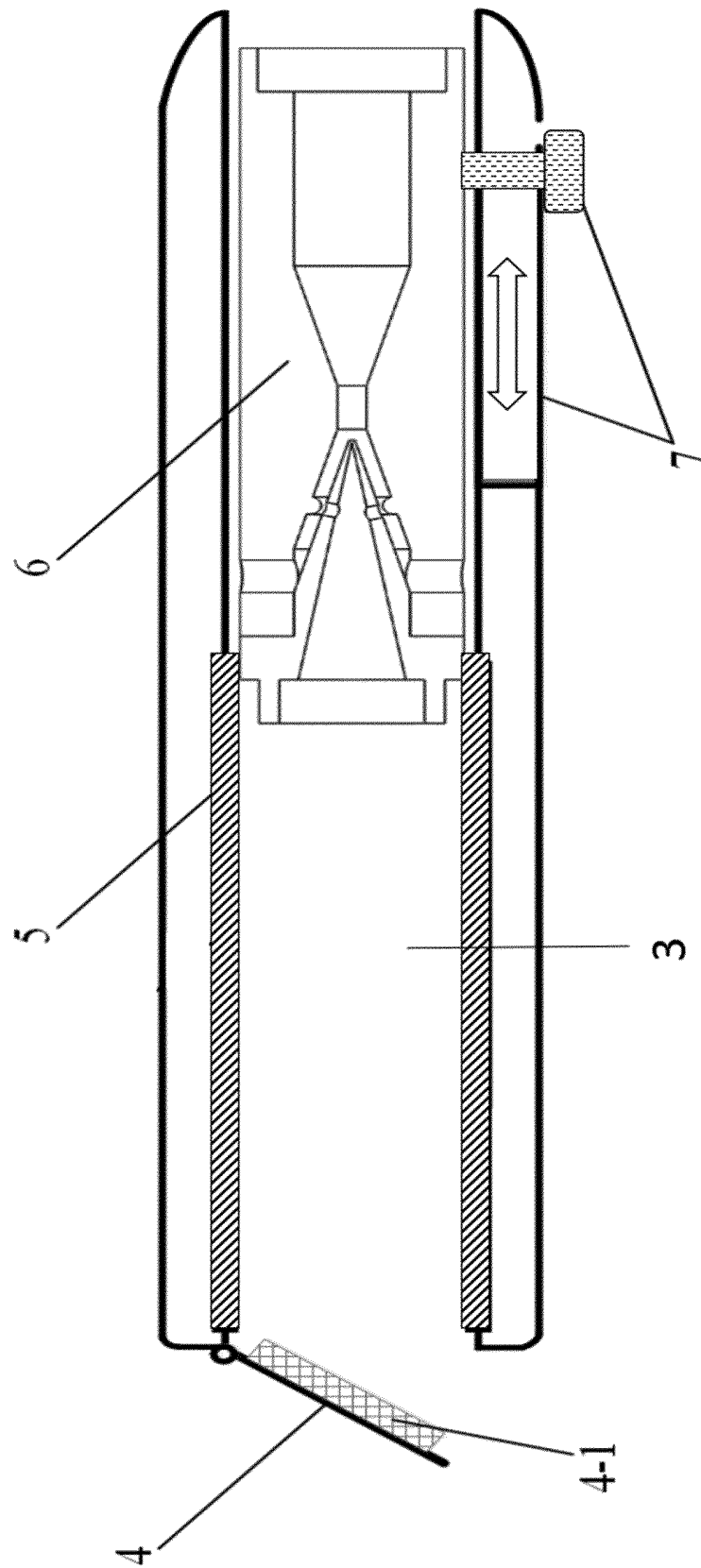


FIG.3

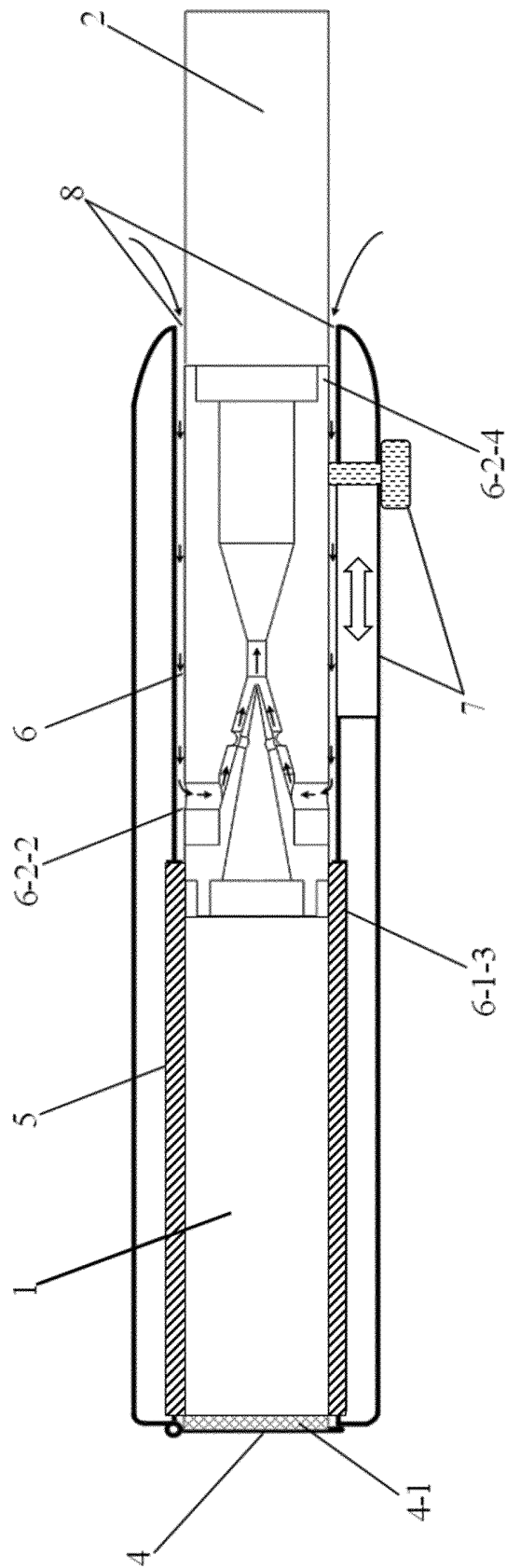


FIG.4

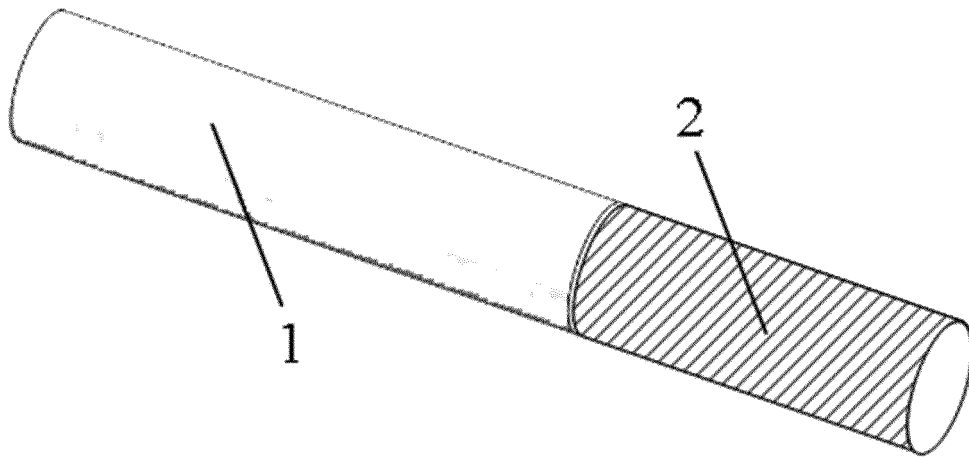


FIG.5

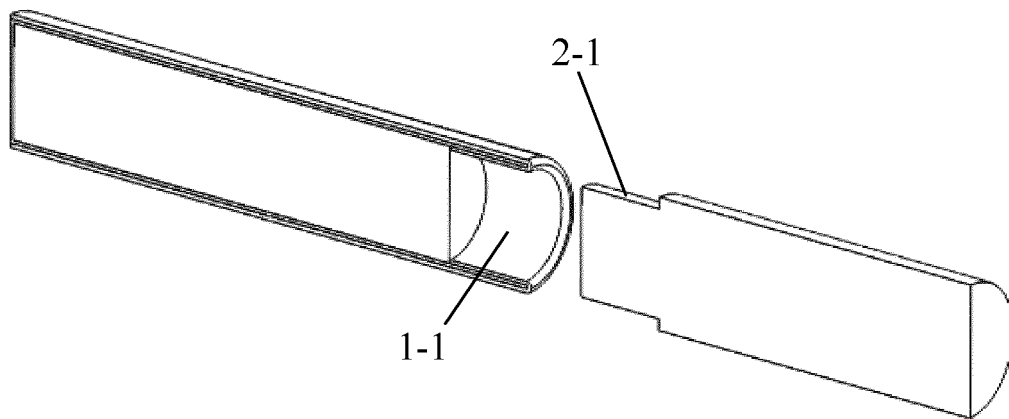


FIG.6

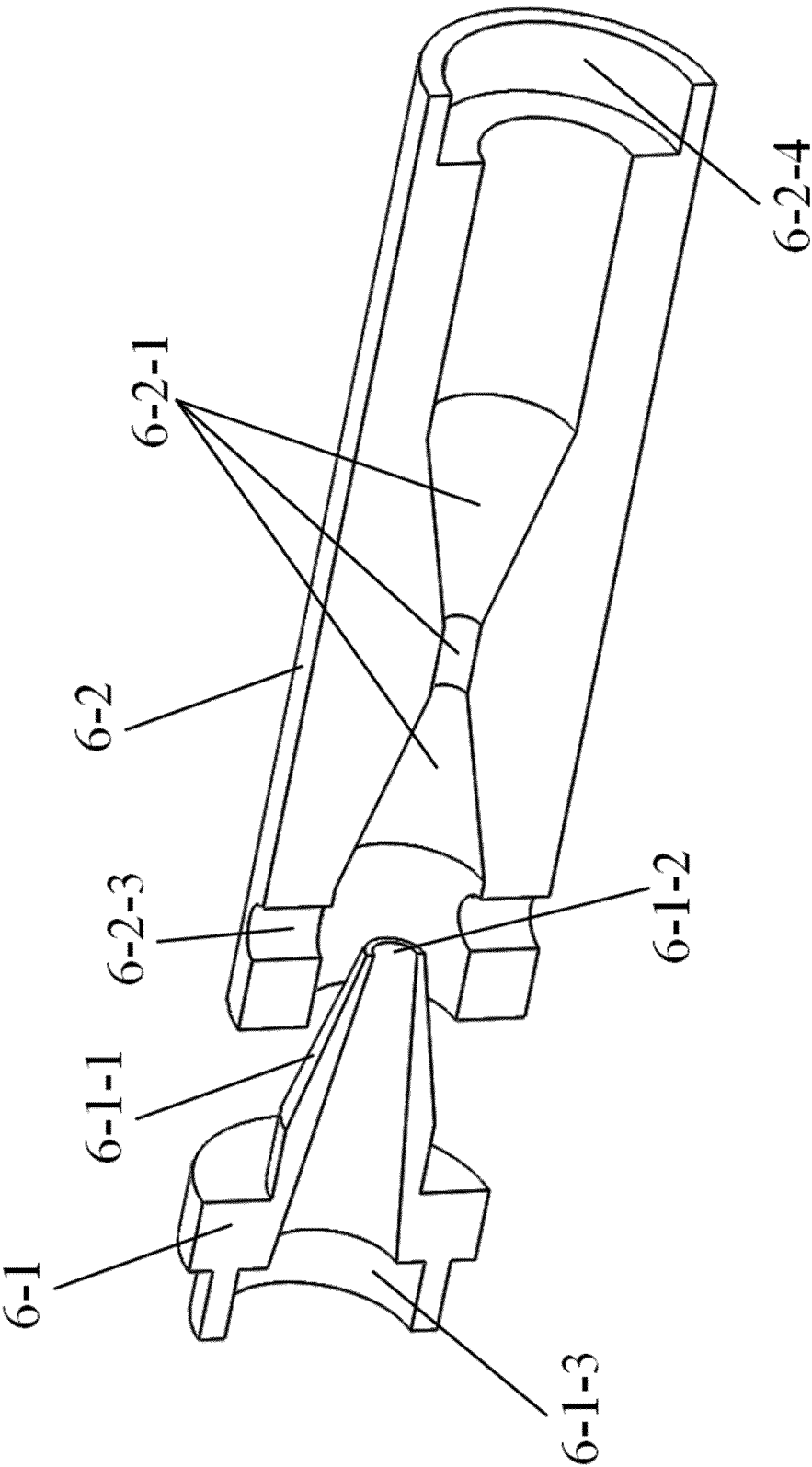


FIG.7

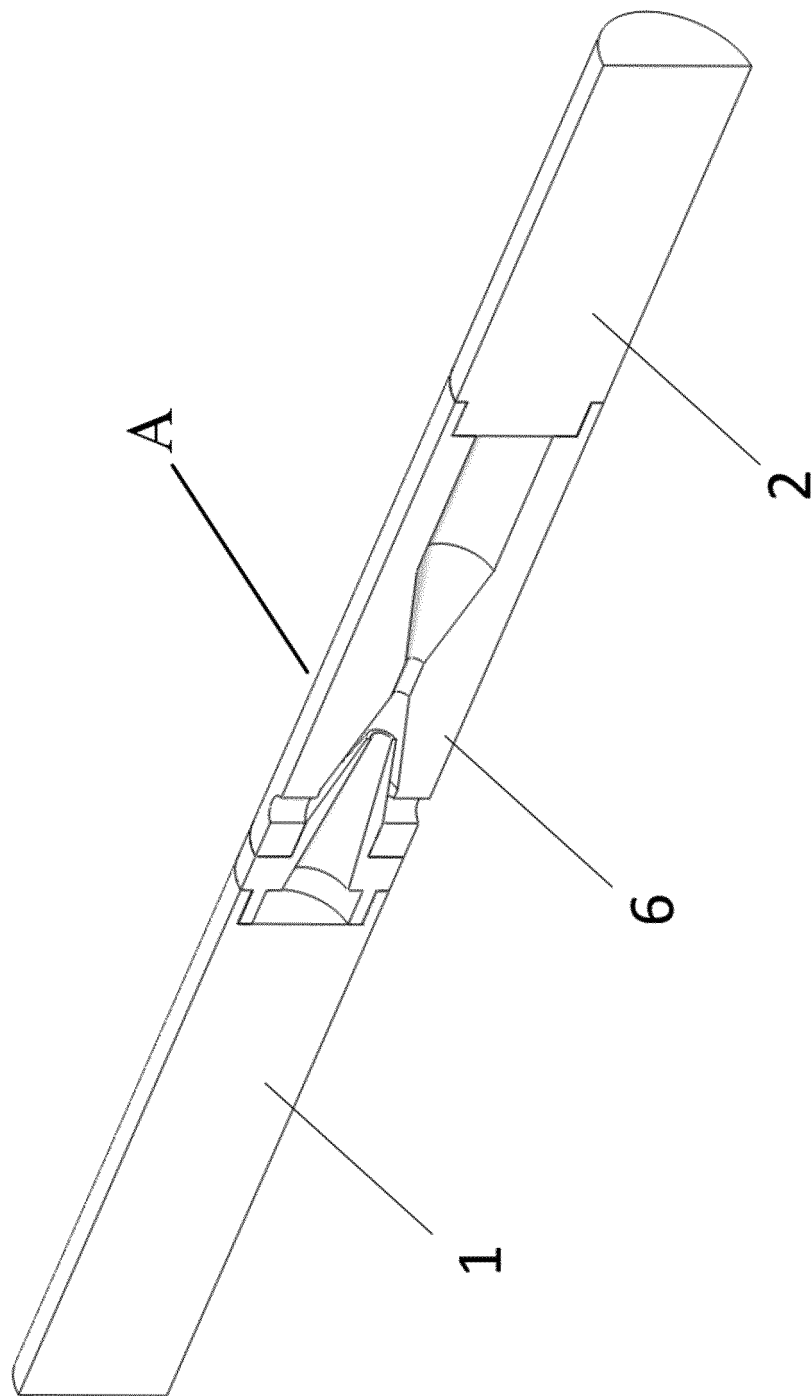


FIG.8

INTERNATIONAL SEARCH REPORT

International application No.

PCT/CN2020/118761

A. CLASSIFICATION OF SUBJECT MATTER

A24F 47/00(2020.01)i; A24F 1/00(2006.01)i; A24D 1/00(2020.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A24F; A24D

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

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

WPI, EPODOC, CNPAT, CNKI: 烟具, 烟草, 卷烟, 香烟, 电子烟, 加热, 不燃烧, 渐缩, 渐扩, 渐阔, 变径, 异径, 文丘里, 文氏, smok+, cigarette, airflow, heat+, non+combustion+, hollow+, cavit+, Venturi

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 104921296 A (CHINA TOBACCO YUNNAN INDUSTRIAL CO., LTD.) 23 September 2015 (2015-09-23) description, paragraphs [0011]-[0020], and figures 1-2	1-10
A	CN 105072937 A (PHILIP MORRIS PRODUCTS S.A.) 18 November 2015 (2015-11-18) entire document	1-10
A	CN 206251933 U (LIN, Guangrong) 16 June 2017 (2017-06-16) entire document	1-10
A	CN 209950385 U (SHENZHEN L-RIDER TECHNOLOGY CO., LTD.) 17 January 2020 (2020-01-17) entire document	1-10
A	CN 207322676 U (ZHENGZHOU TOBACCO RESEARCH INSTITUTE OF CNTC) 08 May 2018 (2018-05-08) entire document	1-10
A	US 3796223 A (TARRANT, John G.) 12 March 1974 (1974-03-12) entire document	1-10
A	DE 19935706 A1 (KUMAR, Zubide) 01 February 2001 (2001-02-01) entire document	1-10

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

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

07 January 2021

Date of mailing of the international search report

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Name and mailing address of the ISA/CN

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Facsimile No. (86-10)62019451

Telephone No.

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/CN2020/118761

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 104921296 A	23 September 2015	None	
CN 105072937 A	18 November 2015	BR 112015020047 A2	18 July 2017
		JP 2019076106 A	23 May 2019
		US 9894930 B2	20 February 2018
		RU 2015138105 A	19 April 2017
		RU 2672657 C2	16 November 2018
		JP 6707679 B2	10 June 2020
		JP 6469024 B2	13 February 2019
		EP 2967137 A2	20 January 2016
		KR 20150132111 A	25 November 2015
		WO 2014140273 A2	18 September 2014
		US 2015313281 A1	05 November 2015
		TW 201442651 A	16 November 2014
		AR 095307 A1	07 October 2015
		JP 2016509852 A	04 April 2016
		CN 111772249 A	16 October 2020
CN 206251933 U	16 June 2017	None	
CN 209950385 U	17 January 2020	None	
CN 207322676 U	08 May 2018	None	
US 3796223 A	12 March 1974	None	
DE 19935706 A1	01 February 2001	None	

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