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(54) **ELECTRONIC CIGARETTE, HEATING ELEMENT THEREOF AND METHOD FOR MANUFACTURING THE HEATING ELEMENT**

(57) The invention relates to an electronic cigarette, a heating element thereof and a method for manufacturing the heating element. The heating element comprises a sheet-shaped main substrate (11), the main substrate comprises an insertion end (A) and a connection end (B) at two opposite ends, and the insertion end is configured to be inserted into a cigarette. Reinforced members (12) are provided by extending outwardly from two lateral sides between the connection end and the insertion end to improve strength of the main substrate, and prevent the main substrate from bending. The reinforced member is configured to strengthen the main substrate, which effectively reduces virtual connection or floating of the heating track due to deformation or fracture of the heating element during inserting and pulling of tobaccos, and optimizes the atomization effect. Meanwhile, the reinforced member increases a heating area of tobaccos, so as to heat and atomize tobaccos more uniformly, and improve taste of tobaccos.

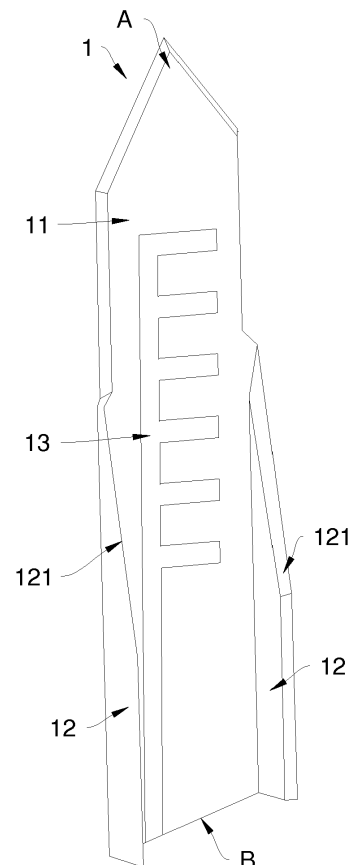


FIG. 1

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Description

TECHNICAL FIELD

[0001] The invention relates to cigarette substitutes, and specifically to a baked smoking set, a heating element thereof and a method for manufacturing the heating element.

BACKGROUND ART

[0002] During high temperature combustion, traditional tobaccos release many noxious substances for human body. Recently, in order to reduce noxious substances produced in high temperature combustion, a low temperature baked smoking set for heating tobaccos without combustion appears, and there are two heating manners defined as peripheral heating and central heating.

[0003] As for a heating element used in central heating, by inserting the heating element into the cigarette, the common structure is to fix a heating element onto a base, and insert the heating element into the tobacco product to heat and atomize surrounding tobaccos.

[0004] The heating element used in current low temperature cigarette smoking set is usually formed by printing a heating track on a long-strip-shaped flat base material in a manner of printing circuits and the like. During inserting and pulling several times, the long-strip-shaped heating element is fractured or deformed due to insufficient strength, such that the heating track floats on the heating element to form a virtual connection, and affect the atomization effect.

SUMMARY OF THE INVENTION

[0005] The technical problem to be solved by the invention is to provide an improved baked smoking set, a heating element thereof and a method for manufacturing the heating element.

[0006] The technical solution of the invention adopted for solving the technical problem is to construct a heating element of a baked smoking set, comprising a sheet-shaped main substrate, wherein; the main substrate comprises an insertion end and a connection end at two opposite ends, and the insertion end is configured to be inserted into a cigarette; reinforced members are provided by extending outwardly from two lateral sides between the connection end and the insertion end to improve strength of the main substrate, and prevent the main substrate from bending.

[0007] Preferably, the reinforced members on the two lateral sides are located on the same side or different sides of the main substrate, respectively.

[0008] Preferably, the main substrate is in a long strip shape.

[0009] Preferably, the insertion end is a sharp end.

[0010] Preferably, the reinforced member is in a sheet or strip shape.

[0011] Preferably, a width of the reinforced member gradually increases from one end close to the insertion end to a direction away from the insertion end of the heating element.

[0012] Preferably, a lateral surface of the reinforced member forms a slope at an angle with the insertion end of the main substrate.

[0013] Preferably, a heating track is provided on a surface of the main substrate.

[0014] Preferably, the main substrate and the reinforced member are integrally formed.

[0015] The invention further provides a method for manufacturing the heating element of a baked smoking set, comprising the steps of:

punching a plate-shaped base material made of a metallic material to form a sheet-shaped heating substrate;

bending the heating substrate to form a heating base material, the heating base material comprising a sheet-shaped main substrate and reinforced members provided by extending outwardly from two lateral sides of the main substrate; and
printing a heating track on the main substrate.

[0016] Preferably, a set of upper die and lower die are provided, wherein the upper die and the lower die are provided with a punching station and a forming station, respectively;

the punching station is used for punching the plate-shaped base material to form the sheet-shaped heating substrate; and
the forming station is used for bending the heating substrate to form the heating base material.

[0017] The invention further provides a baked smoking set, comprising the heating element.

[0018] Implementing the baked smoking set, the heating element thereof and the method for manufacturing the heating element of the invention has the following advantageous effects: the reinforced member is configured to strengthen the main substrate, which effectively reduces virtual connection or floating of the heating track due to deformation or fracture of the heating element during inserting and pulling of tobaccos, and optimizes the atomization effect. Meanwhile, the reinforced member increases a heating area of tobaccos, so as to heat and atomize tobaccos more uniformly, and improve taste of tobaccos.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] Hereinafter, the invention is further described with reference to accompanying drawings and embodiments. In the drawings:

FIG. 1 is a structural diagram of reinforced members of a heating element when disposed on the same side of the main substrate in one embodiment of the

invention.

FIG. 2 is a schematic diagram of the heating element along an end face direction in FIG. 1.

FIG. 3 is a structural diagram of reinforced members of a heating element when disposed on different sides of the main substrate in one embodiment of the invention.

FIG. 4 is a schematic diagram of the heating element along an end face direction in FIG. 3.

FIG. 5 is a schematic diagram of an upper die and a lower die forming the main substrate and the reinforced members.

DETAILED EMBODIMENT OF THE INVENTION

[0020] To clearly understand technical features, objects and effects of the invention, now detailed embodiments of the invention are explicitly explained with reference to the accompanying drawings.

[0021] A baked smoking set in one preferable embodiment of the invention comprises a cavity for insertion of a cigarette, and a heating element 1 disposed within the cavity. When the cigarette is inserted into the cavity, the heating element 1 is also inserted into the cigarette, and after being powered and temperature rising, the heating element 1 bakes and heats the cigarette, and heats and atomizes surrounding tobaccos. In other embodiments, the cigarette can be inserted into the cavity firstly, and then the heating element 1 is inserted into the cigarette.

[0022] As shown in FIGS. 1 and 2, the heating element 1 comprises a sheet-shaped main substrate 11. The main substrate 11 comprises an insertion end A and a connection end B at two opposite ends, the heating element 1 is inserted into a cigarette by the insertion end A, and the connection end B is fixed onto a heating base or a bottom of the cavity. Preferably, the insertion end A is a sharp end to facilitate inserting into the cigarette. In other embodiments, the insertion end A also can be an arc side or an inclined side.

[0023] Reinforced members 12 are provided by extending outwardly from two lateral sides between the connection end B and the insertion end A to improve strength of the main substrate 11, and prevent the main substrate 11 from bending. Generally, a heating track 13 is provided on a surface of the main substrate 11, and after connected to a power supply, the heating track 13 generates heat and transmits the heat to the main substrate 11 and the reinforced members 12, so as to heat and atomize surrounding tobaccos.

[0024] The reinforced member 12 is configured to strengthen the main substrate 11, which effectively reduces virtual connection or floating of the heating track 13 due to deformation or fracture of the heating element 1 during inserting and pulling of tobaccos, and optimizes the atomization effect. Meanwhile, the reinforced member 12 increases a heating area of tobaccos, so as to heat and atomize tobaccos more uniformly, and improve taste of tobaccos.

[0025] In some embodiments, the main substrate 11 is in a long strip shape. The main substrate 11 may also be a conical plate or a triangular plate with a gradually variable width, which can facilitate inserting into the cigarette. The main substrate 11 also may be a long-strip-shaped plate with an arc-shaped fracture surface.

[0026] The reinforced members 12 on the two lateral sides are located on the same side of the main substrate 11, respectively. Generally, the reinforced member 12 is in a sheet shape, and is formed by bending towards the same side of the main substrate 11. In other embodiments, it also can be formed by welding onto the main substrate 11. An angle between the reinforced member 12 and the main substrate 11 may be a right angle, and also may be an obtuse angle, only if it facilitates bending. As shown in FIGS. 3 and 4, in other embodiments, the reinforced members 12 on the two lateral sides also can be located on different sides of the main substrate 11, respectively.

[0027] In other embodiments, the reinforced member 12 also may be in a strip shape, and has a relatively low protruded height by extending outside the main substrate 11, only if strength can be ensured. Position of the strip-shaped reinforced member 12, and the angle with the main substrate 11 can be the same as that of the sheet-shaped reinforced member 12.

[0028] In order to facilitate insertion of the reinforced member 12 into the cigarette, a width of the reinforced member 12 gradually increases from one end close to the insertion end A to a direction away from the insertion end A of the heating element 1. On one hand, it saves effort in inserting and pulling the cigarette, and on the other hand, it also can reduce accumulation of tobaccos on lateral surfaces of the heating element 1, so as to avoid forming residual soot.

[0029] The reinforced member 12 gradually varies in width, such that a guiding face 121 in smooth transition with the insertion end A of the main substrate 11 is formed on the lateral surface of the reinforced member 12 to function as guidance when the cigarette is inserted. Preferably, the guiding face 121 is a slope at an angle with the insertion end A of the main substrate 11, and the guiding face 121 also may be an arc surface.

[0030] In some embodiments, the main substrate 11 and the reinforced member 12 are integrally formed. Preferably, the main substrate 11 and the reinforced member 12 are made of metallic materials, and can be produced by simple punching and bending, which is relatively low in production cost. The main substrate 11 and the reinforced member 12 also may be formed by sintering integrally using materials of ceramics, and the like.

[0031] When the main substrate 11 and the reinforced member 12 are made of metallic materials, such as, stainless steel, alloy and the like, the method for manufacturing the heating element 1 comprises the steps of:

machining a plate-shaped base material made of a metallic material to form a sheet-shaped heating

substrate;
 bending the heating substrate to form a heating base material, the heating base material comprising a sheet-shaped main substrate 11 and reinforced members 12 provided by extending outwardly from two lateral sides of the main substrate 11; and
 printing a heating track 13 on the main substrate 11.

[0032] In some embodiments, machining of the plate-shaped base material made of a metallic material may use die cutting, and also may use wire cut machining.

[0033] As shown in FIG. 5, further, in order to improve machining efficiency, a set of upper die 2 and lower die 3 is provided, and the upper die 2 and the lower die 3 are provided with a punching station (not shown) and a forming station C, respectively;
 the punching station is used for punching the plate-shaped base material to form the sheet-shaped heating substrate; and
 the forming station C is used for bending the heating substrate to form the heating base material.

[0034] It shall be understood that the above respective technical features can be combined optionally for use without limitation.

[0035] The disclosures are only embodiments of the invention, rather than limiting the extent of the invention. Any equivalent structures or equivalent flow changes using the specification and the drawings of the invention, or directly or indirectly application in other relevant technical fields shall also be included in the extent of protection of the invention.

Claims

1. A heating element (1) of a baked smoking set, comprising a sheet-shaped main substrate (11); the main substrate (11) comprising an insertion end (A) and a connection end (B) at two opposite ends, and the insertion end (A) being configured to be inserted into a cigarette; reinforced members (12) provided by extending outwardly from two lateral sides between the connection end (B) and the insertion end (A) to improve strength of the main substrate (11), and prevent the main substrate (11) from bending.
2. The heating element (1) according to claim 1, **characterized in that** the reinforced members (12) on the two lateral sides are located on the same side or different sides of the main substrate (11), respectively.
3. The heating element (1) according to claim 1, **characterized in that** the main substrate (11) is in a long strip shape.
4. The heating element (1) according to claim 1, **characterized in that** the insertion end (A) is a sharp end.

5. The heating element (1) according to claim 1, **characterized in that** the reinforced member (12) is in a sheet or strip shape.
6. The heating element (1) according to claim 1, **characterized in that** a width of the reinforced member (12) gradually increases from one end close to the insertion end (A) to a direction away from the insertion end (A) of the heating element (1).
7. The heating element (1) according to claim 6, **characterized in that** a lateral surface of the reinforced member (12) forms a slope at an angle with the insertion end (A) of the main substrate (11).
8. The heating element (1) according to any one of claims 1-7, **characterized in that** a heating track (13) is provided on a surface of the main substrate (11).
9. The heating element (1) according to any one of claims 1-7, **characterized in that** the main substrate (11) and the reinforced member (12) are integrally formed.
10. A method for manufacturing the heating element (1) of a baked smoking set according to any one of claims 1 to 9, comprising the steps of:

punching a plate-shaped base material made of a metallic material to form a sheet-shaped heating substrate;
 bending the heating substrate to form a heating base material, the heating base material comprising a sheet-shaped main substrate (11) and reinforced members (12) provided by extending outwardly from two lateral sides of the main substrate (11); and
 printing a heating track (13) on the main substrate (11).

11. The method for manufacturing the heating element (1) of a baked smoking set according to claim 10, **characterized in that**; a set of upper die (2) and lower die (3) are provided, wherein the upper die (2) and the lower die (3) are provided with a punching station and a forming station (C), respectively;
 the punching station is used for punching the plate-shaped base material to form the sheet-shaped heating substrate; and
 the forming station (C) is used for bending the heating substrate to form the heating base material.
12. A baked smoking set, comprising the heating element (1) according to any one of claims 1-9.

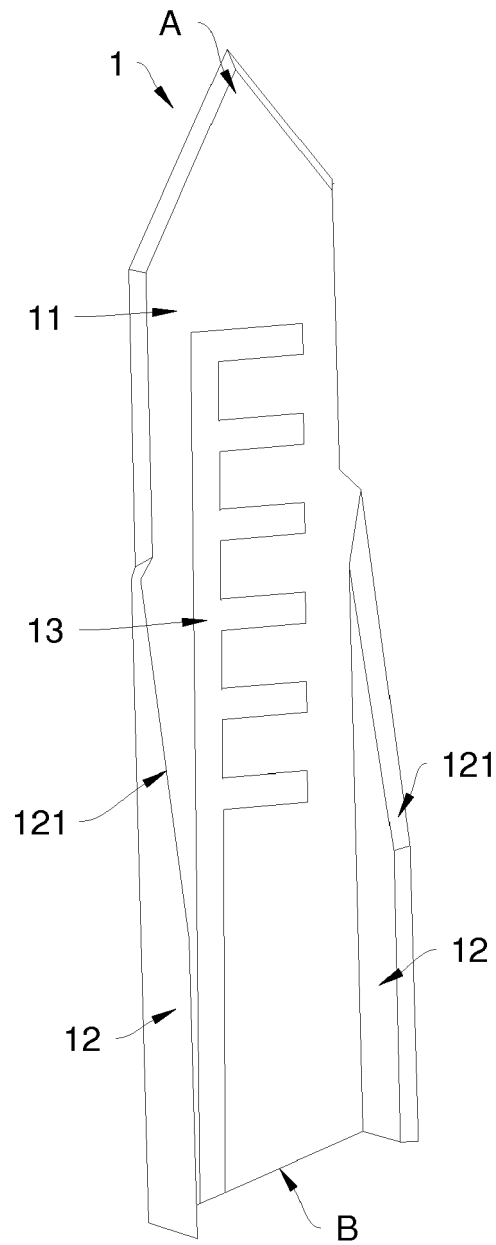


FIG. 1

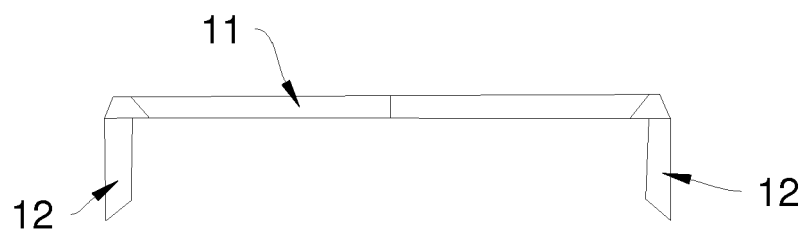


FIG. 2

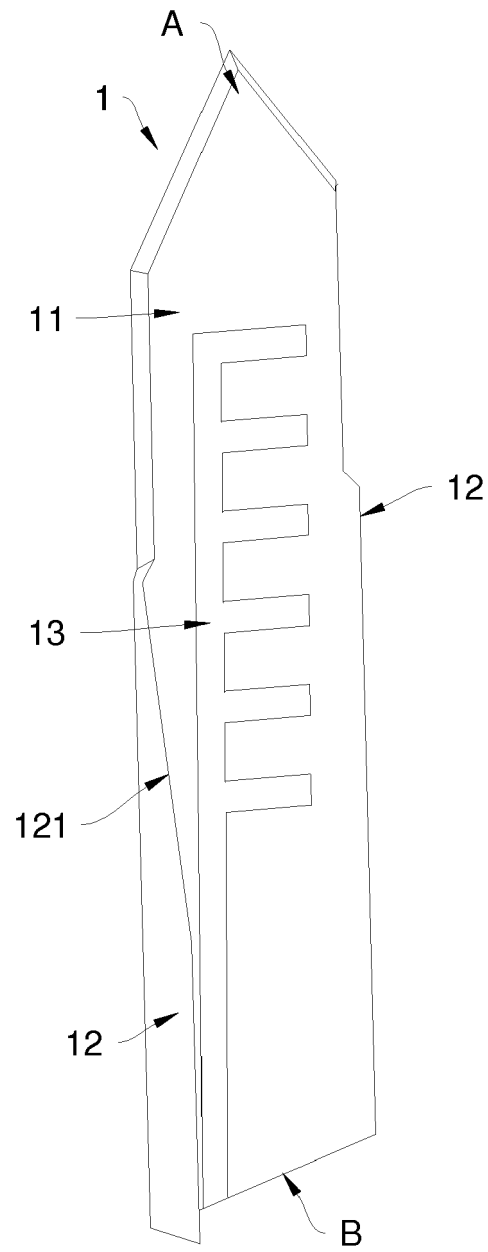


FIG. 3

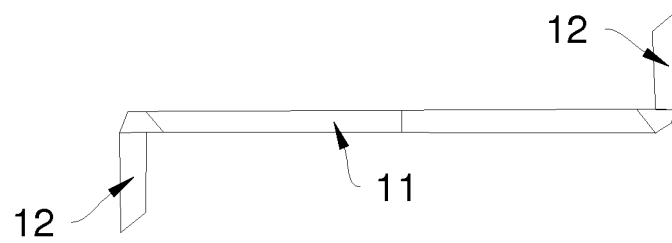


FIG. 4

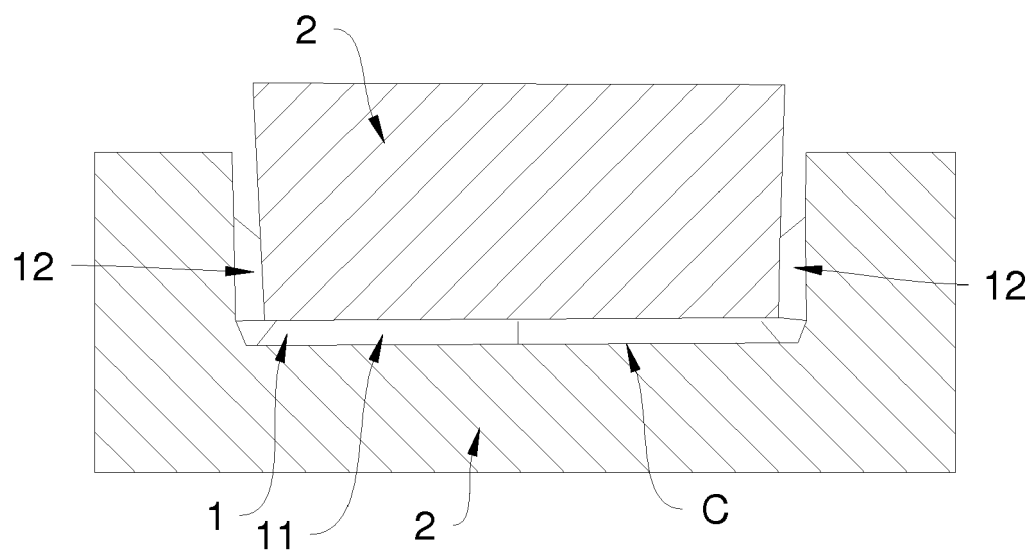


FIG. 5



EUROPEAN SEARCH REPORT

Application Number
EP 19 19 8580

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 30 January 2020	Examiner Koob, Michael
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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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