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(54) **HEAT-NOT-BURN DEVICE AND SYSTEM**

(57) There is provided a heat-not-burn device (100) including a first body portion (130) to which a first heating element (112) is attached; a second body portion (140) to which a second heating element (114) is attached; a heating chamber (120) formed between the first heating element and the second heating element, the heating chamber for receiving a consumable (200) in an insertion direction (105) through a consumable opening (102) in the HNB device; wherein the second body portion is moveable relative to the first body portion to separate the heating elements and expose the heating elements for user access.

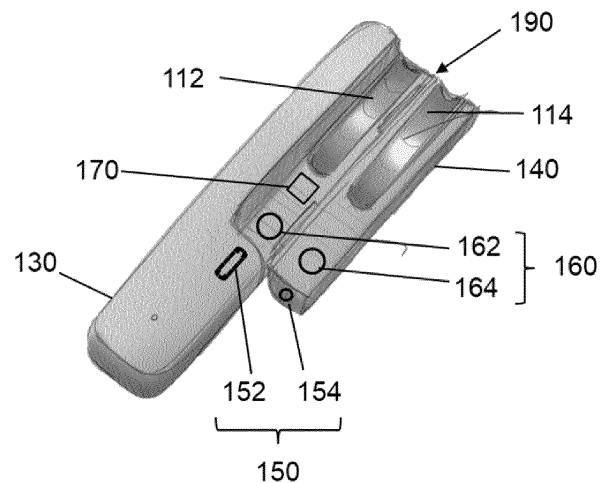


Fig. 3

## Description

### Field of the Invention

[0001] The present invention relates to heat-not-burn device and a heat-not-burn system.

### Background

[0002] A typical aerosol generating apparatus may comprise a power supply, an aerosol generating unit that is driven by the power supply, an aerosol precursor, which in use is aerosolised by the aerosol generating unit to generate an aerosol, and a delivery system for delivery of the aerosol to a user.

[0003] A drawback with known aerosol generating apparatuses relates to residue of heat-not-burn consumables in a heater system of the aerosol generating apparatuses.

[0004] In spite of the effort already invested in the development of aerosol generating apparatuses/systems further improvements are desirable.

### Summary of the Invention

[0005] At its most general, the present invention relates to a HNB device with heating elements which are exposable to enable user access.

[0006] According to a first aspect of the present invention, there is provided a HNB device comprising: a first body portion to which a first heating element is attached; a second body portion to which a second heating element is attached; a heating chamber formed between the first heating element and the second heating element, the heating chamber for receiving a consumable in an insertion direction through a consumable opening in the HNB device; wherein the second body portion is moveable relative to the first body portion to separate the heating elements and expose the heating elements for user access.

[0007] Optionally, the first heating element and the second heating element are configured to substantially enclose the heating chamber.

[0008] Optionally, the heating chamber is substantially cylindrical.

[0009] Optionally, each of the first heating element and the second heating element defines a substantially part-cylindrical portion of the heating chamber, e.g. substantially semi-cylindrical or quarter-cylindrical or any other fraction of a cylinder.

[0010] Optionally, the first heating element and the second heating element define complementary fractions of a cylinder such that, in combination, the first heating element and the second heating element define the substantially cylindrical heating chamber. For example, both heating elements may be substantially semi-cylindrical, or one heating element may be substantially quarter-cylindrical and the other heating element may be

substantially three-quarter-cylindrical.

[0011] Optionally, each heating element is curved around the insertion direction.

[0012] Optionally, the HNB device further comprises a locking mechanism configurable to lock together in order to prevent separating the heating elements.

[0013] Optionally, the locking mechanism includes a first locking portion on the first body portion and a second locking portion on the second body portion.

[0014] Optionally, the locking mechanism is configured to release conditional on a heating operation of the heating elements.

[0015] Optionally, the HNB device further comprises a temperature sensor configured to sense a temperature relating to the first heating element and/or the second heating element; wherein the locking mechanism is configured to release the second body portion dependent on an output of the temperature sensor.

[0016] Optionally, the locking mechanism is configured to release after a pre-determined period of time has passed after the heating operation.

[0017] Optionally, the HNB device further comprises a closing mechanism configured to urge the first heating element and the second heating element together.

[0018] Optionally, the closing mechanism includes a first closing member on the first body portion and a second closing member on the second body portion; wherein the first closing member and the second closing member are configured to magnetically interact to urge the first heating element and the second heating element together.

[0019] Optionally, wherein the first heating element or the second heating element is operable to heat to a temperature in a range of 200 to 350 degrees Celsius, preferably 250 to 320 degrees Celsius, more preferably to a temperature of approximately 290 degrees Celsius. Preferably, the first heating element and the second heating element are operable to heat to a temperature or temperature range as specified.

[0020] Optionally, the first body portion and the second body portion are connected by a hinge portion about which the second body portion is pivotable relative to the first body portion; wherein the second body portion is moveable relative to the first body portion by pivoting the second body portion relative to the first body portion.

[0021] According to a second aspect of the invention, there is provided a HNB system comprising a HNB device as described above and a consumable.

[0022] Optionally, the consumable has a device end and a mouth end, wherein the mouth end of the consumable protrudes from the HNB device when the consumable is inserted into the HNB device.

[0023] The invention includes the combination of the aspects and preferred features described except where such a combination is clearly impermissible or expressly avoided.

### Summary of the Figures

**[0024]** So that the invention may be understood, and so that further aspects and features thereof may be appreciated, embodiments illustrating the principles of the invention will now be discussed in further detail with reference to the accompanying figures, in which:

**Figure 1** shows a HNB system including a HNB device and a HNB consumable received into the HNB device, i.e. an engaged state.

**Figure 2** shows the HNB system of Figure 1, wherein the HNB consumable is separate from the HNB device, i.e. a disengaged state.

**Figure 3** shows the HNB device of Figure 1 in an opened configuration in which a heater chamber of the HNB device is opened for user access.

**Figure 4** shows heater elements of the HNB device of Figure 1 together.

**Figure 5** shows heater elements of the HNB device of Figure 1 separated.

### Detailed Description of the Invention

**[0025]** Before describing several examples implementing the present disclosure, it is to be understood that the present disclosure is not limited by specific construction details or process steps set forth in the following description and accompanying drawings. Rather, it will be apparent to those skilled in the art having the benefit of the present disclosure that the systems, apparatuses and/or methods described herein could be embodied differently and/or be practiced or carried out in various alternative ways.

**[0026]** Unless otherwise defined herein, scientific and technical terms used in connection with the presently disclosed inventive concept(s) shall have the meanings that are commonly understood by those of ordinary skill in the art, and known techniques and procedures may be performed according to conventional methods well known in the art and as described in various general and more specific references that may be cited and discussed in the present specification.

**[0027]** All examples implementing the present disclosure can be made and executed without undue experimentation in light of the present disclosure. While particular examples have been described, it will be apparent to those of skill in the art that variations may be applied to the systems, apparatus, and/or methods and in the steps or in the sequence of steps of the methods described herein without departing from the concept, spirit, and scope of the inventive concept(s). All such similar substitutions and modifications apparent to those skilled in the art are deemed to be within the spirit, scope, and

concept of the inventive concept(s) as defined by the appended claims.

**[0028]** The use of the term "a" or "an" in the claims and/or the specification may mean "one," as well as "one or more," "at least one," and "one or more than one." As such, the terms "a," "an," and "the," as well as all singular terms, include plural referents unless the context clearly indicates otherwise. Likewise, plural terms shall include the singular unless otherwise required by context.

**[0029]** The use of the term "or" in the present disclosure (including the claims) is used to mean an inclusive "and/or" unless explicitly indicated to refer to alternatives only or unless the alternatives are mutually exclusive. For example, a condition "A or B" is satisfied by any of the following: A is true (or present) and B is false (or not present), A is false (or not present) and B is true (or present), and both A and B are true (or present).

**[0030]** As used in this specification and claim(s), the words "comprising," "having," "including," or "containing" (and any forms thereof, such as "comprise" and "comprises," "have" and "has," "includes" and "include," or "contains" and "contain," respectively) are inclusive or open-ended and do not exclude additional, unrecited elements or method steps.

**[0031]** Unless otherwise explicitly stated as incompatible, or the physics or otherwise of the embodiments, examples, or claims prevent such a combination, the features of examples disclosed herein, and of the claims, may be integrated together in any suitable arrangement, especially ones where there is a beneficial effect in doing so. This is not limited to only any specified benefit, and instead may arise from an "ex post facto" benefit. This is to say that the combination of features is not limited by the described forms, particularly the form (e.g. numbering) of example(s), embodiment(s), or dependency of claim(s). Moreover, this also applies to the phrase "in one embodiment," "according to an embodiment," and the like, which are merely a stylistic form of wording and are not to be construed as limiting the following features to a separate embodiment to all other instances of the same or similar wording. This is to say, a reference to 'an,' 'one,' or 'some' embodiment(s) may be a reference to any one or more, and/or all embodiments, or combination(s) thereof, disclosed. Also, similarly, the reference to "the" embodiment may not be limited to the immediately preceding embodiment. Further, all references to one or more embodiments or examples are to be construed as non-limiting to the claims.

**[0032]** The present disclosure may be better understood in view of the following explanations, wherein the terms used that are separated by "or" may be used interchangeably:

As used herein, an "**aerosol generating apparatus**" (or "**electronic(e)-cigarette**") may be an apparatus configured to deliver an aerosol to a user for inhalation by the user. The apparatus may additionally/alternatively be referred to as a "smoking substitute apparatus", if it is intended to be used instead of a conventional combus-

tible smoking article. As used herein a combustible "smoking article" may refer to a cigarette, cigar, pipe or other article, that produces smoke (an aerosol comprising solid particulates and gas) via heating above the thermal decomposition temperature (typically by combustion and/or pyrolysis). An aerosol generated by the apparatus may comprise an aerosol with particle sizes of 0.2 - 7 microns, or less than 10 microns, or less than 7 microns. This particle size may be achieved by control of one or more of: heater temperature; cooling rate as the vapour condenses to an aerosol; flow properties including turbulence and velocity. The generation of aerosol by the aerosol generating apparatus may be controlled by an input device. The input device may be configured to be user-activated, and may for example include or take the form of an actuator (e.g. actuation button) and/or an airflow sensor.

[0033] Each occurrence of the aerosol generating apparatus being caused to generate aerosol for a period of time (which may be variable) may be referred to as an **"activation"** of the aerosol generating apparatus. The aerosol generating apparatus may be arranged to allow an amount of aerosol delivered to a user to be varied per activation (as opposed to delivering a fixed dose of aerosol), e.g. by activating an aerosol generating unit of the apparatus for a variable amount of time, e.g. based on the strength/duration of a draw of a user through a flow path of the apparatus (to replicate an effect of smoking a conventional combustible smoking article).

[0034] The aerosol generating apparatus may be portable. As used herein, the term **"portable"** may refer to the apparatus being for use when held by a user.

[0035] As used herein, an **"aerosol generating system"** may be a system that includes an aerosol generating apparatus and optionally other circuitry/components associated with the function of the apparatus, e.g. one or more external devices and/or one or more external components (here "external" is intended to mean external to the aerosol generating apparatus). As used herein, an "external device" and "external component" may include one or more of a: a charging device, a mobile device (which may be connected to the aerosol generating apparatus, e.g. via a wireless or wired connection); a networked-based computer (e.g. a remote server); a cloud-based computer; any other server system.

[0036] An example aerosol generating system may be a system for managing an aerosol generating apparatus. Such a system may include, for example, a mobile device, a network server, as well as the aerosol generating apparatus.

[0037] As used herein, an **"aerosol"** may include a suspension of precursor, including as one or more of: solid particles; liquid droplets; gas. Said suspension may be in a gas including air. An aerosol herein may generally refer to/include a vapour. An aerosol may include one or more components of the precursor.

[0038] As used herein, a **"precursor"** may include one or more of a: liquid; solid; gel; loose leaf material; other

substance. The precursor may be processed by an aerosol generating unit of an aerosol generating apparatus to generate an aerosol. The precursor may include one or more of: an active component; a carrier; a flavouring. The active component may include one or more of nicotine; caffeine; a cannabidiol oil; a non-pharmaceutical formulation, e.g. a formulation which is not for treatment of a disease or physiological malfunction of the human body. The active component may be carried by the carrier, which may be a liquid, including propylene glycol and/or glycerine. The term "flavouring" may refer to a component that provides a taste and/or a smell to the user. The flavouring may include one or more of: Ethylvanillin (vanilla); menthol, Isoamyl acetate (banana oil); or other. The precursor may include a substrate, e.g. reconstituted tobacco to carry one or more of the active component; a carrier; a flavouring.

[0039] As used herein, a **"storage portion"** may be a portion of the apparatus adapted to store the precursor. It may be implemented as fluid-holding reservoir or carrier for solid material depending on the implementation of the precursor as defined above.

[0040] As used herein, a **"flow path"** may refer to a path or enclosed passageway through an aerosol generating apparatus, e.g. for delivery of an aerosol to a user. The flow path may be arranged to receive aerosol from an aerosol generating unit. When referring to the flow path, upstream and downstream may be defined in respect of a direction of flow in the flow path, e.g. with an outlet being downstream of an inlet.

[0041] As used herein, a **"delivery system"** may be a system operative to deliver an aerosol to a user. The delivery system may include a mouthpiece and a flow path.

[0042] As used herein, a **"flow"** may refer to a flow in a flow path. A flow may include aerosol generated from the precursor. The flow may include air, which may be induced into the flow path via a puff by a user.

[0043] As used herein, an **"aerosol generating unit"** may refer to a device configured to generate an aerosol from a precursor. The aerosol generating unit may include a unit to generate a vapour directly from the precursor (e.g. a heating system or other system) or an aerosol directly from the precursor (e.g. an atomiser including an ultrasonic system, a flow expansion system operative to carry droplets of the precursor in the flow without using electrical energy or other system). A plurality of aerosol generating units to generate a plurality of aerosols (for example, from a plurality of different aerosol precursors) may be present in an aerosol generating apparatus.

[0044] As used herein, a **"heating system"** may refer to an arrangement of at least one heating element, which is operable to aerosolise a precursor once heated. The at least one heating element may be electrically resistive to produce heat from the flow of electrical current there-through. The at least one heating element may be arranged as a susceptor to produce heat when penetrated

by an alternating magnetic field. The heating system may be configured to heat a precursor to below 300 or 350 degrees C, including without combustion.

[0045] As used herein, a **"consumable"** may refer to a unit that includes a precursor. The consumable may include an aerosol generating unit, e.g. it may be arranged as a cartomizer. The consumable may include a mouthpiece. The consumable may include an information carrying medium. With liquid or gel implementations of the precursor, e.g. an e-liquid, the consumable may be referred to as a "capsule" or a "pod" or an "e-liquid consumable". The capsule/pod may include a storage portion, e.g. a reservoir or tank, for storage of the precursor. With solid material implementations of the precursor, e.g. tobacco or reconstituted tobacco formulation, the consumable may be referred to as a "stick" or "package" or "heat-not-burn consumable". In a heat-not-burn consumable, the mouthpiece may be implemented as a filter and the consumable may be arranged to carry the precursor. The consumable may be implemented as a dosage or pre-portioned amount of material, including a loose-leaf product.

[0046] As used herein, an **"information carrying medium"** may include one or more arrangements for storage of information on any suitable medium. Examples include: a computer readable medium; a Radio Frequency Identification (RFID) transponder; codes encoding information, such as optical (e.g. a bar code or QR code) or mechanically read codes (e.g. a configuration of the absence or presents of cut-outs to encode a bit, through which pins or a reader may be inserted).

[0047] As used herein **"heat-not-burn"** (or **"HNB"** or **"heated precursor"**) may refer to the heating of a precursor, typically tobacco, without combustion, or without substantial combustion (i.e. localised combustion may be experienced of limited portions of the precursor, including of less than 5% of the total volume).

[0048] Aspects and embodiments of the present invention will now be discussed with reference to the accompanying figures. Further aspects and embodiments will be apparent to those skilled in the art.

[0049] Figures 1 and 2 are perspective views of an aerosol generating system, which is a heat-not-burn system 10 for providing aerosol/vapour to a user.

[0050] The HNB system 10 comprises an aerosol generating apparatus, provided as a HNB device 100, and an aerosol-forming article in the form of a consumable 200, which comprises a precursor in the form of an aerosol former 202. The HNB device 100 and the consumable 200 are configured such that the consumable 200 can be engaged with the HNB device 100. Figure 1 shows the HNB device 100 and the consumable 200 in an engaged state, whilst Figure 2 shows the HNB device 100 and the consumable 200 in a disengaged state. Suitably, the HNB device 100 has a consumable opening 102. The consumable 200 is insertable into the HNB device 100 through the consumable opening 102 in an insertion direction 105. In some examples, the insertion direction

105 is perpendicular to the consumable opening 102.

[0051] The consumable 200 may also be referred to as a stick consumable or stick. In that respect, the consumable 200 has a generally cylindrical form with a diameter of 7 mm and an axial length of 70 mm, where "mm" represents the physical unit of millimetres.

[0052] The consumable 200 includes a device end 204 and a mouth end 206. In use, the device end 204 is received into the HNB device 100 while the mouth end 206 extends from the HNB device 100 for a user to engage. The device end 204 and the mouth end 206 may be structurally different, for example the mouth end 206 may include a filter.

[0053] The HNB device 100 is configured to vaporise the aerosol former 202 by heating the aerosol former 202 (so as to form a vapour/aerosol for inhalation by a user). Suitably, the HNB device 100 comprises a heating system including a pair of heating elements 110 between which a heater chamber 120 is formed and into which the consumable 200 is received.

[0054] The consumable 200 may in use leave residue in the HNB device 100 and, in particular, in the heater chamber 120. Eventually it may be desirable for the user to clean such residue from the heater chamber 120, for example to ensure that the residue does not adversely affect user experience. Conveniently, the HNB device 100 is adjustable between a first configuration (or 'closed configuration'), in which the heater chamber 120 is closed and the HNB device 100 operational, and a second configuration (or 'opened configuration'), in which the heater chamber 120 is opened for user access. The first configuration is shown in Figures 1 and 2.

[0055] Figure 3 is a perspective view of the HNB device 100 showing the HNB device 100 in the second configuration such that the heating elements 110 are separated and exposed for user access. As shown in Figure 3, the heating chamber 120 is opened to separate the heating elements 110 for user access. More particularly, the heating chamber 120 in this example is elongate and opened along a lengthwise extent of the heating chamber 120 to expose the heating elements 110. Here, "separating" the heating elements 110 may cause separation of at least some portions of the heating elements 110 but may not cause separation of all portions of the heating elements 110.

[0056] The HNB device 100 comprises a first body portion 130 and a second body portion 140. In this example, the first body portion 130 is larger than the second body portion 140. The first body portion 130 has a generally elongate shape, e.g. a bar shape or rod shape, and the second body portion 140 extends along a part but not the whole of the first body portion 130.

[0057] The first body portion 130 and the second body portion 140 are moveable relative to each other. By moving the body portions 130, 140 relative to each other, at least part of one body portion is disengaged from the other body portion. That is to say, at least part of one body portion is engageable with and disengageable from the

other body portion when moving the body portions relative to each other. In this example, the first body portion 130 and the second body portion 140 are connected by a hinge portion 190 which enables relative pivoting of one body portion about the other body portion. For example, the first body portion 130 may be firmly held by the user, which may be convenient since the first body portion 130 is larger, and the second body portion 140 may be pivoted relative to the first body portion 130 by the user. Conversely, the user may hold on to the second body portion 140 and pivot the first body portion 130.

**[0058]** The first body portion 130 and the second body portion 140 are moveable relative to each other to separate the heating elements 110 and expose the heating elements for user access. Suitably, a first heater element 112 of the pair of heating elements 110 is attached to the first body portion 130, while a second heater element 114 of the pair is attached to the second body portion 140. Conveniently, the heating elements 110 are attached to the respective body portion such that removal therefrom may not be possible for the user, e.g. the heating elements 110 may be integrated with the body portion 130, 140.

**[0059]** Figures 4 and 5 are perspective views of the heating elements 110. In Figure 4, the heating elements 110 are arranged together, as when the HNB device 100 is in the closed configuration. In Figure 5, the heating elements 110 are separated, as when the HNB device 100 is in the opened configuration.

**[0060]** The heating chamber 120, which is formed between the heating elements 110, has a first end 122 and, opposite thereto, a second end 124 (both represented by dashed-dotted lines in Figure 4). The first end 122 is an open end through which the consumable 200 is receivable into the heating chamber 120 when inserted into the HNB device 100 through the consumable opening 102.

**[0061]** The heating chamber 120 is substantially enclosed by the heating elements 110. The heating chamber 120 is a recess formed between the heating elements 110 when the heating elements 110 are brought together, i.e. the HNB device 100 is in the closed configuration. In this example, the heating chamber 120 is generally cylindrical and, as such, the ends 122, 124 of the heating chamber 120 correspond to axial ends.

**[0062]** The heating elements 110 bound the heating chamber 120 in a direction perpendicular to the insertion direction 105. In particular, the heating elements 110 form a cylindrical wall around the heating chamber 120 and bound the cylindrical heating chamber 120 in the radial direction.

**[0063]** Each heating element 112, 114 has an inner surface 115 (or 'heat emitting surface'). The inner surface 115 in use emits heat towards the consumable 200. In this example, the inner surface 115 of each heating element 112, 114 is continuous, i.e. no aperture extends through the inner surface 115.

**[0064]** In this example, the heating elements 110 are

provided as panel heaters curved about the insertion direction 105 to define semi-cylindrical halves of the heating chamber 120. As such, the heating elements 110 form a cylindrical shell around the heating chamber 120.

**[0065]** The HNB device 100 comprises a locking mechanism 150, which may also be referred to as a locking system. The locking mechanism 150 provides means for locking the first body portion 130 and the second body portion 140 together, thereby preventing a user from moving the body portions 130, 140 relative to each other and, in particular, exposing the heating elements 110.

**[0066]** The locking mechanism 150 includes a first locking portion 152 on the first body portion 130 and a second locking portion 154 on the second body portion 140. The first body portion 152 and the second body portion 154 are configured to cooperate to lock together the first body portion 130 and the second body portion 140, thereby preventing separation of the first body portion 130 and the second body portion 140.

**[0067]** In this example, the locking mechanism 150 is implemented as a mechanical locking mechanism in which the first locking portion 152 is a pin and the second locking portion 154 is a socket to receive the pin. When the pin 152 is received into the socket 154, the locking mechanism 150 locks the first body portion 130 and the second body portion 140 together, since the pin 152 received into the socket 154 prevents pivoting of the body portions relative to the each other.

**[0068]** The locking mechanism 150 is configured to release conditional on a heating operation of the heating elements. As part of a session, the heating operation may cause the heating elements 110 to heat to a relatively high temperature such that it is deemed unsafe for a user to handle the heating elements 110. Conveniently, releasing of the locking mechanism 150 is conditional on the heating operation. More particularly, releasing of the locking mechanism 150 may be conditional on, for example, a sensed temperature or elapsing of a predetermined period of time from the heating operation.

**[0069]** The HNB device 100 comprises a temperature sensor 170 configured to sense a temperature relating to at least one of the first heating element 112 and the second heating element 114. In this example, the temperature sensor 170 is configured to sense a temperature relating to both the first heating element 112 and the second heating element 114. The locking mechanism 150 is configured to release dependent on an output of the temperature sensor 170. For example, the temperature sensor 170 may indicate a relatively low temperature of the heating elements 110, such as less than 45 degrees Celsius or any other temperature value deemed suitable.

**[0070]** The HNB device 100 comprises a closing mechanism 160 configured to urge the first body portion 130 and the second body portion 140 together. As such, the closing mechanism 160 is functionally different from the locking mechanism 150, which prevents separating the

first body portion 130 and the second body portion 140. The closing mechanism 160 may in some examples be implemented together with the locking mechanism 150, e.g. in a suitably configured electromagnetic lock.

**[0071]** As shown in Figure 3, the closing mechanism 160 includes a first closing member 162 on the first body portion 130 and a second closing member 164 on the second body portion 140. The first closing member 162 and the second closing member 164 are configured to cooperate to urge the first body portion 130 and the second body portion 140 together, thereby urging together the first heating element 112 and the second heating element 114. In this example, the closing members 162, 164 are configured to magnetically interact to urge the first body portion 130 and the second body portion 140 together. The closing mechanism 160 may snap-lock. For example, the first closing member 162 may be provided as a permanent magnet and the second closing member 164 may be a ferromagnetic portion of the second body portion 140.

**[0072]** In use, insertion of the consumable 200 into the HNB device 100 through the consumable opening 102 by a user causes the consumable 200 to be received into the heater chamber 120 formed between the heating elements 110.

**[0073]** The HNB device 100 is configured to generate aerosol/vapour for inhalation by the user through heating of the consumable 200 by means of the heating elements 110 as part of a session. Suitably the heating elements 110 are configured to heat the consumable 200 to a suitable temperature, for example each heating element 110 may be configured to heat to a temperature between 200 and 300 degrees Celsius. Conveniently the heating elements 110 are electrically connectable to a power supply 180.

**[0074]** In some examples, the first heater element 112 and the second heater element 114 make independent electrical connection with the power supply 180. As such, the heater elements 112, 114 may be activated independently. In some examples, the first heater element 112 and the second heater element 114 are jointly electrically connected with the power supply 180, for example electrically connected to each other and the power supply 180. As such, the heater elements 112, 114 may be activated together.

**[0075]** When the heater elements 112, 114 are separated, the electrical connection with the power supply 180 may be disconnected, for example as a result of a mechanical disconnection, between the heater elements 112, 114. In some examples, only the second heater element 114 is disconnected. When the heater elements 112, 114 are brought together and the heater chamber 120 is formed, electrical connection with the power supply 180 may be re-established.

**[0076]** Following one or multiple sessions, the user may wish to inspect the heating chamber 120, e.g. in order to assess whether cleaning of the heating chamber 120 may be desired or may be prompted to do so by the

HNB device 100. In some examples, the HNB device 100 is opened only when more thorough cleaning is required, not after every stick.

**[0077]** As a result of the session, the heating elements 110 may be at comparatively high temperature, which may not be considered safe for handling by the user. As such, the locking mechanism 150 prevents the user from moving the first body portion 130 and the second body portion 140 to separate the heating elements 110 whilst the heating elements 110 are too hot.

**[0078]** Following release of the locking mechanism 150, the user may proceed to open the heating chamber 120 by moving the first body portion 130 and the second body portion 140 relative to each other, thereby separating the heating elements 110 and exposing the heating elements 110 for user access.

**[0079]** If desired, the user may perform cleaning of the heating elements 110, which may involve removing of residue from one or multiple consumables 200, e.g. by means of a suitable tool such as a brush.

**[0080]** The user may return the HNB device 100 to the closed configuration by suitably moving the first body portion 130 and the second body portion 140 relative to each other, thereby bringing together the heating elements 110 and closing the heater chamber 120. The closing mechanism 160 may assist the user when returning the HNB device 100 to the closed configuration. In this example, the closing mechanism 160 may help ensure that the heating elements 110 are brought together and that the locking mechanism 150 may be engageable.

**[0081]** As such, the HNB device 100 described above may provide some or all of the following advantages:

- improved access for cleaning;
- removing need for piercing of stick by heater, reducing residue in heater chamber;
- maintaining compatibility with conventional stick design;
- improved heating when compared to pin-type heaters (inside-out heating)

**[0082]** By contrast, conventional devices utilising outside-in heating may have a fixed heating chamber which is not accessible for cleaning. Here, an access door is implemented to open the device for cleaning.

**[0083]** The locking mechanism described above utilises a mechanical locking mechanism, in the form of a pin and a socket, for locking together the first body portion and the second body portion. However, any suitable locking mechanism may be utilised such as, for example, a different mechanical locking mechanism or an electromagnetic locking mechanism.

**[0084]** The features disclosed in the foregoing description, or in the following claims, or in the accompanying drawings, expressed in their specific forms or in terms of a

means for performing the disclosed function, or a method or process for obtaining the disclosed results, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

**[0085]** While the invention has been described in conjunction with the exemplary embodiments described above, many equivalent modifications and variations will be apparent to those skilled in the art when given this disclosure. Accordingly, the exemplary embodiments of the invention set forth above are considered to be illustrative and not limiting. Various changes to the described embodiments may be made without departing from the spirit and scope of the invention.

**[0086]** For the avoidance of any doubt, any theoretical explanations provided herein are provided for the purposes of improving the understanding of a reader. The inventors do not wish to be bound by any of these theoretical explanations.

**[0087]** Any section headings used herein are for organizational purposes only and are not to be construed as limiting the subject matter described.

**[0088]** Throughout this specification, including the claims which follow, unless the context requires otherwise, the words "have", "comprise", and "include", and variations such as "having", "comprises", "comprising", and "including" will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

**[0089]** It must be noted that, as used in the specification and the appended claims, the singular forms "a," "an," and "the" include plural referents unless the context clearly dictates otherwise. Ranges may be expressed herein as from "about" one particular value, and/or to "about" another particular value. When such a range is expressed, another embodiment includes from the one particular value and/or to the other particular value. Similarly, when values are expressed as approximations, by the use of the antecedent "about," it will be understood that the particular value forms another embodiment. The term "about" in relation to a numerical value is optional and means, for example, +/- 10%.

**[0090]** The words "preferred" and "preferably" are used herein refer to embodiments of the invention that may provide certain benefits under some circumstances. It is to be appreciated, however, that other embodiments may also be preferred under the same or different circumstances. The recitation of one or more preferred embodiments therefore does not mean or imply that other embodiments are not useful, and is not intended to exclude other embodiments from the scope of the disclosure, or from the scope of the claims.

## Claims

1. A HNB device (100), comprising:

a first body portion (130) to which a first heating element (112) is attached;  
a second body portion (140) to which a second heating element (114) is attached;  
a heating chamber (120) formed between the first heating element and the second heating element, the heating chamber for receiving a consumable (200) in an insertion direction (105) through a consumable opening (102) in the HNB device;  
wherein the second body portion is moveable relative to the first body portion to separate the heating elements and expose the heating elements for user access.

2. The HNB device according to claim 1, wherein the first heating element and the second heating element are configured to substantially enclose the heating chamber.

3. The HNB device according to claim 2, wherein the heating chamber is substantially cylindrical and each of the first heating element and the second heating element defines a substantially semi-cylindrical portion of the heating chamber.

4. The HNB device according to any preceding claim, wherein each heating element is curved about the insertion direction.

5. The HNB device according to any preceding claim, further comprising a locking mechanism (150) configurable to lock together the first body portion and the second body portion to prevent separating the first heating element and the second heating element.

6. The HNB device according to claim 5, wherein the locking mechanism (150) includes a first locking portion (152) on the first body portion and a second locking portion (154) on the second body portion.

7. The HNB device according to claim 5 or 6, wherein the locking mechanism is configured to release conditional on a heating operation of the heating elements.

8. The HNB device according to claim 7,

further comprising a temperature sensor (170) configured to sense a temperature relating to the first heating element or the second heating element;  
wherein the locking mechanism is configured to release conditional on an output of the temperature sensor.



9. The HNB device according to any one of claims 6 to 8,  
wherein the locking mechanism is configured to release after a pre-determined period of time has passed after the heating operation. 5
10. The HNB device according to any preceding claim, further comprising a closing mechanism (160) configured to urge the first heating element and the second heating element together. 10
11. The HNB device according to claim 10,  
  
wherein the closing mechanism includes a first closing member (162) on the first body portion and a second closing member (164) on the second body portion; 15  
wherein the first closing member and the second closing member are configured to magnetically interact to urge the first heating element and the second heating element together. 20
12. The HNB device according to any preceding claim, wherein the first heating element or the second heating element is operable to heat to a temperature in a range of 200 to 350 degrees Celsius, preferably 250 to 320 degrees Celsius, more preferably to a temperature of approximately 290 degrees Celsius. 25
13. The HNB device according to any preceding claim, wherein the first body portion and the second body portion are connected by a hinge portion (190) about which the second body portion is pivotable relative to the first body portion, wherein the second body portion is moveable relative to the first body portion by pivoting the second body portion relative to the first body portion. 30 35
14. A HNB system (10) comprising a HNB device (100) according to any preceding claim and a consumable (200). 40
15. The HNB system according to claim 14,  
  
wherein the consumable has a device end (204) and a mouth end (206), 45  
wherein the mouth end protrudes from the HNB device when the consumable is inserted into the HNB device. 50

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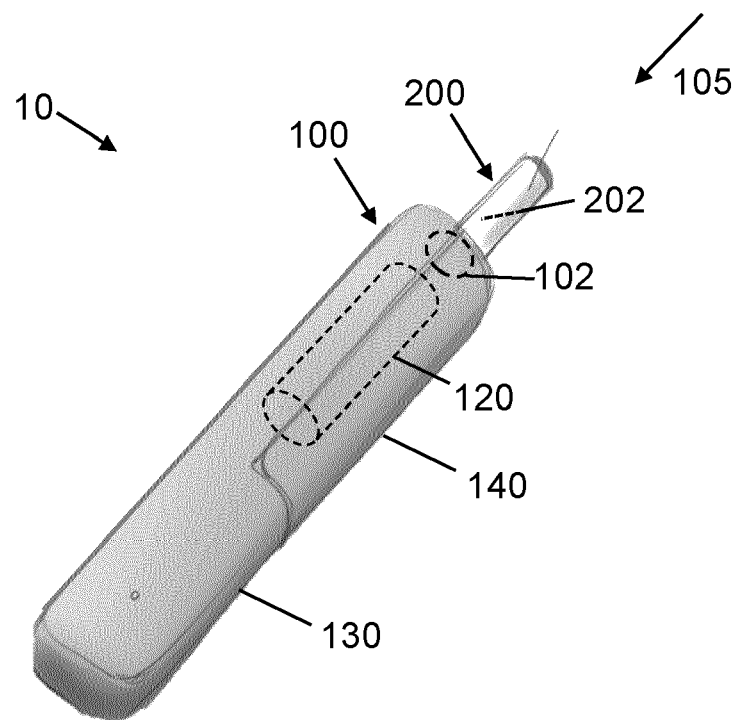


Fig. 1

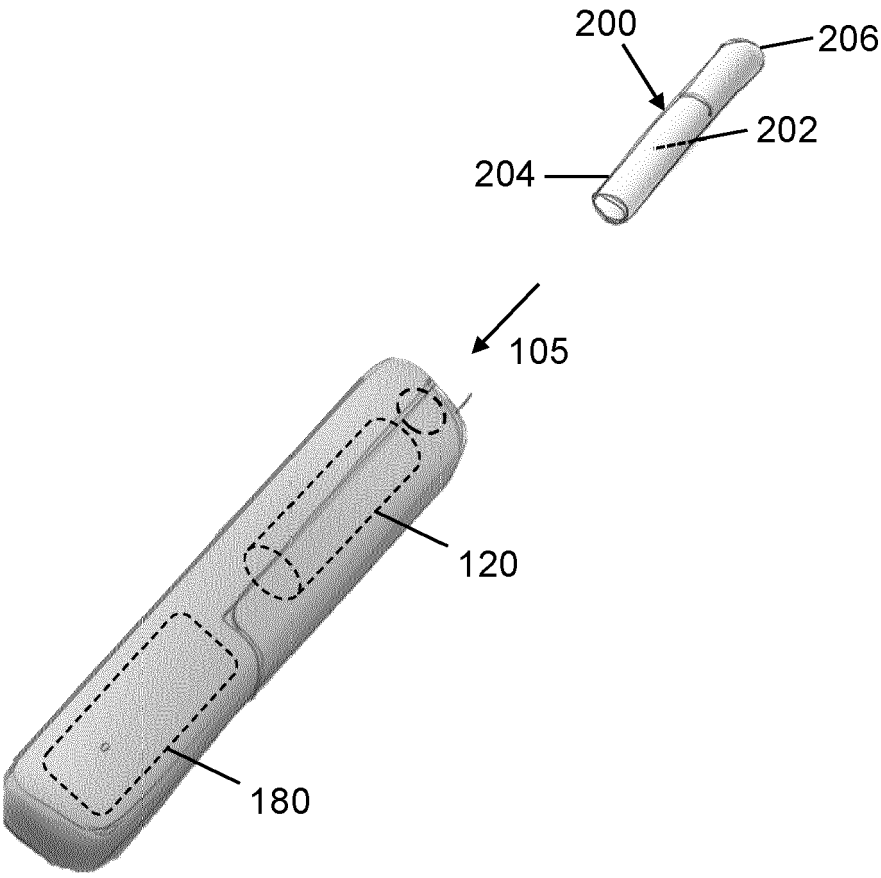


Fig. 2

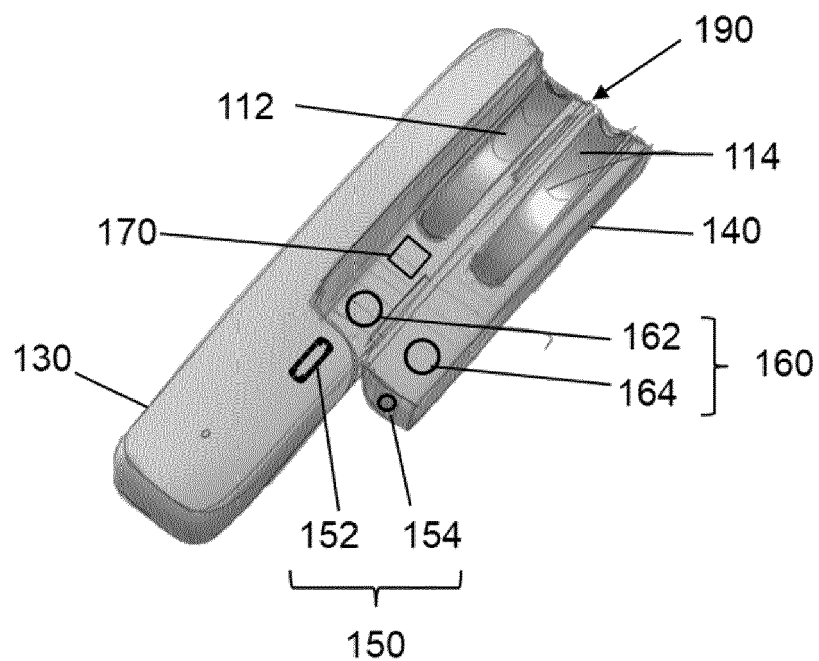


Fig. 3

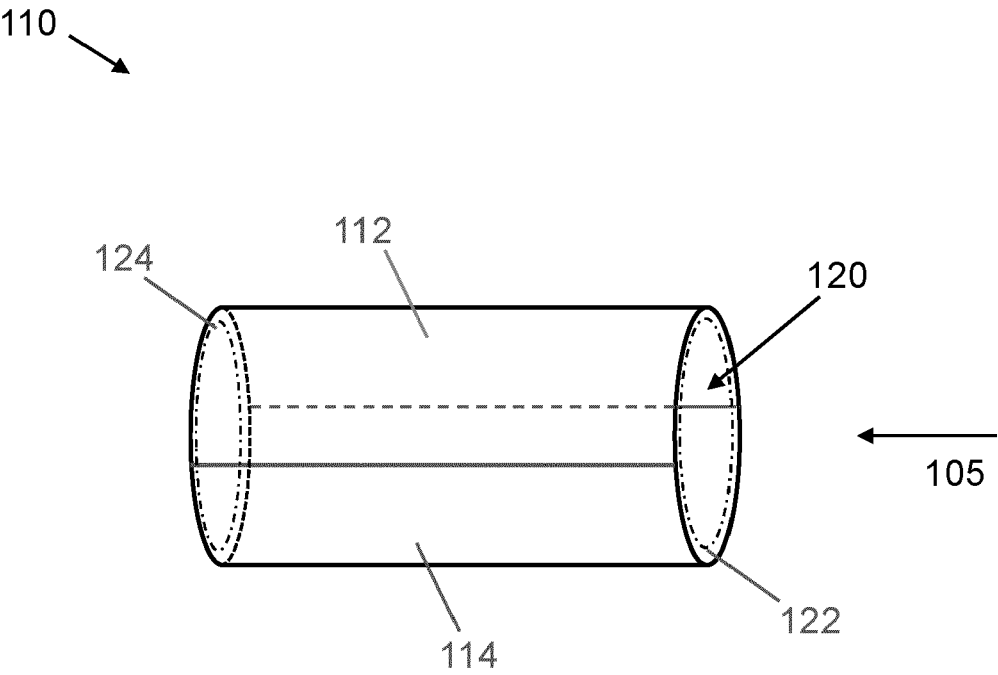


Fig. 4

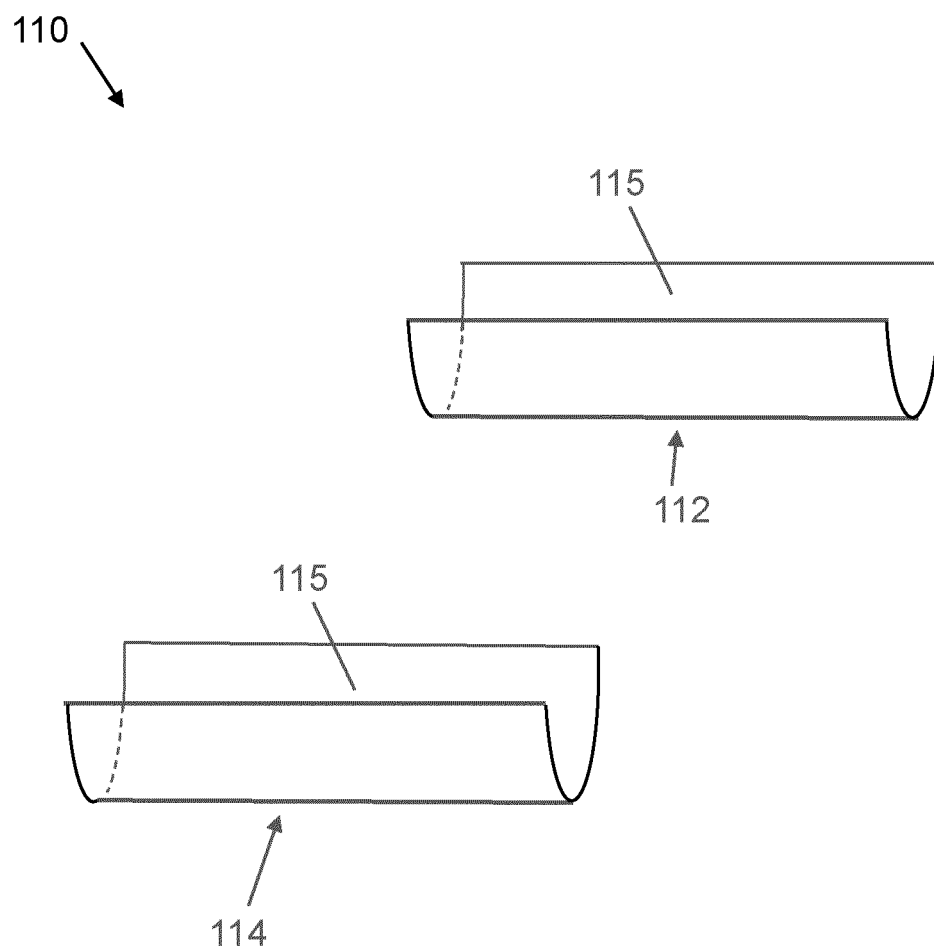


Fig. 5



## EUROPEAN SEARCH REPORT

Application Number

EP 23 19 1153

## DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	IT 2018 0001 0062 A1 (GD SPA [IT]) 6 May 2020 (2020-05-06) * page 5, line 3 - page 12, line 11; figures 1-2d *	1-15	INV. A24F40/40 A24F40/46
A	US 2022/225667 A1 (BLACKMON ZACK W [US] ET AL) 21 July 2022 (2022-07-21) * paragraph [0027] - paragraph [0069]; figures 1-12 *	1-15	
A	WO 2022/207743 A1 (JT INT SA [CH]) 6 October 2022 (2022-10-06) * page 6, line 13 - page 14, line 3; figures 1-6 *	1-15	
			TECHNICAL FIELDS SEARCHED (IPC)
			A24F
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		24 January 2024	Klintebäck, Daniel
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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# **ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO.**

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
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24-01-2024

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
<b>IT 201800010062 A1</b>	<b>06-05-2020</b>	-----	
<b>US 2022225667 A1</b>	<b>21-07-2022</b>	<b>CA 3204770 A1</b>	<b>21-07-2022</b>
		<b>CN 117177680 A</b>	<b>05-12-2023</b>
		<b>EP 4277485 A1</b>	<b>22-11-2023</b>
		<b>KR 20230135099 A</b>	<b>22-09-2023</b>
		<b>US 2022225667 A1</b>	<b>21-07-2022</b>
		<b>WO 2022154862 A1</b>	<b>21-07-2022</b>
		-----	
<b>WO 2022207743 A1</b>	<b>06-10-2022</b>	<b>EP 4312620 A1</b>	<b>07-02-2024</b>
		<b>WO 2022207743 A1</b>	<b>06-10-2022</b>
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