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(54)

AEROSOL GENERATING DEVICE

- (57)

An aerosol generating device comprising a housing (102), a printed circuit board (104) fixed within the housing, and a heater assembly 106 fixed within the housing. The heater assembly comprises an elongate heater 108, a heater flange 110 extending in a transverse direction from the heater and an electrical contact electrically connecting the heater to the printed circuit board.
- The heater flange has rotational symmetry of order 1 about a longitudinal axis of the heater. The heater flange comprises a top surface 116 facing a heating portion of the heater, a bottom surface 120 opposite the top surface, and a substantially planar surface 122 extending from the top surface to the bottom surface.

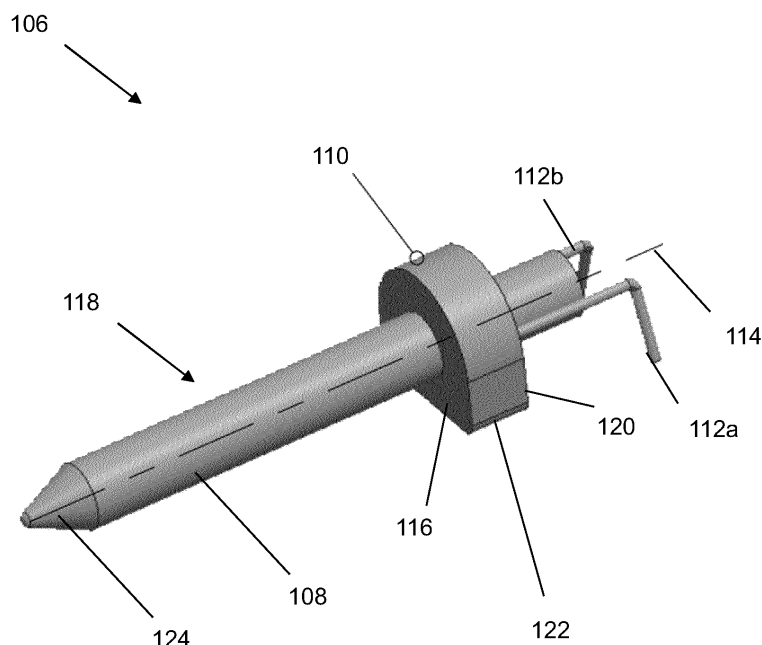


Fig. 4

Description

FIELD

[0001] The present disclosure relates to an aerosol generating device, and more particularly, though not exclusively to an aerosol generating device for provision of an aerosol to a user for inhalation.

BACKGROUND

[0002] A typical aerosol generating device / apparatus, or smoking substitute apparatus / device, 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. The aerosol is delivered to the user for inhalation by the user. The aerosol generating unit is, in some cases, a heater, which heats the aerosol precursor to form the aerosol. In such examples, the heater and the aerosol precursor are in thermal contact with one another, to allow the heating for aerosol formation. In some examples, the aerosol precursor is provided as a consumable, or as part of a consumable. The consumable is a separate unit from the aerosol generating device. The aerosol generating device includes the heater. The aerosol generating device and consumable are mutually engaged with one another. Such engagement brings the heater into thermal contact with the aerosol precursor, for heating. The temperature of the heater is controlled, to, in turn, control the heating of the aerosol precursor. Accurate temperature control is important.

[0003] A drawback with known aerosol generating apparatuses is that aerosol generating apparatuses may be complex and/or time consuming to manufacture.

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

SUMMARY

[0005] The present disclosure provides an aerosol generating device that comprises a housing, a printed circuit board (PCB) fixed within the housing, and a heater assembly fixed within the housing, the heater assembly comprising an elongate heater, a heater flange extending in a transverse direction from the elongate heater, and an electrical contact electrically connecting the heater to the PCB, wherein the heater flange has rotational symmetry of order 1 about a longitudinal axis of the elongate heater, and wherein the heater flange comprises a top surface facing a heating portion of the heater, a bottom surface opposite the top surface, and a substantially planar surface extending from the top surface to the bottom surface.

[0006] In this way, there may be a pre-determined alignment between the elongate heater and the housing.

In this way, there may be a predetermined alignment between the electrical contact of the heater and the PCB. In this way, there may be a reduced risk of incorrect assembly of the aerosol generating device. In particular, the orientation of the elongate heater relative to the housing, is fixed and predetermined. This may be important for calibration of the heater. The calibration of the heater may be part of the manufacturing process of the device.

[0007] Further, advantageously, the rotational symmetry of order 1 of the heater flange may be achieved by a simple flange structure.

[0008] The heater flange having rotational symmetry of order 1 about a longitudinal axis of the elongate heater may mean that the heater flange is rotationally symmetric about a longitudinal axis of the elongate heater only when the rotation is by an integer multiple of 360 degrees.

[0009] The longitudinal axis of the elongate heater may be the axis along the length of the heater which passes through the transverse centre of the heater.

[0010] Substantially planar may mean planar. Planar may mean flat. A planar surface may be a surface comprising no indenting portions or protruding portions.

[0011] The heating portion of the elongate heater may be configured to heat an aerosol precursor. The aerosol precursor may be part of a consumable, the consumable engageable with the aerosol generating device.

[0012] The top surface of the heater flange may face a cap of the aerosol generating device. The top surface of the heater flange may face a top end of the aerosol generating device.

[0013] The bottom surface of the heater flange may face a device engagement portion of the heater. The bottom surface of the heater flange may face the electrical contact. The bottom surface of the heater flange may face the PCB. The bottom surface of the heater flange may face a battery fixed within the housing.

[0014] In some examples, the elongate heater may be a rod heater. A rod heater may be rotationally symmetric around a longitudinal axis of the rod heater when the rotation is by any angle. The rod heater may alternatively be described as an elongate heater with a transverse cross sectional shape that is substantially circular.

[0015] In some examples, the heating portion of the elongate heater may comprise a pointed portion. The pointed portion may be configured to penetrate a consumable or a portion of a consumable. The pointed portion may penetrate the aerosol forming portion of the consumable. In this way, insertion of the heater into a consumable may be facilitated.

[0016] In some examples, the electrical contact may include a first wire. The first wire may extend from the bottom surface of the heater flange. In some examples, the electrical contact may include a second wire. The second wire may extend from the bottom surface of the heater flange. Advantageously, the elongate heater may be electrically connected to the PCB by wires. The electrical connection provides an electrical pathway for electrical power to be supplied to the heater. The supply of

the electrical power to the heater may cause the heater to be heated, for example via resistive / Ohmic heating.

[0017] In some examples, the PCB may comprise a first heater connection terminal. In some examples, the first heater connection terminal may be electrically connected to the first wire. In some examples, the PCB may comprise a first wire insertion hole. In some examples, the first wire may pass through the first wire insertion hole. In some examples, the PCB may comprise a second heater connection terminal. In some examples, the second heater connection terminal may be electrically connected to the second wire. In some examples, the PCB may comprise a second wire insertion hole. In some examples, the second wire may pass through the second wire insertion hole. In this way, the heater may be reliably electrically connected to heater connection terminals on the PCB.

[0018] In some examples, the elongate heater may be configured to generate a circumferential temperature heating profile. In some examples, the circumferential temperature heating profile may be non-uniform.

[0019] The circumferential temperature heating profile being non-uniform may mean that the temperature is a function of circumferential angle. The circumferential temperature heating profile being non-uniform may mean that, at a particular longitudinal distance along the elongate heater, the temperature on a first transverse side of the elongate heater is higher than the temperature on a second transverse side of the heater.

[0020] The circumferential heating profile may have a rotational symmetry of order 1 about a longitudinal axis of the heater. The circumferential heating profile may be non-circularly symmetric.

[0021] In some examples, the elongate heater may comprise a heater track. The heater track may be a resistive heater track. The heater track may be electrically connected to the electrical contact. The heater track may be disposed on a main body of the heater. The main body of a rod heater may be a rod. The heater track may be disposed on the main body of the heater such that the heater track is non-uniformly distributed on the main body of the heater. The heater track may be non-uniformly distributed around the longitudinal axis of the heater. The location of the heater track may give rise to the non-uniform circumferential temperature heating profile.

[0022] In some examples, the longitudinal axis of the PCB may be offset in a transverse direction from the longitudinal axis of the heater.

[0023] In some examples, both a front plane of the PCB and a back plane of the PCB may be offset in a transverse direction from the longitudinal axis of the heater. The front plane of the PCB may be opposite the back plane of the PCB. The front plane of the PCB and the back plane of the PCB may be the two largest planes of the PCB corresponding, generally, to the two main surfaces of the PCB substrate.

[0024] In this way, the longitudinal axis of the elongate heater may be aligned along the central axis of the hous-

ing, and there may be sufficient space adjacent the PCB for a battery to be fixed within the housing.

[0025] The longitudinal axis of the elongate heater may be aligned along the longitudinal axis of the housing.

[0026] In some examples, the aerosol generating device may further comprise a mounting flange. The mounting flange may comprise an upper shroud. The heater flange and the upper shroud may be configured to engage with one another in only one orientation of the heater flange with respect to the mounting flange.

[0027] In this way, the heater assembly may be engageable with the mounting flange in only one orientation of the heater assembly relative to the mounting flange. Advantageously, there may be a pre-determined alignment between the elongate heater and the mounting flange. Advantageously, there may be a reduced risk of incorrect assembly of the aerosol generating device.

[0028] In some examples, the upper shroud may comprise a cavity, the cavity being complementary in shape to the shape of the heater flange.

[0029] In this way, the heater assembly may be engageable with the mounting flange in only one orientation of the heater assembly relative to the mounting flange. Advantageously, there may be a pre-determined alignment between the elongate heater and the mounting flange. Advantageously, there may be a reduced risk of incorrect assembly of the aerosol generating device.

[0030] In some examples, the upper shroud may comprise a heater-receiving aperture. The heating portion of the elongate heater may protrude through the heater receiving aperture.

[0031] In some examples, the mounting flange may comprise a lower shroud. The lower shroud and the upper shroud may be configured to engage with one another to retain the heater flange between the upper shroud and the lower shroud.

[0032] Advantageously, the heater assembly may be fixed relative to the mounting flange.

[0033] In some examples, the upper shroud may comprise one or more upper shroud projections. The lower shroud may comprise one or more lower shroud apertures. Each of the one or more upper shroud projections may be complementary in shape to a respective one of the one or more lower shroud apertures.

[0034] In this way, the heater assembly may be securely fixed relative to the mounting flange.

[0035] In some examples, the lower shroud and the upper shroud may be configured to engage with one another in only one orientation of the lower shroud with respect to the upper shroud. In some examples, the upper shroud may comprise one or more upper shroud grooves. The lower shroud may comprise one or more lower shroud protrusions. The one or more lower shroud protrusions may be complementary in shape to one of the one or more upper shroud grooves.

[0036] Advantageously, there may be a pre-determined alignment between the lower shroud and the upper shroud.

[0037] In some examples, the heater assembly may comprise a gasket disposed between the upper shroud and the lower shroud.

[0038] In some examples, the gasket may be configured to engage with the upper shroud. The gasket may comprise one or more gasket apertures. Each of the one or more gasket apertures may be complementary in shape to a respective one of the one or more upper shroud projections.

[0039] In some examples, the gasket may be configured to create a seal around the heater flange. In some examples, the gasket may comprise a sealing aperture. The sealing aperture may be complementary in shape to the shape of the heater flange.

[0040] In this way, a seal may be created between the upper shroud and the lower shroud. The seal may be a hermetic seal.

[0041] In some examples, the mounting flange and the housing are configured to engage with one another.

[0042] In some examples, the housing may comprise one or more alignment grooves. The mounting flange may comprise one or more alignment protrusions. Each of the one or more alignment protrusions may be complementary in shape to a respective one of the one or more alignment grooves. The housing may comprise one or more alignment protrusions. The mounting flange may comprise one or more alignment grooves. Each of the one or more alignment grooves may be complementary in shape to a respective one of the one or more alignment protrusions.

[0043] Advantageously, the mounting flange may be configured to securely engage with the housing.

[0044] In some examples, the one or more mounting flange grooves and/or the one or more mounting flange protrusions are located on the upper shroud of the mounting flange.

[0045] In some examples, the upper shroud is shaped to engage with the housing in exactly two orientations of the upper shroud with respect to the housing.

[0046] In this way, the mounting flange may be engageable with the housing in only two orientations of the mounting flange relative to the housing.

[0047] In some examples, the lower shroud may comprise a first wire aperture. The first wire aperture may be configured to receive the first wire therethrough. The lower shroud may comprise a second wire aperture. The second wire aperture may be configured to receive the second wire therethrough.

[0048] Advantageously, the electrical contact may be connectable to the PCB.

[0049] In some examples, the lower shroud may comprise a lower surface facing the PCB. The lower surface may comprise a first wire groove between the first wire aperture and the PCB. The lower surface may comprise a second wire groove between the second wire aperture and the PCB.

[0050] In this way, there may be a pre-determined alignment between the mounting flange and the housing.

Advantageously, there may be a pre-determined alignment between the elongate heater and the housing. Advantageously, there may be a pre-determined alignment between the electrical contact and the PCB. Advantageously, there may be a reduced risk of incorrect assembly of the aerosol generating device.

[0051] The first wire groove may receive the first wire. The second wire groove may receive the second wire.

[0052] The first wire may be bent such that the first wire extends within the first wire groove towards the PCB. The second wire may be bent such that the second wire extends within the second wire groove towards the PCB.

[0053] Advantageously, the first wire and the second wire may be securely aligned respectively towards the first heater connection terminal and the second heater connection terminal.

[0054] In some examples, the mounting flange may be made of a thermally insulating material. The thermally insulating material may be polyetheretherketone (PEEK).

[0055] In this way, the mounting flange may inhibit heat transfer from the elongate heater to the housing.

[0056] In some examples, the heater flange may be configured to engage with the housing.

[0057] In some examples, the housing may comprise a cavity, the cavity being complementary in shape to the shape of the heater flange.

[0058] In this way, the heater assembly may be engageable with the housing in only one orientation of the heater assembly relative to the housing. Advantageously, there may be a pre-determined alignment between the elongate heater and the housing. Advantageously, there may be a pre-determined alignment between the electrical contact and the PCB. Advantageously, there may be a reduced risk of incorrect assembly of the aerosol generating device.

[0059] In some examples, the top surface may be stepped such that the top surface comprises a lower step with a lower radius and an upper step with an upper radius. The lower radius may be larger than the upper radius. The housing may include a step abutting portion. The step abutting portion may be shaped to abut the lower step. Advantageously, the heater flange may be securely fixed within the housing. The housing may comprise a bottom surface abutting portion. Advantageously, the heater flange may be securely fixed within the housing.

[0060] In this way, the heater flange may be securely engaged with the housing.

[0061] In some examples, the heater flange may comprise a curved circumferential surface.

[0062] In some examples, the heater flange may be engageable within a housing where the housing comprises a curved circumferential surface.

[0063] In some examples, the curved circumferential surface may extend circumferentially at least 180 degrees around the longitudinal axis of the heater.

[0064] In this way, the heater flange may be securely

engageable within a housing where the housing comprises a curved circumferential surface extending circumferentially at least 180 degrees around the longitudinal axis of the housing.

[0065] In some examples, the curved circumferential portion of the heater flange and the planar surface of the heater flange are arranged, such that a cross section of the heater flange taken transverse to the longitudinal axis of the heater is D-shaped.

[0066] In some examples, the heater assembly may comprise a first electrical conductor and a second electrical conductor. The first electrical conductor and the second electrical conductor may form components of a temperature sensor, for example a thermocouple. The first electrical conductor may be electrically connected to a first thermocouple connection terminal on the PCB. The second electrical conductor may be electrically connected to a second thermocouple connection terminal on the PCB. The first electrical conductor and the second electrical conductor may be wires.

[0067] Advantageously, the temperature of the elongate heater may be measured.

[0068] In some examples, the PCB may comprise a first thermocouple insertion hole. In some examples, the first electrical conductor may extend through the first thermocouple insertion hole. In some examples, the PCB may comprise a first thermocouple insertion hole. In some examples, the first electrical conductor may extend through the first thermocouple insertion hole.

[0069] In some examples, the PCB may comprise a second thermocouple insertion hole. In some examples, the second electrical conductor may extend through the second thermocouple insertion hole. In some examples, the PCB may comprise a second thermocouple insertion hole. In some examples, the second electrical conductor may extend through the second thermocouple insertion hole.

[0070] In some examples, the length of the planar surface of the heater flange may be between 4 mm and 6 mm. The length of the planar surface of the heater flange may be between 4.5 mm and 5.5 mm.

[0071] In some examples, the distance between the centre of the circumferential portion and the centre of the planar surface may be between 4 mm and 10 mm. The distance between the centre of the circumferential portion and the centre of the planar surface may be between 9 mm and 10 mm. The distance between the centre of the circumferential portion and the centre of the planar surface may be between 4 mm and 5 mm.

[0072] In some examples, the upper radius of the upper step of the top surface of the heater flange may be between 3.5 mm and 4.5 mm. In some examples, the lower radius of the lower step of the top surface of the heater flange may be between 4.5 mm and 5.5 mm.

[0073] In some examples, a diameter of a cross-section of the elongate heater may be between 1.5 mm and 2.5 mm.

[0074] In some examples, the length of the mounting

flange may be between 12.9 mm and 13.9 mm. The width of the mounting flange between 11 mm and 12 mm. The length of the mounting flange may be the length of the upper shroud taken at a position where the upper shroud includes the alignment protrusion. The width of the mounting flange may be the width of the upper shroud taken at a position where the upper shroud includes the alignment protrusion.

[0075] In some examples, the length of the upper shroud taken at a position where the upper shroud includes the alignment protrusion may be between 12.9 mm and 13.9 mm. The width of the upper shroud taken at a position where the upper shroud includes the alignment protrusion may be between 11 mm and 12 mm. The length of the upper shroud taken at a position where the upper shroud does not include the alignment protrusion may be between 12.3 mm and 13.3 mm. The width of the upper shroud taken at a position where the upper shroud does not include the alignment protrusion may be between 10.5 mm and 11.5 mm.

[0076] In some examples, a transverse cross-sectional shape of the upper shroud is an oval shape with flattened sides. The oval shape may have exactly two flattened sides.

[0077] In some examples, the diameter of the heater-receiving aperture is between 2 mm and 3 mm.

[0078] In some examples the aerosol generating device is a heat-not-burn aerosol generating device.

[0079] In some examples, the elongate heater may be made of zirconium oxide. Zirconium oxide may be referred to as zirconia.

[0080] The preceding summary is provided for purposes of summarizing some examples to provide a basic understanding of aspects of the subject matter described herein. Accordingly, the above-described features should not be construed to narrow the scope or spirit of the subject matter described herein in any way. Moreover, the above and/or proceeding examples may be combined in any suitable combination to provide further examples, except where such a combination is clearly impermissible or expressly avoided. Other features, aspects, and advantages of the subject matter described herein will become apparent from the following text and the accompanying drawings.

BRIEF DESCRIPTION OF THE FIGURES

[0081] Aspects, features and advantages of the present disclosure will become apparent from the following description of examples in reference to the appended drawings in which like numerals denote like elements.

Fig. 1 is a block system diagram showing an example aerosol generating apparatus;

Fig. 2 is a block system diagram showing an example implementation of the apparatus of Fig. 1, where the aerosol generating apparatus is configured to gen-

erate aerosol from a solid precursor;

Fig. 3 is a schematic diagram showing an example implementation of the apparatus of Fig. 2;

Fig. 4 is a perspective view of a heater assembly according to an embodiment of the present invention;

Fig. 5 is a perspective view of a mounting flange and a heater assembly according to an embodiment of the present invention;

Fig. 6 is a cut-away view of an aerosol generating device according to an embodiment of the present invention;

Fig. 7A is a top view of a heater assembly according to an embodiment of the present invention;

Fig. 7B is a top view of a mounting flange according to an embodiment of the present invention;

Fig. 8 is a side view of a heater assembly according to an embodiment of the present invention;

Fig. 9 is a bottom view of a heater assembly according to an embodiment of the present invention, and;

Fig. 10 is a top view of a heater assembly according to an embodiment of the present invention.

DETAILED DESCRIPTION OF EMBODIMENTS

[0082] 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.

[0083] 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.

[0084] Any patents, published patent applications, and non-patent publications mentioned in the specification are hereby incorporated by reference in their entirety.

[0085] All examples implementing the present disclosure can be made and executed without undue experi-

mentation 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.

[0086] 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.

[0087] 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).

[0088] 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.

[0089] 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.

[0090] 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 combustible 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.

[0091] 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).

[0092] 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.

[0093] 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.

[0094] An example aerosol generating system may be a system for managing an aerosol generating apparatus. Such a system may include, for example, a mobile de-

vice, a network server, as well as the aerosol generating apparatus.

[0095] 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. 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 cannabinoid 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.

[0096] 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.

[0097] 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.

[0098] 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.

[0099] 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. As used herein, a **"puff"** (or **"inhale"** or **"draw"**) by a user may refer to expansion of lungs and/or oral cavity of a user to create a pressure reduction that induces flow through the flow path.

[0100] 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 includ-

ing 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.

[0101] As used herein, a **"heating system"** or a **"heater assembly"** may refer to an arrangement of at least one heater, which is operable to aerosolise a precursor once heated. The at least one heater may be electrically resistive to produce heat from the flow of electrical current therethrough. The at least one heater 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.

[0102] 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.

[0103] As used herein, an **"information carrying medium"** may include one or more +ments 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 cutouts to encode a bit, through which pins or a reader may be inserted).

[0104] 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).

[0105] Referring to Fig. 1, an example aerosol generating apparatus 1 includes a power supply 2, for supply of electrical energy. The apparatus 1 includes an aerosol generating unit 4 that is driven by the power supply 2. The power supply 2 may include an electric power supply in the form of a battery and/or an electrical connection to an external power source. The apparatus 1 includes a

precursor 6, which in use is aerosolised by the aerosol generating unit 4 to generate an aerosol. The apparatus 2 includes a delivery system 8 for delivery of the aerosol to a user.

[0106] Electrical circuitry (not shown in figure 1) may be implemented to control the interoperability of the power supply 4 and aerosol generating unit 6.

[0107] In variant examples, which are not illustrated, the power supply 2 may be omitted since, e.g. an aerosol generating unit implemented as an atomiser with flow expansion may not require a power supply.

[0108] Fig. 2 shows an implementation of the apparatus 1 of Fig. 1, where the aerosol generating apparatus 1 is configured to generate aerosol by a heat-not-burn process.

[0109] In this example, the apparatus 1 includes a device body 50 and a consumable 70.

[0110] In this example, the body 50 includes the power supply 4 and a heating system 52. The heating system 54 includes at least one heater 54. The body may additionally include any one or more of electrical circuitry 56, a memory 58, a wireless interface 60, one or more other components 62.

[0111] The electrical circuitry 56 may include a processing resource for controlling one or more operations of the body 50, e.g. based on instructions stored in the memory 58.

[0112] The wireless interface 60 may be configured to communicate wirelessly with an external (e.g. mobile) device, e.g. via Bluetooth.

[0113] The other component(s) 62 may include an actuator, one or more user interface devices configured to convey information to a user and/or a charging port, for example (see e.g. Fig. 3).

[0114] The body 50 is configured to engage with the consumable 70 such that the at least one heater 54 of the heating system 52 penetrates into the solid precursor 6 of the consumable. In use, a user may activate the aerosol generating apparatus 1 to cause the heating system 52 of the body 50 to cause the at least one heater 54 to heat the solid precursor 6 of the consumable (without combusting it) by conductive heat transfer, to generate an aerosol which is inhaled by the user.

[0115] Fig. 3 shows an example implementation of the aerosol generating device 1 of Fig. 2.

[0116] As depicted in Fig. 3, the consumable 70 is implemented as a stick, which is engaged with the body 50 by inserting the stick into an aperture at a top end 53 of the body 50, which causes the at least one heater 54 of the heating system 52 to penetrate into the solid precursor 6.

[0117] The consumable 70 includes the solid precursor 6 proximal to the body 50, and a filter distal to the body 50. The filter serves as the mouthpiece of the consumable 70 and thus the apparatus 1 as a whole. The solid precursor 6 may be a reconstituted tobacco formulation.

[0118] In this example, the at least one heater 54 is a rod-shaped element with a circular transverse profile.

Other heater shapes are possible, e.g. the at least one heater may be blade-shaped (with a rectangular transverse profile) or tube-shaped (e.g. with a hollow transverse profile).

[0119] In this example, the body 50 includes a cap 51. In use the cap 51 is engaged at a top end 53 of the body 50. Although not apparent from Fig. 3, the cap 51 is moveable relative to the body 50. In particular, the cap 51 is slidable and can slide along a longitudinal axis of the body 50.

[0120] The body 50 also includes an actuator 55 on an outer surface of the body 50. In this example, the actuator 55 has the form of a button.

[0121] The body 50 also includes a user interface device configured to convey information to a user. Here, the user interface device is implemented as a plurality of lights 57, which may e.g. be configured to illuminate when the apparatus 1 is activated and/or to indicate a charging state of the power supply 4. Other user interface devices are possible, e.g. to convey information haptically or audibly to a user. The body may also include an airflow sensor which detects airflow in the aerosol generating apparatus 1 (e.g. caused by a user inhaling through the consumable 70). This may be used to count puffs, for example.

[0122] In this example, the consumable 70 includes a flow path which transmits aerosol generated by the at least one heater 54 to the mouthpiece of the consumable.

[0123] In this example, the aerosol generating unit 4 is provided by the above-described heating system 52 and the delivery system 8 is provided by the above-described flow path and mouthpiece of the consumable 70.

[0124] According to the present invention, there is provided an aerosol generating device, which may be implemented in any of the preceding examples, the aerosol generating device comprising a housing 102, a PCB 104, 204 fixed within the housing 102, and a heater assembly 106, 206 fixed within the housing 102. The aerosol generating device may correspond to the aerosol generating unit 4 in any of the preceding examples. The PCB 104, 204 may correspond to the electrical circuitry 56 in any of the preceding examples. The heater assembly 106, 206 may correspond to the heating system 52 in any of the preceding examples.

[0125] Fig. 4 shows a perspective view of an example of the heater assembly 106 included in a first embodiment of an aerosol generating device according to the present invention, where the aerosol generating device is a heat-not-burn aerosol generating device.

[0126] The heater assembly 106 comprises an elongate heater 108, a heater flange 110 extending in a transverse direction from the elongate heater 108, a first wire 112a and a second wire 112b. The elongate heater 108 may correspond to the heater 54 in any of the preceding examples.

[0127] The first wire 112a and the second wire 112b extend from the bottom surface 120 of the heater flange 110. The first wire 112a and the second wire 112b are

configured to electrically connect the elongate heater 108 to the PCB 104 (not shown in Fig. 4, see Figure 6). Ultimately, the heater, via the first and second wires, is connected to the power supply for supply of power to the heater.

[0128] The heater flange 110 comprises a top surface 116 facing a heating portion 118 of the elongate heater 108, a bottom surface 120 opposite the top surface 116, and a substantially planar surface 122 extending from the top surface 116 to the bottom surface 120. The heater flange 110 has rotational symmetry of order 1 about a longitudinal axis 114 of the elongate heater 108. This is achieved by the D-shape of the heater flange 110. Thus, the rotational symmetry of order 1 of the heater flange 110 is achieved with a simple structure. Although the rotational symmetry of order 1 is achieved by the D-shape of the heater flange in the present embodiment, it is to be understood that other flange shapes may be used to achieve the rotational symmetry of order 1.

[0129] The elongate heater 108 is a rod heater 108 which is rotationally symmetric by any angle of rotation around the longitudinal axis 114 of the rod heater 108. The heating portion 118 of the elongate heater 108, which is for heating the aerosol precursor of a consumable inserted into the aerosol generating device, comprises a pointed portion 124. The pointed portion 124 allows for the heating portion 118 to more easily penetrate a consumable inserted into the aerosol generating device. Although the elongate heater 108 in the present embodiment is a rod heater 108, it is to be understood that other elongate heater types, such as a blade heater, may be used.

[0130] The elongate heater 108 comprises a heater track (not visible in the figures) electrically connected to the first wire 112a and the second wire 112b. The heater track is non-uniformly distributed around the longitudinal axis 114 of the elongate heater 108. Therefore, the elongate heater 108 is configured to generate a heating profile with a circumferential heating profile component which is non-uniform. The circumferential heating profile component has a rotational symmetry of order 1 about the longitudinal axis 114 of the elongate heater 108.

[0131] The elongate heater 108 is made out of zirconium oxide. However, it is to be understood that other suitable materials for a heater may be used.

[0132] In the first embodiment of the aerosol generating device, the heater assembly is fixed within the housing 102 by the heater flange 110 being retained within a mounting flange 126, which in turn is engaged with the housing 102 (see Fig. 6).

[0133] Fig. 5 is a pre-assembly perspective view of the mounting flange 126 and the heater assembly 118.

[0134] The mounting flange 126 comprises an upper shroud 128, a gasket 130 and a lower shroud 132.

[0135] During assembly, the heating portion of the heater 118 is inserted through a heater-receiving aperture 136 in the upper shroud 128. The upper shroud 128 comprises a cavity 134 which is complementary in shape

to the shape of the heater flange 110. In particular, the upper shroud 128 comprises a D-shaped aperture 134 complementary in shape to the D-shape of the heater flange 110. Thus, the heater flange 110 and the upper shroud 128 are configured to engage with one another in only one orientation of the heater flange 110 with respect to the upper shroud 128. As a result, a manufacturer of the aerosol generating device can know the location of the heater track relative to the housing of the device when assembling the aerosol generating device. This is important because the heater, in a heated condition, may be measured during a calibration process of the heater. Knowledge of the position of the heater track is important in this process, so that the position of the heater track, and thus, the heating profile resultant from the heater track, can be accounted for in the calibration process.

[0136] The gasket 130 and the lower shroud 132 engage with the upper shroud by the four upper shroud projections 138.

[0137] The gasket 130 comprises four gasket apertures 146. Each of the gasket apertures 146 is complementary in shape to a respective one of the upper shroud projections 138. During assembly, each of the four upper shroud projections 138 are slotted into a respective one of the four gasket apertures.

[0138] The gasket 130 further comprises a D-shaped sealing aperture 148 which is complementary in shape to the D-shaped heater flange 110. The D-shaped sealing aperture 148 fits around the D-shaped heater flange 110 to create a seal around the D-shaped heater flange 110.

[0139] Similarly to the gasket, the lower shroud 132 comprises four lower shroud apertures 140 complementary in shape to the four upper shroud projections 138. During assembly, each of the four upper shroud projections 138 are slotted into a respective one of the four lower shroud apertures 140.

[0140] The lower shroud further comprises two lower shroud protrusions 144 which are complementary in shape to an upper shroud groove 142. The two lower shroud protrusions slot into the upper shroud groove. In this way, the lower shroud 132 is configured to engage with the upper shroud 128 in only one orientation of the lower shroud 132 with respect to the upper shroud 128.

[0141] It is to be understood that the configurations of the lower shroud, the gasket and the upper shroud which allow them to engage with one another are not limited to those of the present embodiment. For example, the lower shroud may instead comprise lower shroud projections, and the upper shroud may comprise complementary upper shroud apertures. The lower shroud may instead comprise a lower shroud groove, and the upper shroud may comprise complementary upper shroud protrusions.

[0142] The lower shroud 132 further comprises a first wire aperture 150a and a second wire aperture 150b. The first wire aperture 150a and the second wire aperture 150b are respectively configured to receive the first wire 112a and the second wire 112b therethrough. During as-

sembly, the first wire 112a is slotted into the first wire aperture 150a, and the second wire is slotted into the second wire aperture 150b.

[0143] Further, on the lower surface of the lower shroud 132 there is a first wire groove 152a extending from the first wire aperture 150a and a second wire groove 152b extending from the second wire aperture 150b. The first wire groove 152a and the second wire groove 152b are respectively configured to retain the first wire 112a and the second wire 112b. During manufacture of the aerosol generating device, the first wire 112a is bent into the first wire groove 152a, and the second wire 112b is bent into the second wire groove 152b.

[0144] The first wire groove 152a and the second wire groove 152b allow for a pre-determined alignment between the mounting flange 126 and the housing 102, as a manufacturer can know to align the first wire groove 152a and the second wire groove 152b such that they point towards the PCB 104 fixed within the housing (see Fig. 6).

[0145] In the first embodiment, the mounting flange 126 is made from PEEK material. However, the mounting flange may be made from any suitable heat-resistant material.

[0146] Fig. 6 is a cut-away view of an aerosol generating device according to the first embodiment of the present invention. Fig. 6 shows the mounting flange 126, which is retaining the heater flange 110 of the heater assembly 106, engaged with the housing 102 of the device, and the PCB 104 fixed within the housing 102.

[0147] The mounting flange is engaged with the housing by an alignment groove 154 in the housing and a complementary alignment protrusion 156 on the upper shroud 128 of the mounting flange 126. The alignment protrusion 156 sits within the alignment groove 154. It is to be understood that the configurations of the mounting flange 126 and the housing 102 which allow them to engage with one another are not limited to those of the present embodiment. For example, the upper shroud 128 may comprise an alignment groove and the housing 102 may comprise a complementary alignment protrusion.

[0148] Fig. 6 further shows that the upper shroud 128 has an oval shape with two flattened sides 158a/b (only one of which is fully visible in the figures). Thus, it can be seen that the upper shroud 128 is shaped to engage with the housing 102 in exactly two orientations of the upper shroud 128 with respect to the housing 102. It is to be understood that other upper shroud shapes, which achieve the effect of allowing the upper shroud to engage with the housing 102 in exactly two orientations of the upper shroud 128 with respect to the housing 102 may be used.

[0149] A manufacturer can know the correct way to insert the mounting flange 126 into the housing 102 by orientating the mounting flange 126 in one of the two possible orientations in which the mounting flange 126 can engage with the housing 102 by their respective shapes, and by aligning the first wire groove 152a and

the second wire groove 152b such that they point towards the PCB 104 fixed within the housing 102.

[0150] The mounting flange 126 can be seen engaged within the housing 102 in Fig. 6 such that the first wire groove 152a and the second wire groove 152b point towards the PCB 104. In more detail, the first wire groove 152a and the second wire groove 152b each extend respectively between the first wire aperture 150a and a first wire insertion hole 160a of the PCB 104 and between the second wire aperture 150b and the second wire insertion hole 160b of the PCB 104.

[0151] The first wire insertion hole 150a and the second wire insertion hole 150b are located on a back plane 162 of the PCB 104. The first wire insertion hole 160a leads to a first heater connection terminal (not visible in the figures). The first wire 112a is put into electrical contact with the first heater connection terminal by extending the first wire 112a through the first wire insertion hole 150a. Similarly, the second wire insertion hole 160b leads to a second heater connection terminal (not visible in the figures), and the second wire 112b is put into electrical contact with the second heater connection terminal by extending the second wire 112b through the second wire insertion hole 160b. In this way, through the PCB 104 being in electrical contact with a battery (which may be the power supply 2 of any of the preceding examples), the elongate heater 108 is put into electrical contact with the power supply.

[0152] Both the back plane 162 of the PCB 104 and the front plane of the PCB 104 (not visible in the figures), which is opposite the back plane 162, are offset in a transverse direction from the longitudinal axis 114 of the elongate heater 108, which is aligned along the longitudinal axis of the aerosol generating device. The offset of the PCB 104 provides more room for the battery (not visible in the figures), which is fixed adjacent the PCB 104, in the housing 102 of the aerosol generating device.

[0153] Figures 7A and 7B show the dimensions of the heater flange 110 and of the upper shroud 128 in the first embodiment of the present invention.

[0154] Fig. 7A shows that the length of the planar surface 122 of the heater flange 110 is between 4.8 mm and 5 mm. The distance between the centre of a circumferential portion 168 of the heater flange 110 and the centre of the planar surface 122 of the heater flange 110 is between 4.4 mm and 4.6 mm.

[0155] The diameter of the cross section of the elongate heater 108, taken transverse to the longitudinal axis 114 of the elongate heater 108 at a point where the diameter of the elongate heater 108 is the largest, is between 2.05 mm and 2.25 mm.

[0156] Fig. 7B shows that the length of the mounting flange 126, which is the length of the upper shroud 128 of the mounting flange 126 taken where the upper shroud includes the alignment protrusion 156, is between 13.35 mm and 13.45 mm. The width of the mounting flange 126, includes is the width of the upper shroud 128 of the mounting flange 126 taken where the upper shroud com-

prises the alignment protrusion 156, is between 11.47 mm and 11.57 mm. The length of the upper shroud 128 of the mounting flange 126 taken where the upper shroud does not include the alignment protrusion 156, is between 12.75 mm and 12.85 mm. The width of the upper shroud 128 of the mounting flange 126 taken where the upper shroud does not include the alignment protrusion 156, is between 10.91 mm and 11.01 mm.

[0157] Fig. 7B further shows that the diameter of the heater-receiving aperture 136 is approximately 2.35 mm.

[0158] In a second embodiment of the present invention, the heater flange 210 is not retained within a mounting flange 126, and instead the heater flange 210 engages directly with the housing 202 of the aerosol generating device.

[0159] Fig. 8 is a perspective view of a heater assembly 206 included within an aerosol generating device according to the second embodiment of the present invention, which is a heat-not-burn aerosol generating device.

[0160] The heater assembly 206 comprises an elongate heater 208 and a heater flange 210 extending in a transverse direction from the elongate heater 208. The wires of the heater assembly are not visible in Fig. 8, see Fig. 9.

[0161] The heater flange 210 comprises a top surface 216 facing a heating portion 218 of the elongate heater 208, a bottom surface 220 opposite the top surface 216, and a substantially planar surface 222 extending from the top surface 216 to the bottom surface 220. The heater flange 210 has rotational symmetry of order 1 about a longitudinal axis 214 of the elongate heater 208. This is achieved by the D-shape of the lower step 270 of the heater flange 210. Thus, the rotational symmetry of order 1 of the heater flange 210 is achieved with a simple structure. Although the rotational symmetry of order 1 is achieved by the D-shape of the heater flange in the present embodiment, it is to be understood that other flange shapes may be used to achieve the rotational symmetry of order 1.

[0162] The top surface 216 of the heater flange 210 is stepped. The top surface 216 comprises a lower step 270 and an upper step 272, where the lower step 270 is larger than the upper step 272 (for exact dimensions of the lower step 270 and the upper step 272, see Fig. 10). The stepping of the heater flange provides for secure engagement of the heater flange 220 within the housing of the aerosol generating device, as is discussed in more detail with reference to Fig. 9.

[0163] It is to be understood that the elongate heater 208 included in the second embodiment of the aerosol generating device shares features with the elongate heater 108 included in the first embodiment of the aerosol generating device. These features are not repeated here.

[0164] Fig. 9 is a bottom view of the heater assembly 206 fixed within the housing (not shown in the figures) of the aerosol generating device and electrically connected to the PCB 204, which is also fixed within the housing of the aerosol generating device.

[0165] Although not shown in Fig. 9, the heater flange 220 of the heater assembly 206 is engaged with the housing of the aerosol generating device by an inner wall of the housing being complementary in shape to the shape of the heater flange 220. In particular, the housing includes a step-abutting portion which abuts the lower step 270 of the top surface 216 of the heater flange 210, and a bottom-surface abutting portion which abuts the bottom-surface 220 of the heater flange 210. The curved circumferential portion 268 of the D-shaped heater flange 210 extends more than 180 degrees around the longitudinal axis of the elongate heater 208 to provide a secure engagement between the heater flange 210 and the housing. It is to be understood that the configurations of the mounting flange 126 and the housing 102 which allow them to engage with one another are not limited to those of the present embodiment.

[0166] Due to the heater flange 210 having rotational symmetry of order 1, the heater assembly 206 is engageable with the housing in only one orientation of the heater assembly 206 relative to the housing. Thus, a manufacturer can know the correct way to insert the heater assembly 206 into the housing by orientating the heater assembly in the one possible orientation in which the heater flange can engage with the housing.

[0167] Fig. 9 shows the heater assembly 206 orientated to allow electrical connection of the heater assembly 206 to the PCB 204.

[0168] The elongate heater 208 is electrically connected to the PCB 204 by the first wire 212a and the second wire 212b, which both extend from the bottom surface 220 of the heater flange 210.

[0169] It is to be understood that the PCB 204 and the connections of the first wire 212a and the second wire 212b to the PCB, 204 in the second embodiment, share features with the PCB 204 and the connections of the first wire 112a and the second wire 112b to the PCB 104 in the first embodiment. These features will not be repeated here.

[0170] As well as the first wire 212a and the second wire 212b, the heater assembly 206 comprises a first electrical conductor 266a and a second electrical conductor 266b, which are components of a thermocouple. The first electrical conductor 266a is electrically connected to a first thermocouple connection terminal on the PCB 204, and similarly, the second electrical conductor 266b is electrically connected to a second thermocouple connection terminal on the PCB 204. To respectively connect to the first thermocouple and the second thermocouple connection terminals, the first electrical conductor 266a and the second electrical conductor 266b respectively pass through a first electrical conductor insertion hole and a second electrical conductor insertion hole in the PCB 204. The first electrical conductor 266a and the second electrical conductor 266b are wires.

[0171] Fig. 10 shows the dimensions of the heater flange 210 in the second embodiment of the present invention.

[0172] Fig. 10 shows that the distance between the centre of the circumferential portion 268 and the centre of the planar surface 222 is approximately 9.3 mm.

[0173] The length of the planar surface 222 of the heater flange 210 is approximately 5 mm.

[0174] The radius of the upper step of the top surface is between 3.95 mm and 4.05 mm. The radius of the lower step of the top surface is approximately 5 mm.

[0175] The diameter of the cross section of the elongate heater 208, taken transverse to the longitudinal axis 114 of the elongate heater 208 at a point where the diameter of the elongate heater 208 is the largest is approximately 2.15 mm.

[0176] The preceding summary is provided for purposes of summarizing some examples to provide a basic understanding of aspects of the subject matter described herein. Accordingly, the above-described features should not be construed to narrow the scope or spirit of the subject matter described herein in any way. Moreover, the above and/or proceeding examples may be combined in any suitable combination to provide further examples, except where such a combination is clearly impermissible or expressly avoided. Other features, aspects, and advantages of the subject matter described herein will become apparent from the following text and the accompanying drawings.

Claims

1. An aerosol generating device comprising:

a housing;
a printed circuit board, PCB, fixed within the housing; and
a heater assembly fixed within the housing, the heater assembly comprising:

an elongate heater;
a heater flange extending in a transverse direction from the elongate heater; and,
an electrical contact electrically connecting the elongate heater to the printed circuit board,

wherein the heater flange has rotational symmetry of order 1 about a longitudinal axis of the heater, and

wherein the heater flange comprises:

a top surface facing a heating portion of the elongate heater,
a bottom surface opposite the top surface, and
a substantially planar surface extending from the top surface to the bottom surface.

2. The aerosol generating device of any of the preced-

ing claims wherein the elongate heater is a rod heater.

3. The heater assembly of any of the preceding claims wherein the electrical contact includes a first wire and a second wire, the first wire and the second wire each extending from the bottom surface of the heater flange. 5
4. The heater assembly of any of the preceding claims wherein the elongate heater is configured to generate a circumferential temperature heating profile, wherein the circumferential temperature heating profile is non-uniform. 10
5. The heater assembly of any of the preceding claims wherein a longitudinal axis of the PCB is offset in a transverse direction from the longitudinal axis of the heater. 15
6. The aerosol generating device of any of the preceding claims wherein the device further comprises a mounting flange comprising an upper shroud, and wherein the heater flange is configured to engage with the upper shroud in only one orientation of the heater flange with respect to the mounting flange. 20
7. The aerosol generating device of claim 6 wherein the mounting flange comprises a lower shroud, the lower shroud configured to engage with the upper shroud to retain the heater flange between the upper shroud and the lower shroud. 25
8. The aerosol generating device of claim 7, when dependent upon claim 3, wherein the lower shroud comprises a first wire aperture and a second wire aperture, the first wire aperture configured to receive the first wire therethrough and the second wire aperture configured to receive the second wire therethrough. 30
9. The aerosol generating device of either of claims 7 or 8 wherein the lower shroud comprises a lower surface facing the PCB, wherein the lower surface comprises: 35
 - a first wire groove between the first wire aperture and the printed circuit board; and,
 - a second wire groove between the second wire aperture and the printed circuit board. 40
10. The aerosol generating device of any of claims 6 to 9 wherein the mounting flange is configured to engage with the housing in only one orientation of the mounting flange with respect to the housing. 45
11. The aerosol generating device of any of claims 5 to 10 wherein the mounting flange is made of a thermally insulating material. 50

mally insulating material.

12. The aerosol generating device of any of claims 1 to 4 wherein the heater flange is configured to engage with the housing in only one orientation of the heater flange with respect to the housing. 55
13. The heater assembly of claim 12 wherein the top surface is stepped such that the top surface has an upper diameter and a lower diameter.
14. The heater assembly of any of the preceding claims wherein the length of the planar surface of the heater flange is between 4 mm and 6 mm.
15. The heater assembly of any of the preceding claims wherein the heater flange comprises a circumferential portion and wherein a distance between a centre of the circumferential portion and a centre of the planar surface is between 4 mm and 10 mm.

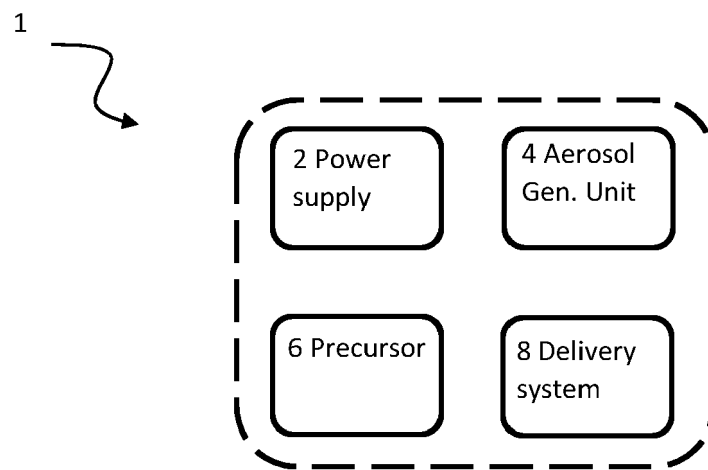


Fig. 1

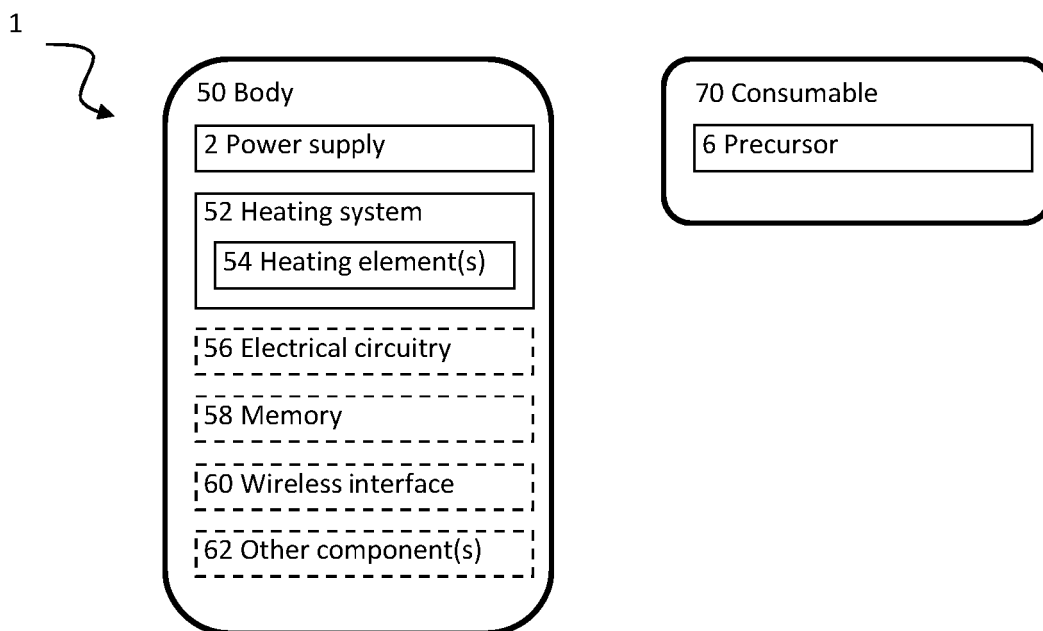


Fig. 2

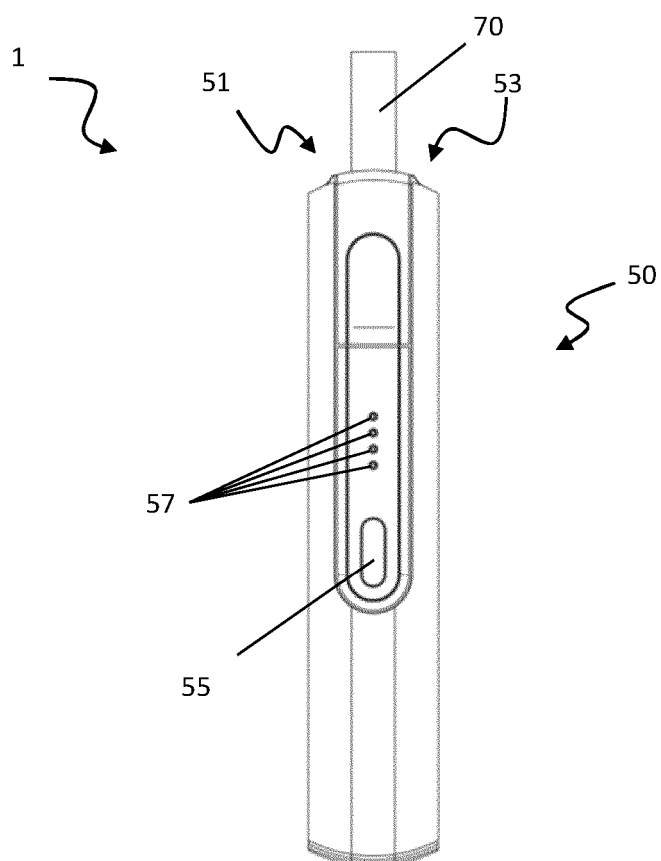


Fig. 3

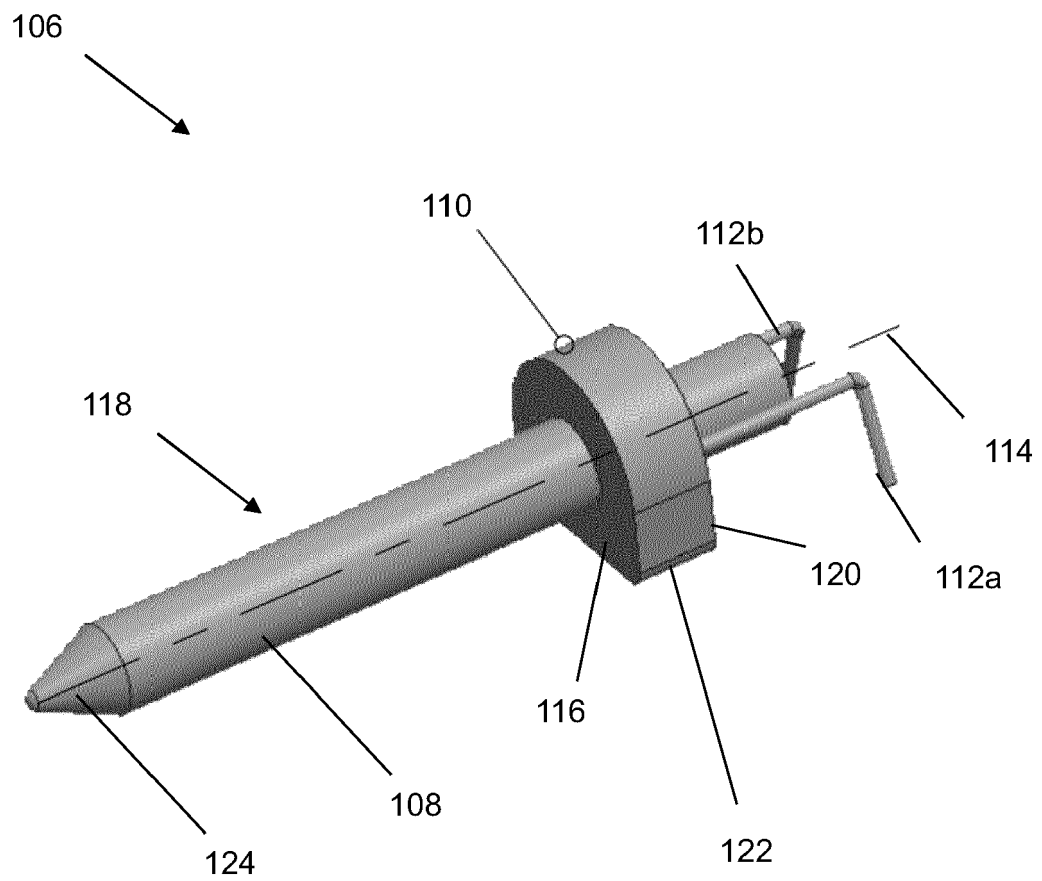


Fig. 4

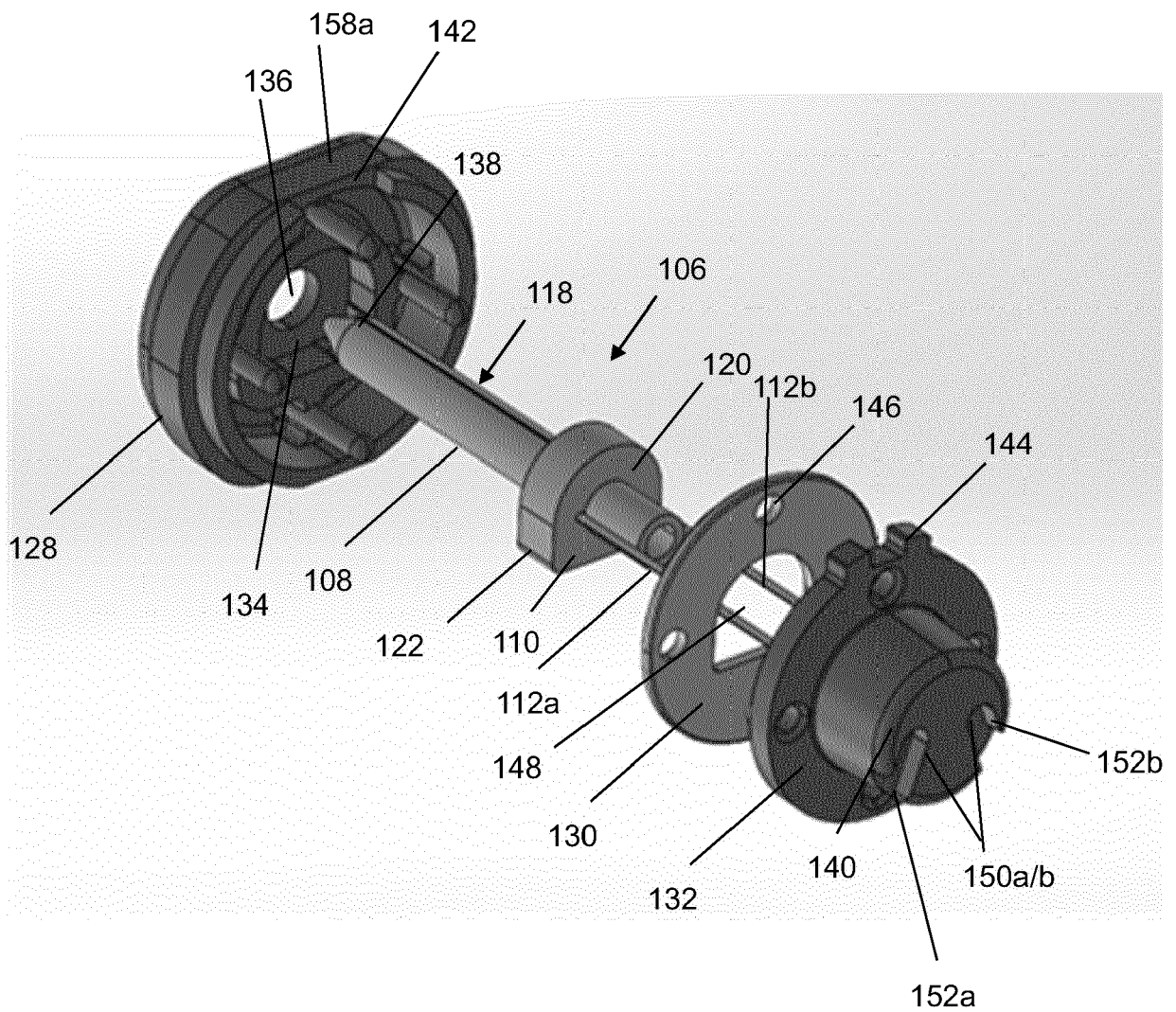


Fig. 5

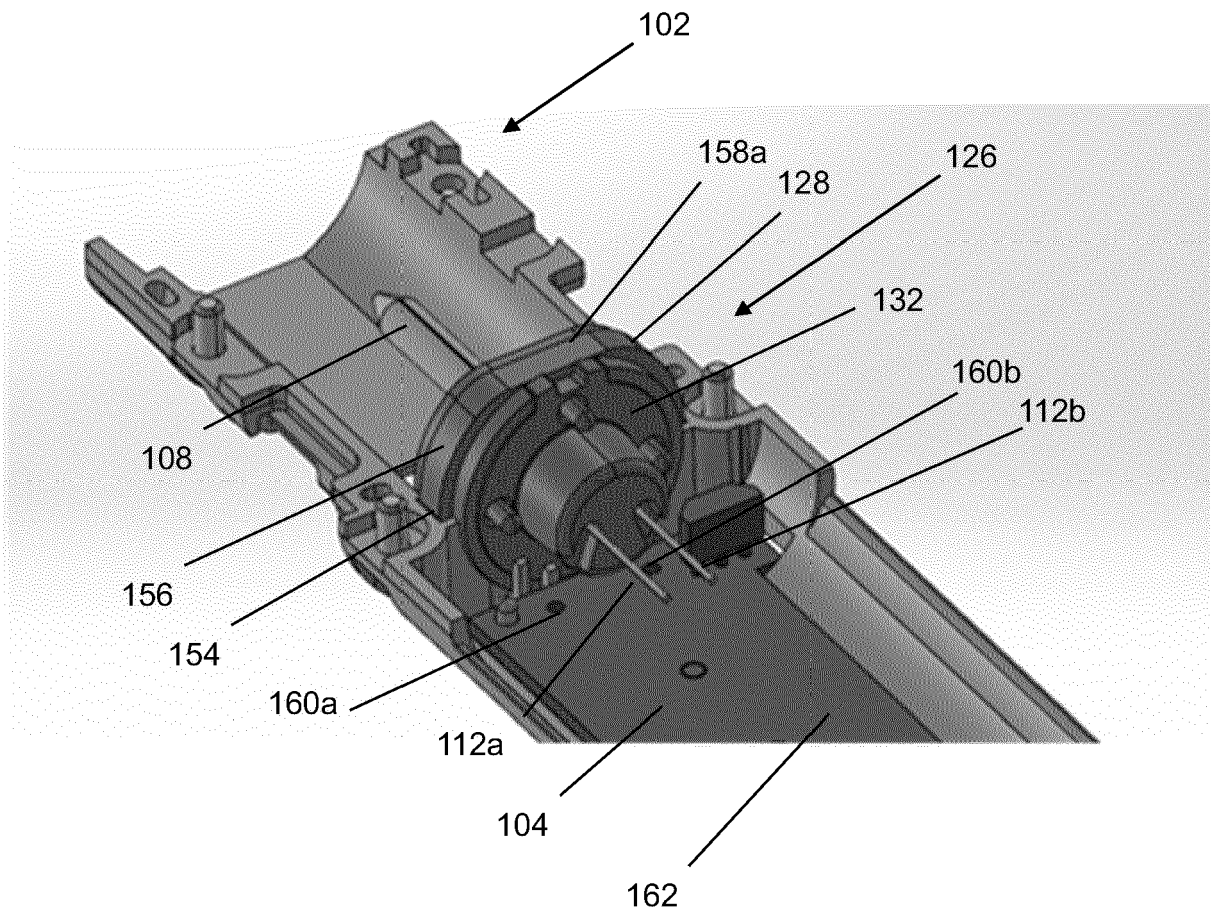


Fig. 6

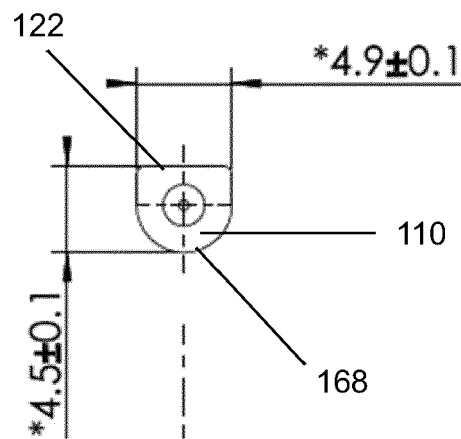


Fig. 7A

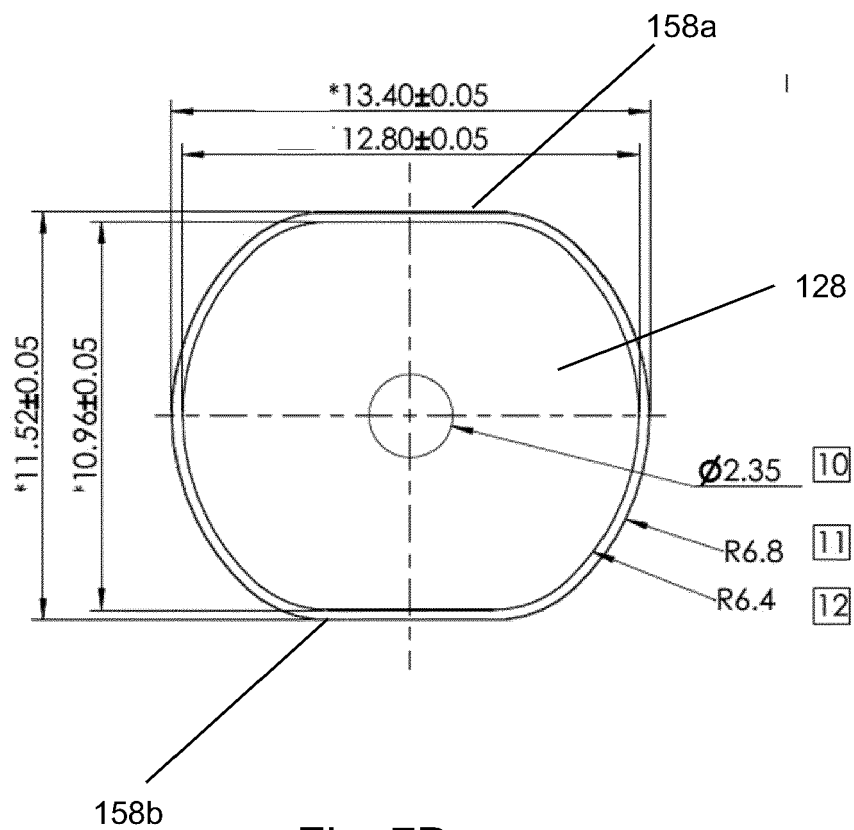


Fig. 7B

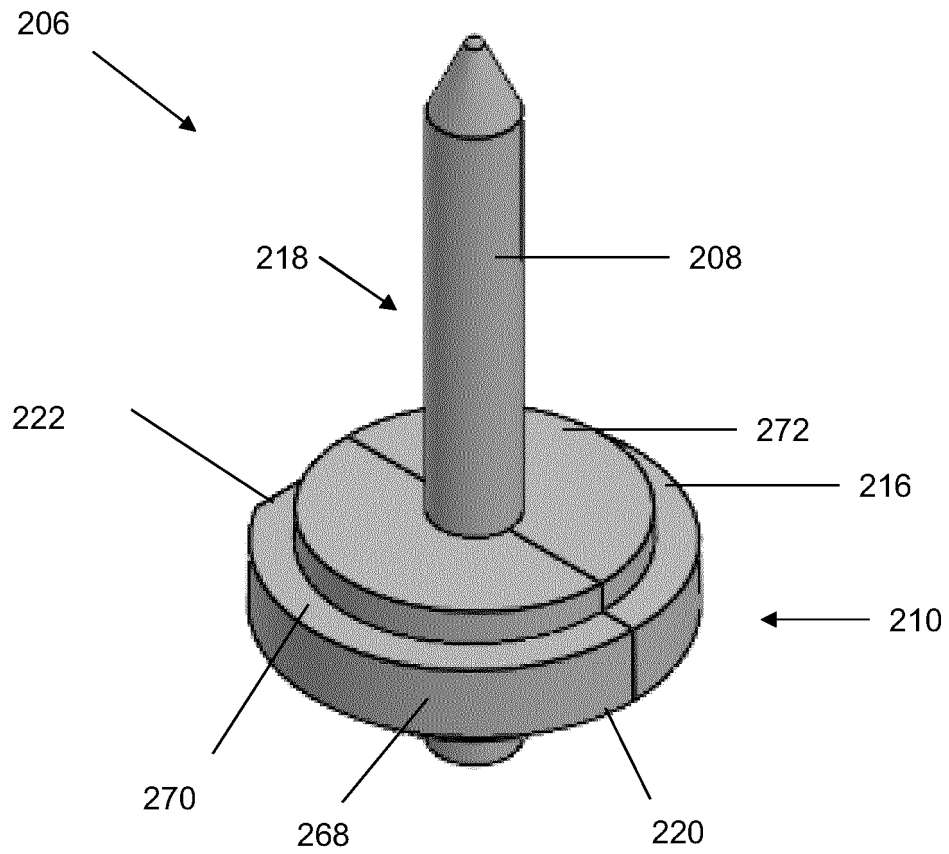


Fig. 8

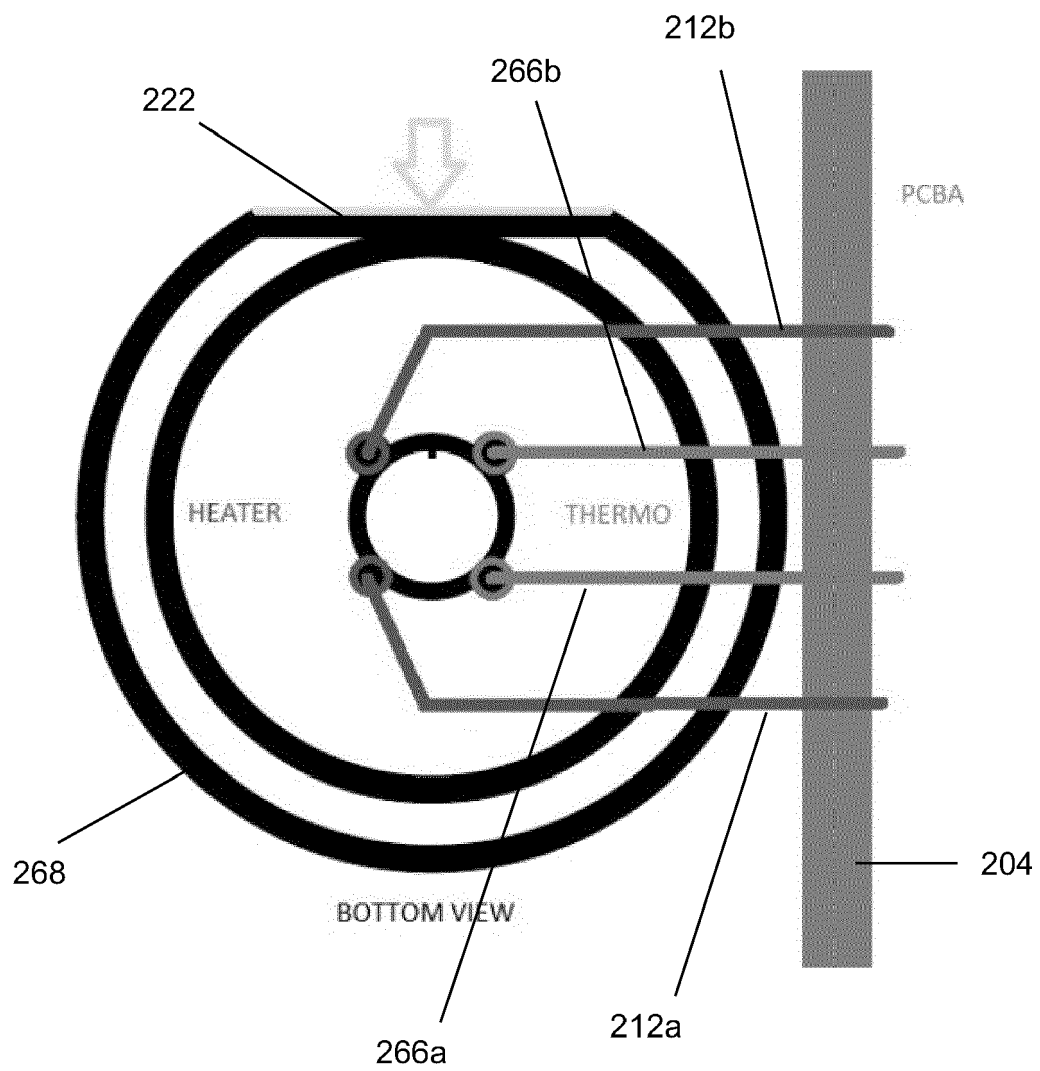


Fig. 9

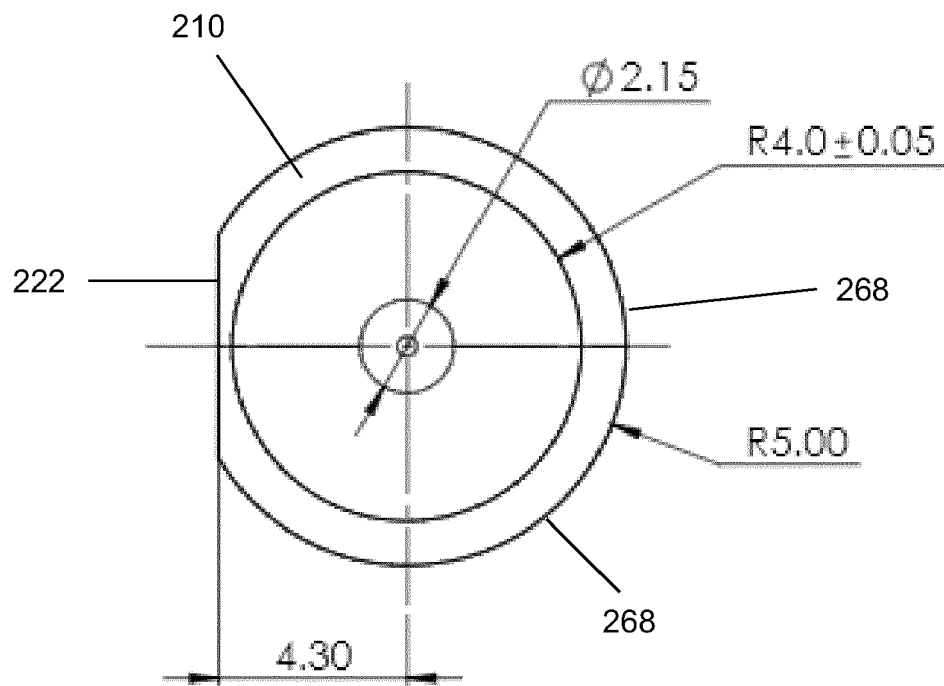


Fig. 10



EUROPEAN SEARCH REPORT

Application Number

EP 22 21 4674

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	CN 115 460 726 A (KEY MAT CO LTD) 9 December 2022 (2022-12-09)	4, 5, 13-15	INV. A24F40/46
Y	* abstract; figures 1-4 *	3	ADD. A24F40/20 A24F40/70
X	US 2020/178605 A1 (AW SZE CHIEK [SG] ET AL) 11 June 2020 (2020-06-11)	4, 5, 13-15	
Y	* paragraph [0084] - paragraph [0094]; figures 1-3 *	1-3, 6-12	
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