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(54) SMOKING SUBSTITUTE COMPONENT

(57) The present disclosure relates to an aerosol-delivery component, comprising: a vaporiser disposed in a vaporising chamber; and an electrical contact for electrically connecting the vaporiser to a power supply, the contact extending through a base member of the component and into the vaporising chamber. The component further comprises a sealing element configured to seal between the electrical contact and the base member.

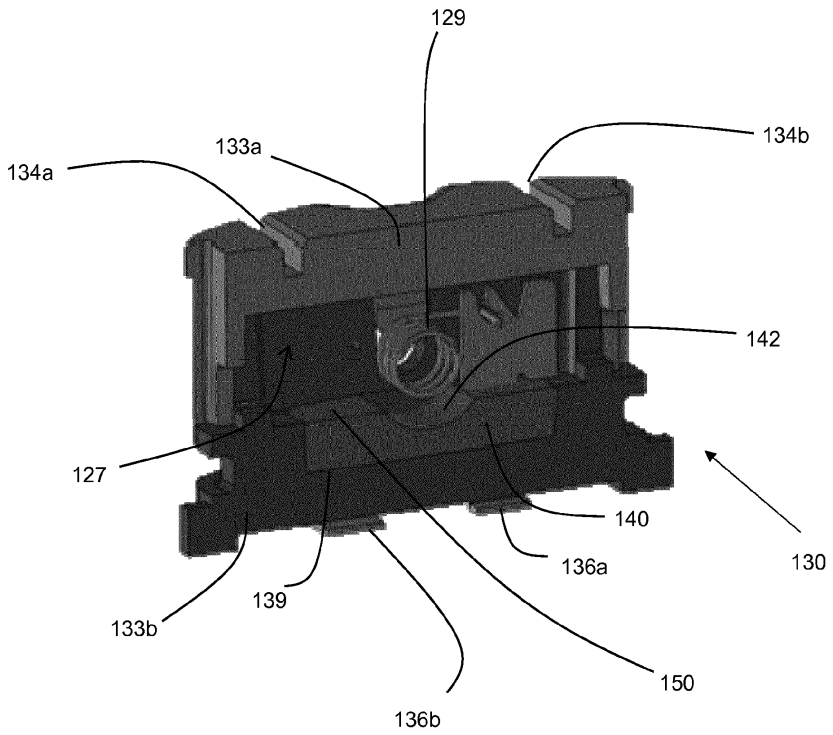


FIG 4A

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Description

Technical field

[0001] The present disclosure relates to an aerosol-delivery component, which may be a consumable for receipt in an aerosol-delivery device to form an aerosol-delivery system (e.g. a smoking substitute system).

Background

[0002] The smoking of tobacco is generally considered to expose a smoker to potentially harmful substances. It is generally thought that a significant amount of the potentially harmful substances are generated through the heat caused by the burning and/or combustion of the tobacco and the constituents of the burnt tobacco in the tobacco smoke itself.

[0003] Combustion of organic material such as tobacco is known to produce tar and other potentially harmful by-products. There have been proposed various smoking substitute systems in order to avoid the smoking of tobacco.

[0004] Such smoking substitute systems can form part of nicotine replacement therapies aimed at people who wish to stop smoking and overcome a dependence on nicotine.

[0005] Smoking substitute systems, which may also be known as electronic nicotine delivery systems, may comprise electronic systems that permit a user to simulate the act of smoking by producing an aerosol, also referred to as a "vapour", which is drawn into the lungs through the mouth (inhaled) and then exhaled. The inhaled aerosol typically bears nicotine and/or flavourings without, or with fewer of, the odour and health risks associated with traditional smoking.

[0006] In general, smoking substitute systems are intended to provide a substitute for the rituals of smoking, whilst providing the user with a similar experience and satisfaction to those experienced with traditional smoking and tobacco products.

[0007] The popularity and use of smoking substitute systems has grown rapidly in the past few years. Although originally marketed as an aid to assist habitual smokers wishing to quit tobacco smoking, consumers are increasingly viewing smoking substitute systems as desirable lifestyle accessories. Some smoking substitute systems are designed to resemble a traditional cigarette and are cylindrical in form with a mouthpiece at one end. Other smoking substitute systems do not generally resemble a cigarette (for example, the smoking substitute device may have a generally box-like form).

[0008] There are a number of different categories of smoking substitute systems, each utilising a different smoking substitute approach. A smoking substitute approach corresponds to the manner in which the substitute system operates for a user.

[0009] One approach for a smoking substitute system is the so-called "vaping" approach, in which a vaporisable liquid, typically referred to (and referred to herein) as "e-liquid", is heated by a heater to produce an aerosol vapour which is inhaled by a user. An e-liquid typically includes a base liquid as well as nicotine and/or flavourings. The resulting vapour therefore typically contains nicotine and/or flavourings. The base liquid may include propylene glycol and/or vegetable glycerine.

[0010] A typical vaping smoking substitute system includes a mouthpiece, a power source (typically a battery), a tank or liquid reservoir for containing e-liquid, as well as a heater. In use, electrical energy is supplied from the power source to the heater, which heats the e-liquid to produce an aerosol (or "vapour") which is inhaled by a user through the mouthpiece.

[0011] Vaping smoking substitute systems can be configured in a variety of ways. For example, there are "closed system" vaping smoking substitute systems which typically have a heater and a sealed tank which is pre-filled with e-liquid and is not intended to be refilled by an end user. One subset of closed system vaping smoking substitute systems include a device which includes the power source, wherein the device is configured to be physically and electrically coupled to a consumable component including the tank and the heater. In this way, when the tank of the consumable component has been emptied, the device can be reused by connecting it to a new consumable component. Another subset of closed system vaping smoking substitute systems are completely disposable, and intended for one-use only.

[0012] There are also "open system" vaping smoking substitute systems which typically have a tank that is configured to be refilled by a user, so the system can be used multiple times.

[0013] An example vaping smoking substitute system is the myblu™ e-cigarette. The myblu™ e cigarette is a closed system which includes a device and a consumable component. The device and consumable component are physically and electrically coupled together by pushing the consumable component into the device. The device includes a rechargeable battery. The consumable component includes a mouthpiece, a sealed tank which contains e-liquid, as well as a vaporiser, which for this system is a heating filament coiled around a portion of a wick which is partially immersed in the e-liquid. The system is activated when a microprocessor on board the device detects a user inhaling through the mouthpiece. When the system is activated, electrical energy is supplied from the power source to the vaporiser, which heats e-liquid from the tank to produce a vapour which is inhaled by a user through the mouthpiece.

[0014] Another example vaping smoking substitute system is the blu PRO™ e-cigarette. The blu PRO™ e cigarette is an open system which includes a device, a (refillable) tank, and a mouthpiece. The device and tank are physically and electrically coupled together by screwing one to the other. The mouthpiece and refillable tank are physically coupled together by screwing one into the

other, and detaching the mouthpiece from the refillable tank allows the tank to be refilled with e-liquid. The system is activated by a button on the device. When the system is activated, electrical energy is supplied from the power source to a vaporiser, which heats e-liquid from the tank to produce a vapour which is inhaled by a user through the mouthpiece.

[0015] As the vapour passes through the consumable (entrained in the airflow) from the location of vaporization to an outlet of the consumable (e.g. a mouthpiece), the vapour cools and condenses to form an aerosol for inhalation by the user. The aerosol may contain nicotine and/or flavour compounds.

[0016] Consumable components typically include various openings in the vaporising chamber e.g. to allow connection of electrical contacts to the vaporiser. It has been found that these openings may allow leakage of unvaporised e-liquid from the vaporising chamber which may soil the user.

[0017] It is the object of the present invention to provide an improved aerosol delivery component.

Summary

[0018] According to a first aspect there is a provided an aerosol-delivery component, comprising:

a vaporiser disposed in a vaporising chamber;
an electrical contact for electrically connecting the vaporiser to a power supply, the contact extending through a base member of the component and into the vaporising chamber; and
a sealing element configured to seal between the electrical contact and the base member.

[0019] Advantageously, the sealing element seals between the base member and the electrical contact, so as to prevent leakage of e-liquid from the vaporising chamber or ingress of contaminants/moisture into the vaporising chamber.

[0020] Optional features will now be set out. These are applicable singly or in any combination with any aspect.

[0021] In some embodiments, the component further comprises a second electrical contact for electrically connecting the vaporiser to the power supply, the second contact extending through the base member of the component and into the vaporising chamber. In these embodiments, the sealing element is further configured to seal between the second electrical contact and the base member.

[0022] The base member comprises a base slot through which the electrical contact extends. In embodiments with a second electrical contact, the base member may comprise a second base slot through which the second electrical contact extends.

[0023] The electrical contact(s) preferably extend(s) through the base member (e.g. through the base slot(s)) in a longitudinal direction i.e. in a direction aligned with the longitudinal axis of the component.

[0024] The base slot(s) may be transversely elongated i.e. elongated in a direction perpendicular to the longitudinal axis of the component. For example, it/they may extend between substantially rectangular base slot opening(s).

[0025] The sealing element comprises a seal slot through which the electrical contact extends. In embodiments with a second electrical contact, the sealing element may comprise a second seal slot through which the second electrical contact extends.

[0026] The electrical contact(s) preferably extend(s) through the sealing element (e.g. through the seal slot(s)) in a longitudinal direction i.e. in a direction aligned with the longitudinal axis of the component.

[0027] The seal slot(s) may be transversely elongated i.e. elongated in a direction perpendicular to the longitudinal axis of the component. For example, it/they may extend between substantially rectangular seal slot opening(s).

[0028] The base slot and seal slot may be vertically/longitudinally aligned i.e. the base slot and seal slot may overlay one another in the longitudinal direction of the component. The second base slot and second seal slot may be vertically/longitudinally aligned i.e. the second base slot and second seal slot may overlay one another in the longitudinal direction of the component.

[0029] The dimensions (e.g. length and/or width in a plane perpendicular to the longitudinal axis of the component) of the seal slot/seal slot opening may be less than the dimensions of the base slot/base slot opening such that the seal slot forms a tight fit around the electrical contact. The dimensions (e.g. length and/or width in a plane perpendicular to the longitudinal axis of the component) of the second seal slot/seal slot opening may be less than the dimensions of the second base slot/base slot opening such that the second seal slot forms a tight fit around the second electrical contact.

[0030] The base member may comprise a lower transverse wall and the base slot(s) may be formed in the lower transverse wall. The base member may comprise opposing side walls upstanding from the lower transverse wall. The base member may comprise opposing front and rear walls upstanding from the lower transverse wall. The opposing upstanding side walls and upstanding front/rear walls may at least partly define the side walls and front/rear walls of the vaporising chamber.

[0031] The base member may further comprise an upper transverse wall which is substantially parallel to the lower transverse wall and which defines an upper wall of the vaporising chamber. The base member may comprise opposing side walls depending downwards from the upper transverse wall. The base member may comprise opposing front and rear walls depending downwards from the upper transverse wall. The opposing depending side walls and depending front/rear walls may at least partly define the side walls and front/rear walls of the vaporising chamber.

[0032] The depending side walls and depending front/rear walls may cooperate with the upstanding side walls and upstanding front/rear walls to partially seal the vaporising chamber. For example, the depending walls may form a sleeve arrangement radially outwards of the upstanding walls.

[0033] The lower transverse wall of the base member may comprise a recess for housing the sealing element. The lower transverse wall/sealing element (i.e. an upper surface of the sealing element) may define the lower transverse wall of the vaporising chamber.

[0034] The sealing element has a length, a width and a thickness. The sealing element may be substantially cuboid. The thickness of the sealing element extends along the longitudinal axis of the consumable component. The cross-sectional area of the sealing element in the transverse plane may be substantially rectangular.

[0035] The upper surface of the sealing element (facing the vaporising chamber) may comprise an elongate channel which may have a semi-cylindrical profile. The elongate channel may extend between the front and rear walls of the base member/vaporising chamber.

[0036] The vaporiser may comprise a heating filament mounted on (e.g. coiled around) a substrate e.g. a porous substrate or wick. The substrate/wick may be elongated and the axis of the elongate substrate/wick may be parallel to and vertically spaced above the channel.

[0037] The axis of the channel (and substrate/wick) may be perpendicular to the transverse extension of the base/seal slot opening(s).

[0038] Where there are first and second base/seal slot openings the first base/seal slot openings may be provided on an opposing side of the channel to the second base/seal slots. The first base/seal slot openings and second base/seal slot openings may be off set in a front to rear direction e.g. the first base/seal slot openings may be proximal the rear wall of the base member/vaporising chamber and the second base/seal slot openings may be proximal the front wall of the base member/vaporising chamber (or vice versa).

[0039] In some embodiments, the sealing element is formed of a heat resistant and/or electrically insulating material e.g. it may be at least partially formed of silicone.

[0040] The component comprises an airflow path that extends from an air inlet to an air outlet. The air outlet is provided in a mouthpiece portion e.g. a mouthpiece portion of a component housing.

[0041] The air outlet/mouthpiece portion may be provided at a first lateral end of the housing. The housing comprises the base member at the opposing lateral end. The base member is received into an open (e.g. lower) end of the housing.

[0042] The air flow path passes the vaporiser between the air inlet to the air outlet. The vaporiser is housed in the vaporising chamber.

[0043] The air flow path may comprise a first portion extending from the air inlet towards the base member of the housing (and away from the mouthpiece portion) e.g. in a substantially longitudinal direction.

[0044] The airflow path may comprise a second portion which passes the vaporiser e.g. passes through the vaporising chamber.

[0045] The airflow path may comprise a third portion extending longitudinally from the second portion to the air outlet (formed in the mouthpiece portion of the housing).

[0046] In this respect, a user may draw air into and along the airflow path by inhaling at the air outlet (e.g. using a mouthpiece attachment affixed to the mouthpiece portion).

[0047] The third portion of the airflow path may be substantially parallel to the first portion of the airflow path. The third portion of the airflow path may be longer (i.e. in a longitudinal direction) than the first airflow path. The second portion of the airflow path may be a transverse portion i.e. extending substantially perpendicular to the first and/or third portions of the airflow path.

[0048] The airflow path may be generally U-shaped (the first and third portions forming stems of the "U" and the second portion forming the base of the "U"). In this respect, the second portion of the airflow path may connect the first and third portions of the airflow path. The airflow path may comprise at least two turns (e.g. each of around 90°) between the inlet and the vaporiser. The airflow path may comprise at least one turn between the vaporiser and the outlet.

[0049] The component may comprise a tank for housing an aerosol precursor (e.g. a liquid aerosol precursor). The aerosol precursor may comprise an e-liquid, for example, comprising a base liquid and e.g. nicotine. The base liquid may include propylene glycol and/or vegetable glycerine. Hence, the component may be a vaping smoking substitute component.

[0050] A vent may be provided in the upper transverse wall of the base member for the flow of air into the tank (i.e. so as to allow for pressure equalisation in the tank).

[0051] The second portion of the airflow path may be disposed between (i.e. longitudinally between) the upper and lower transverse walls of the base member i.e. within the vaporising chamber. The tank may be disposed between (in a transverse direction) the first and the third portions of the airflow path.

[0052] References to "downstream" in relation to the air flow path are intended to refer to the direction towards the air outlet/mouthpiece portion. Thus the second and third portions of the air flow path are downstream of the first portion of the air flow path. Conversely, references to "upstream" are intended to refer to the direction towards the air inlet. Thus the first portion of the air flow path (and the air inlet) is upstream of the second/third portions of the air flow path (and the air outlet/mouthpiece portion).

[0053] As discussed above, the component housing comprises the mouthpiece portion (with the air outlet) at a first lateral end and the base member at the opposing lateral end.

[0054] The housing further comprises one or more side walls (e.g. laterally opposed first and second side walls) extending longitudinally from the mouthpiece portion to the base member.

[0055] The air inlet may be provided in the first side wall, longitudinally spaced (towards the mouthpiece portion) from the base member.

[0056] The air inlet may be longitudinally spaced from the base member/lower end of the housing by a distance that is greater than 8 mm. The distance may be greater than 10 mm, or e.g. greater than 13 mm.

[0057] The housing may further comprise opposing front and rear walls spaced by the laterally opposed first and second side walls. The distance between the first and second side walls of the housing may define a width of the housing. The distance between the front and rear walls may define a depth of the housing. The width of the housing may be greater than the depth of the housing.

[0058] The length of the housing may be greater than the width of the housing. The depth of the housing may be smaller than each of the width and the length.

[0059] The first portion of the airflow path may be defined within an inlet passage between a wall of the tank and a wall of the housing. The wall of the housing partly defining the first portion of the airflow path may be the first side wall of the housing. The wall of the tank defining the first portion of the airflow path may be a first tank wall. Thus the first portion of the airflow path/inlet passage may be defined between the first tank wall and the first side wall. The first side wall and the first tank wall may be integrally formed with one another.

[0060] The third portion of the airflow path may be defined within an outlet passage between a wall of the tank and a wall of the housing. The wall of the housing partly defining the third portion of the airflow path may be the second side wall of the housing. The wall of the tank defining the third portion of the airflow path may be a second tank wall. Thus the third portion of the airflow path/outlet passage may be defined between the second tank wall and the second side wall. The second side wall and the second tank wall may be integrally formed with one another.

[0061] All of the first side wall, second side wall, first tank wall and second tank wall may all be integrally formed and may additionally be integrally formed with the mouthpiece portion. In that way, the component may be easily manufactured using injection moulding.

[0062] References to "upper", "lower", "above" or "below" are intended to refer to the component when in an upright/vertical orientation i.e. with elongate (longitudinal/length) axis of the component vertically aligned and with the mouthpiece portion vertically uppermost and the base portion lowermost.

[0063] The first and second tank walls may be spaced from one another so as to define the tank therebetween. The first and second tank walls may extend longitudinally from the mouthpiece portion towards the base member of the housing. The first and second tank walls may be substantially parallel. Each of the first and second tank walls may extend between (and span) the front and rear walls of the housing.

[0064] Each of the first and second tank walls may extend from the mouthpiece portion (i.e. internally in the housing). Each of the first and second tank walls may be integrally formed with the mouthpiece portion.

[0065] The tank may be partly defined by a wall of the housing (e.g. the front or rear wall). At least a portion of one of the walls defining the tank may be translucent or transparent. That is, the tank may comprise a window to allow a user to visually assess the quantity of e-liquid in the tank. The tank may be referred to as a "clearomizer" if it includes a window, or a "cartomizer" if it does not.

[0066] As discussed above, the air flow path passes the vaporiser between the air inlet to the air outlet. The vaporiser may comprise a heating element for heating the wick.

[0067] The wick may extend across the second (transverse) portion of the air flow path. The wick may be oriented so as to extend in a direction from the front wall to the rear wall of the vaporising chamber, i.e. it may be oriented in the direction of the depth dimension of the component. Thus the wick may extend in a direction perpendicular to the direction of air flow in the second portion of the air flow path.

[0068] As discussed above, the substrate/wick may extend between the front/rear walls of the base member/vaporising chamber. The front and rear walls of the base member/vaporising chamber may separate (i.e. partially separate) the vaporising chamber from the tank. The front/rear walls may each comprise a respective opening through which a respective end of the substrate/wick projects such that the wick is fluid communication with aerosol precursor/e-liquid in the tank. In this way a central portion of the wick may be exposed to air in the (second portion of the) airflow path and end portions of the wick may be in contact with aerosol precursor/e-liquid stored in the tank. Thus, aerosol precursor may be drawn (e.g. by capillary action) along the wick, from the tank to the exposed portion of the wick.

[0069] The wick may have an elongate shape. The wick may be cylindrical and preferably has an axis extending parallel to the axis of the elongate channel provided in the upper surface of the sealing element. The heating element may be in the form of a filament wound about the wick (e.g. the filament may extend helically about the wick). The filament may be wound about the exposed portion of the wick (i.e. the portion of the wick extending across the airflow path). The heating element may be electrically connectable (or connected) to a power source via the first/second electrical contacts. Thus, in operation, the power source may supply electricity to (i.e. apply a voltage across) the heating element so as to heat the heating element. This may cause liquid stored in the wick (i.e. drawn from the tank) to be heated so as to form a vapour and become entrained in fluid flowing along the airflow path. This vapour may subsequently

cool to form an aerosol in the airflow path (e.g. the third portion of the airflow path).

[0070] In a second aspect there is provided an aerosol-delivery system (e.g. a smoking substitute system) comprising a component according to the first aspect and an aerosol-delivery (e.g. smoking substitute) device.

[0071] The component may be an aerosol-delivery (e. g. a smoking substitute) consumable i.e. in some embodiments the component may be a consumable component for engagement with the aerosol-delivery (e.g. a smoking substitute) device to form the aerosol-delivery (e.g. s smoking substitute) system.

[0072] The device may be configured to receive the consumable component. For example the device and the consumable component may be configured to be physically coupled together. For example, the consumable component may be at least partially received in a recess of the device, such that there is snap engagement between the device and the consumable component. Alternatively, the device and the consumable component may be physically coupled together by screwing one onto the other, or through a bayonet fitting.

[0073] Thus, the consumable component may comprise one or more engagement portions for engaging with the device. In this way, one end of the consumable component (i.e. the inlet end) may be coupled with the device, while an opposing end (i.e. the outlet end) of the consumable component may define a mouthpiece portion.

[0074] The consumable component may comprise an electrical interface for interfacing with a corresponding electrical interface of the device. One or both of the electrical interfaces may include one or more electrical contacts. Thus, when the device is engaged with the consumable component, the electrical interface may be configured to transfer electrical power from the power source to a heating element of the consumable component. The electrical interface may also be used to identify the consumable component from a list of known types. The electrical interface may additionally or alternatively be used to identify when the consumable component is connected to the device.

[0075] The device may alternatively or additionally be able to detect information about the consumable component via an RFID reader, a barcode or QR code reader. This interface may be able to identify a characteristic (e. g. a type) of the consumable. In this respect, the consumable component may include any one or more of an RFID chip, a barcode or QR code, or memory within which is an identifier and which can be interrogated via the interface.

[0076] In other embodiments, the component may be integrally formed with the aerosol-delivery (e.g. a smoking substitute) device to form the aerosol-delivery (e.g. s smoking substitute) system.

[0077] In such embodiments, the aerosol former (e.g. e-liquid) may be replenished by re-filling a tank that is integral with the device (rather than replacing the consumable). Access to the tank (for re-filling of the e-liquid) may be provided via e.g. an opening to the tank that is sealable with a closure (e.g. a cap).

[0078] Further features of the device are described below. These are applicable to both the device for receiving a consumable component and to the device integral with the component.

[0079] The device may comprise a power source. The device may comprise a controller.

[0080] A memory may be provided and may be operatively connected to the controller. The memory may include non-volatile memory. The memory may include instructions which, when implemented, cause the controller to perform certain tasks or steps of a method. The device may comprise a wireless interface, which may be configured to communicate wirelessly with another device, for example a mobile device, e.g. via Bluetooth®. To this end, the wireless interface could include a Bluetooth® antenna. Other wireless communication interfaces, e.g. WiFi®, are also possible. The wireless interface may also be configured to communicate wirelessly with a remote server.

[0081] An airflow (i.e. puff) sensor may be provided that is configured to detect a puff (i.e. inhalation from a user). The airflow sensor may be operatively connected to the controller so as to be able to provide a signal to the controller that is indicative of a puff state (i.e. puffing or not puffing). The airflow sensor may, for example, be in the form of a pressure sensor or an acoustic sensor. The controller may control power supply to a heating element in response to airflow detection by the sensor. The control may be in the form of activation of the heating element in response to a detected airflow. The airflow sensor may form part of the device.

[0082] In a third aspect there is provided a method of using the aerosol-delivery (e.g. smoking substitute) consumable component according to the first aspect, the method comprising engaging the consumable component with an aerosol-delivery (e.g. smoking substitute) device (as described above) having a power source so as to electrically connect the power source to the consumable component (i.e. to the vaporiser of the consumable component).

[0083] The invention includes the combination of the aspects and preferred features described except where such a combination is clearly impermissible or expressly avoided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0084] So that further aspects and features thereof may be appreciated, embodiments will now be discussed in further detail with reference to the accompanying figures, in which:

- Fig. 1A is a front schematic view of a smoking substitute system;
- Fig. 1B is a front schematic view of a device of the system;

- Fig. 1C is a front schematic view of a consumable of the system;
- Fig. 2A is a schematic of the components of the device;
- Fig. 2B is a schematic of the components of the consumable;
- Fig. 3A is a front section view of the consumable;
- Fig. 3B is a perspective section view of the consumable;
- Fig. 3C is a side section view of the consumable;
- Fig, 4A is a perspective section view of a vaporizing chamber of the component;
- Fig. 4B is a side section view of the vaporising chamber;
- Fig. 5A is a perspective view of a sealing element of the component; and
- Fig. 5B is a bottom view of the sealing element.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0085] Aspects and embodiments will now be discussed with reference to the accompanying figures. Further aspects and embodiments will be apparent to those skilled in the art.

[0086] Fig. 1A shows a smoking substitute system 100. In this example, the smoking substitute system 100 includes a device 101 and an aerosol delivery consumable component 102. The consumable component 102 may alternatively be referred to as a "pod", "cartridge" or "cartomizer". It should be appreciated that in other examples (i.e. open systems), the device may be integral with the component. In such systems, a tank of the aerosol delivery component may be accessible for refilling the system.

[0087] In this example, the smoking substitute system 100 is a closed system vaping system, wherein the consumable component 102 includes a sealed tank 103 and is intended for single-use only. The consumable component 102 is removably engageable with the device 101 (i.e. for removal and replacement). Fig. 1A shows the smoking substitute system 100 with the device 101 physically coupled to the consumable component 102, Fig. 1B shows the device 101 of the smoking substitute system 100 without the consumable component 102, and Fig. 1C shows the consumable component 102 of the smoking substitute system 100 without the device 101.

[0088] The device 101 and the consumable component 102 are configured to be physically coupled together by pushing the consumable component 102 into a cavity at an upper end 104 of the device 101, such that there is an interference fit between the device 101 and the consumable component 102. In other examples, the device 101 and the consumable component 102 may be coupled by screwing one onto the other, or through a bayonet fitting.

[0089] The consumable component 102 comprises a housing 105 having a base portion 106 (at a lower end), a mouthpiece portion 107 (at an upper end), and walls extending longitudinally from the base portion 106 to the mouthpiece portion 107. In particular, the consumable component 102 comprises front 108a and rear walls spaced by opposing first 108c and second 108d side walls. The distance between the front 108a and rear 108b walls defines a depth of the housing 105 and the distance between the side walls 108c, 108d defines a width of the housing 105. The width of the housing 105 is greater than the depth of the housing 105.

[0090] The tank 103 of the consumable component 102 comprises a window 109, which allows the quantity of e-liquid remaining in the tank 103 to be visually assessed. The device 101 includes a slot 110 so that the window 109 of the consumable component 102 can be seen whilst the rest of the tank 103 is obscured from view when the consumable component 102 is inserted into the cavity at the upper end 108 of the device 101.

[0091] A lower end 111 of the device 101 includes a light 112 (e.g. an LED) located behind a small translucent cover. The light 112 may be configured to illuminate when the smoking substitute system 100 is activated. Whilst not shown, the consumable component 102 may identify itself to the device 101, via an electrical interface, RFID chip, or barcode.

[0092] Figs. 2A and 2B are schematic drawings of the device 101 and consumable component 102. These figures provide an overview of the components that form part of the consumable component 102 and device 101. As is apparent from Fig. 2A, the device 101 includes a power source 113, a controller 114, a memory 115, a wireless interface 116, an electrical interface 117, and, optionally, one or more additional components 118.

[0093] The power source 113 is a battery (e.g. a rechargeable battery). The controller 114 may, for example, include a microprocessor. The memory 115 may include non-volatile memory. The memory 115 may include instructions which, when implemented, cause the controller 114 to perform certain tasks or steps of a method.

[0094] The wireless interface 116 may be configured to communicate wirelessly with another device, for example a mobile device, e.g. via Bluetooth®. To this end, the wireless interface 116 could include a Bluetooth® antenna. Other wireless communication interfaces, e.g. WiFi®, are also possible. The wireless interface 116 may also be configured to communicate wirelessly with a remote server.

[0095] The electrical interface 117 of the device 101 may include one or more electrical contacts. The electrical interface 117 may be located in a base of the cavity formed in the upper end 104 of the device 101. When the device 101 is physically coupled to the consumable component 102, the electrical interface 117 of the device 101 is configured to transfer electrical power from the power source 113 to the consumable component 102 (i.e. upon activation of the smoking substitute system 100).

[0096] The electrical interface 117 may be configured to receive power from a charging station when the device 101 is not physically coupled to the consumable compo-

nent 102 and is instead coupled to the charging station. The electrical interface 117 may also be used to identify the consumable component 102 from a list of known consumables. For example, the consumable component 102 may include e-liquid having a particular flavour and/or having a certain concentration of nicotine (which may be identified by the electrical interface 117). This can be indicated to the controller 114 of the device 101 when the consumable component 102 is connected to the device 101. Additionally, or alternatively, there may be a separate communication interface provided in the device 101 and a corresponding communication interface in the consumable component 102 such that, when connected, the consumable component 102 can identify itself to the device 101.

[0097] The additional components 118 of the device 101 may comprise an indicator (e.g. the light 112 discussed above), a charging portion, a battery charging control circuit, a sensor or e.g. user input.

[0098] The charging port (e.g. USB or micro-USB port) may be configured to receive power from the charging station (i.e. when the power source 118 is a rechargeable battery). This may be located at the lower end 111 of the device 101. Alternatively, the electrical interface 117 discussed above may be configured to act as a charging port configured to receive power from the charging station such that a separate charging port is not required.

[0099] The battery charging control circuit may be configured for controlling the charging of the rechargeable battery. However, a battery charging control circuit could equally be located in the charging station (if present).

[0100] The sensor may be e.g. an airflow (i.e. puff) sensor for detecting airflow in the smoking substitute system 100, e.g. caused by a user inhaling through a mouthpiece attachment (not shown) affixed to the mouthpiece portion 107 of the consumable component 102. The smoking substitute system 100 may be configured to be activated when airflow is detected by the airflow sensor. This sensor could alternatively be included in the consumable component 102. The airflow sensor can be used to determine, for example, how heavily a user draws on the mouthpiece portion 107 (e.g. via the mouthpiece attachment) or how many times a user draws on the mouthpiece portion 107 in a particular time period.

[0101] The user input may be a button. The smoking substitute system 100 may be configured to be activated when a user interacts with the user input (e.g. presses the button). This provides an alternative to the airflow sensor as a mechanism for activating the smoking substitute system 100.

[0102] The consumable component 102, which is shown in Fig. 2B, includes the tank 103, an electrical interface 119, a vaporiser 120, an air inlet 121, an air outlet 122 (e.g. formed in the mouthpiece portion 107), and one or more additional components 123.

[0103] The electrical interface 119 of the consumable component 102 may include one or more electrical contacts. The electrical interface 117 of the device 101 and the electrical interface 119 of the consumable component 102 may be configured to contact each other and thereby electrically couple the device 101 to the consumable component 102 when the base portion 106 of the consumable component 102 is inserted into the cavity formed in the upper end 104 of the device 101 (as shown in Fig. 1A). In this way, electrical energy (e.g. in the form of an electrical current) is able to be supplied from the power source 113 in the device 101 to the vaporiser 120 in the consumable component 102.

[0104] The vaporiser 120 is configured to heat and vaporise e-liquid contained in the tank 103 using electrical energy supplied from the power source 113. As will be described further below, the vaporiser 120 heats the e-liquid received from the tank 103 to vaporise the e-liquid. The air inlet 121 is configured to allow air to be drawn into the smoking substitute system 100 when a user inhales using the air outlet 122 formed in the mouthpiece portion 107, such that the vaporised e-liquid is drawn through the consumable component 102 for inhalation by the user.

[0105] In operation, a user activates the smoking substitute system 100, e.g. through interaction with a user input forming part of the device 101 or by inhaling through the air outlet 122 as described above. Upon activation, the controller 114 may supply electrical energy from the power source 113 to the vaporiser 120 (via electrical interfaces 117, 119), which may cause the vaporiser 120 to heat e-liquid drawn from the tank 103 to produce a vapour which is inhaled by a user through the mouthpiece portion 107 (using a mouthpiece attachment (not shown)).

[0106] An example of one of the one or more additional components 123 of the consumable component 102 is an interface for obtaining an identifier of the consumable component 102. As discussed above, this interface may be, for example, an RFID reader, a barcode, a QR code reader, or an electronic interface which is able to identify the consumable component 102. The consumable component 102 may, therefore include any one or more of an RFID chip, a barcode or QR code, or memory within which is an identifier and which can be interrogated via the electronic interface 117 in the device 101.

[0107] It should be appreciated that the smoking substitute system 100 shown in figures 1A to 2B is just one exemplary implementation of a smoking substitute system 100. For example, the system could otherwise be in the form of an entirely disposable (single-use) system or an open system in which the tank is refillable (rather than replaceable).

[0108] Figures 3A, 3B and 3C are section views of the consumable component 102 described above. The air inlet 121 of the consumable component 102 is in the form of an aperture formed in the first side wall 108c of the housing 105. In particular, the air inlet 121 is spaced along the first side wall 108c (in a longitudinal direction) from the base portion 106 of the housing 105 so as to be partway along the first side wall 108c from the base por-

tion 106. The air outlet 122 is formed in the mouthpiece portion 107 and an airflow path 124 extends from the air inlet 121 to the air outlet 122, such that a user can draw air through the airflow path 124 by inhaling at the air outlet 122. As will be described in more detail below, the airflow path 124 follows a generally U-shaped path through the consumable component 102.

[0109] The airflow path 124 comprises first 138a, second and third 138c airflow path portions. The first airflow path portion is defined by an inlet passage 125a extending longitudinally from the air inlet 121 towards the base portion 106 of the consumable component 102. This inlet passage 125a is defined between a first tank wall 126a that is laterally (i.e. transversely) spaced from the first side wall 108c (in which the air inlet 121 is formed) and that extends longitudinally from an internal surface of the mouthpiece portion 107.

[0110] The third airflow path is similarly defined by an outlet passage 125b that is formed between a second tank wall 126b and the second side wall 108d. The second tank wall 126b extends longitudinally from an internal surface of the mouthpiece portion 107 and is laterally spaced from the second side wall 108d. Both the first 126a and second 126b tank walls span the front 108a and rear 108b (see Fig. 3B) walls of the housing 105. In this way, the tank 103 is partly defined between the first and second tank walls 126a, 126b, the front 108a and rear 108b walls, and an internal surface of the mouthpiece portion 107.

[0111] The tank walls 126a, 126b and the mouthpiece portion 107 are integrally formed with each other so as to form a single unitary component that may e.g. be formed by way of an injection moulding process. Such a component may be formed of a thermoplastic material such as polypropylene. To facilitate this (e.g. to allow removal from a mould), each of the tank walls 126a, 126b is tapered from a proximal end at which it is connected to the mouthpiece portion 107 to an opposing distal end.

[0112] The second airflow path portion is in the form of a vaporising chamber 127 that extends transversely across the housing 105 so as to connect lower ends of the first 125a and second 125b passages. Thus, upon inhalation by a user, air may flow into the inlet 121, through the inlet passage 125a, through the vaporising chamber 127 (where vapour may be entrained in the air) and subsequently through the outlet passage 125b where it is discharged (into a user's mouth) from the outlet 122 at an upper end of the outlet passage 125b. Thus, the airflow path 124 comprises at least two turns (at the inlet 121 and the connection between the vaporising chamber 127 and the inlet passage 125a) between the vaporiser chamber 127 and the inlet 121. This may reduce the propensity for leakage of e-liquid out of the inlet 121 (i.e. from the vaporising chamber 127).

[0113] The vaporiser 120 is located in the vaporising chamber 127 and comprises a porous wick 128 and a heater filament 129 coiled around the porous wick 128. The wick 128 extends across the vaporising chamber 127 (perpendicular to the direction of airflow through the chamber 127). That is, the wick 128 extends in the depth direction of the housing 105.

[0114] The vaporising chamber 127 is formed within a base member 130 that is received in an open lower end of the housing 105 so as to define the base portion 106 of the consumable component 102. The base member 130 seals against the walls of the housing 105 so as to define a lower end of the tank 103. Thus, the walls of the base member 130 (defining the vaporising chamber 127) separate the vaporising chamber 127 from the tank 103. In particular, an upper transverse wall 133a of the base member 130 spans the first tank wall 126a and the second tank wall 126b so as to separate the vaporising chamber 127 from the tank 103 (and so as to define a lower surface of the tank 103).

[0115] The base member 130 also includes a lower transverse wall 133b which is longitudinally spaced from the upper transverse wall 133a. The vaporising chamber 127 is formed between the lower transverse wall 133b and the upper transverse wall 133a. The lower transverse wall 133b includes a recess 139 which houses a sealing element 140.

[0116] To form a seal with the tank walls 126a, 126b, the upper wall comprises grooves 134a, 134b that extend in a direction of the depth of the housing 105 and receive distal ends of the tank walls 126a, 126b. This arrangement also seals the tank 103 from the air passages 125a, 125b, which connect to the vaporising chamber 127 via respective channels 135a, 135b formed in the base member 130.

[0117] As shown in Figure 3B, the front and rear walls of the vaporising chamber 127 comprises two apertures 131a, 131b formed in opposing front and rear walls of the base member 130 for receipt of respective ends of the wick 128 therethrough. The base member 130 is spaced from each of the front 108a and rear 108b walls of the housing, such that gaps 132a, 132b are formed between the base member 130 and each of the front 108a and rear 108b housing walls. These gaps 132a, 132b are arranged such that the ends of the wick 128 projecting through the apertures 131a, 131b in the base member 134 are received in the gaps 132a, 132b. In this way, the ends of the wick 128 are in contact with aerosol precursor (e-liquid) stored in the tank 103. This e-liquid is transported along the wick 128 (e.g. by capillary action) to a central portion of the wick 128 that is exposed to airflow flowing through the vaporising chamber 127. The transported e-liquid is heated by the heater filament 129 (when activated e.g. by detection of inhalation), which causes the e-liquid to be vaporised and to be entrained in air flowing across the wick 128. This vaporised liquid may cool to form an aerosol in the passage 140, which may then be inhaled by a user.

[0118] The base member also 130 accommodates the electrical interface 119 of the consumable component 102. The electrical interface 119 comprises two electrical contacts 136a, 136b that are electrically connected to

the heater filament 129. When the consumable component 102 is engaged with the device 101, power can be supplied from the power source 113 of the device to the heater filament 129. Electrical contacts 136a, 136b have different polarities (i.e. one is a positive contact and the other is a negative contact), so as to facilitate the flow of electrical current between the contacts 136a, 136b. The flow of current through the heating filament 129 heats up the filament 129, and thus electrical energy is partially converted to heat. This effect is used to heat up the aerosol precursor in the manner described above.

[0119] The lower transverse wall 133b further includes first and second base slots 137a, 137b which extend longitudinally through the lower transverse wall 133b to the cavity 139.

[0120] The first and second base slots 137a, 137b are transversely elongated i.e. in a direction perpendicular to the longitudinal axis of the component.

[0121] As shown in Figures 3A, 4A and 4B, the base member 130 accommodates the sealing element 140 within the cavity 139 defined in the lower transverse wall 133b of the base member 130.

[0122] The sealing element 140 has a length, a width and a thickness. The sealing element 140 may be substantially cuboid. The thickness of the sealing element extends along the longitudinal axis of the consumable component 102. The cross-sectional area of the sealing element 140 in the transverse plane is substantially rectangular.

[0123] The sealing element 140 has an upper surface, a bottom surface, and a side surface. The upper surface 150 faces the vaporising chamber 127 and so is exposed to the airflow flowing through the vaporising chamber 127. The upper surface 150 includes a recess 142 for at least partly receiving the heater filament 129. The recess 140 extends across the width of the sealing element 140 and has a shape, which corresponds to the shape of the heater filament 129. In the illustrated example, that shape is semi-cylindrical.

[0124] The sealing element 140 is seated within (and fills) the recess 139, such that the bottom surface and the side surface of the sealing element 140 engage with the recess 139. The upper surface 150 is flush with the lower transverse wall 133b, such that the upper surface 150 at least partly defines the vaporising chamber 127.

[0125] As shown in Figures 5A and 5B, the sealing element 140 includes a pair of seal slots 144a and 144b extending through the thickness of the sealing element 140. Each seal slot 144a, 144b has a substantially rectangular transverse cross-section and slot opening, which corresponds to the shape of the electrical contacts 136a, 136b, although other suitable cross sections - such as circular - are also possible. The seal slots 144a are disposed at diagonally opposite ends of the sealing element 140, although they can also be disposed in line with each other, or in any other suitable configuration. The arrangement and the shape of the seal slots 144a, 144b corresponds to that of the base slots 137a, 137b such that the seal slots 144a, 144b and the base slots 137a, 137b are arranged in the same position in the transverse plane and have the same transverse cross-sectional profile.

[0126] The electrical contacts 136a, 136b extend through the base member 130 and into the vaporising chamber 127 via their corresponding base slots 137a, 137b and seal slots 144a, 144b. Thus, the sealing element 140 directly engages both electrical contacts 136a, 136b, such that the seal 140 seals between the electrical contacts 136a, 136b and the base member 130, thus preventing leakage of fluids from the vaporising chamber 127 or ingress of moisture through the base slots 137a, 137b.

[0127] While exemplary embodiments have been described above, many equivalent modifications and variations will be apparent to those skilled in the art when given this disclosure. Accordingly, the exemplary embodiments set forth above are considered to be illustrative and not limiting.

[0128] 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.

[0129] 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%.

[0130] 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. An aerosol-delivery component, comprising:

a vaporiser disposed in a vaporising chamber;

an electrical contact for electrically connecting the vaporiser to a power supply, the contact extending through a base member of the component and into the vaporising chamber; and
a sealing element configured to seal between the electrical contact and the base member.

2. A component according to claim 1 wherein the component further comprises a second electrical contact for electrically connecting the vaporiser to the power supply, the second contact extending through the base member of the component and into the vaporising chamber, wherein the sealing element is configured to seal between the second electrical contact and the base member.

3. A component according to claim 1 or 2 wherein the base member comprises a base slot through which the electrical contact extends and, optionally, a second base slot through which the second electrical contact extends, and wherein the sealing element comprises a seal slot through which the electrical contact extends, and optionally a second seal slot through which the second electrical contact extends.

4. A component according to claim 3 wherein the electrical contact(s) extend through the base slot(s) and seal slot(s) in a direction aligned with a longitudinal axis of the component.

5. A component according to claim 4 wherein the base slot(s) and seal slot(s) are transversely elongated in a direction perpendicular to the longitudinal axis of the component.

6. A component according to any one of claims 3 to 5 wherein the base slot and seal slot are vertically aligned and, optionally, the second base slot and second seal slot are vertically aligned.

7. A component according to any one of claims 3 to 6 wherein the length and/or width of the seal slot in a plane perpendicular to the longitudinal axis of the component) is less than that of the base slot and, optionally, the length and/or width of the second seal slot in a plane perpendicular to the longitudinal axis of the component is less than that of the second base slot.

8. A component according to any one of claims 3 to 7 wherein the base member comprises a lower transverse wall and the base slot(s) are formed in the lower transverse wall.

9. A component according to claim 8 wherein the lower transverse wall of the base member comprises a recess for housing the sealing element.

10. A component according to claim 9 wherein an upper surface of the sealing element defines a lower transverse wall of the vaporising chamber.

11. A component according to claim 10 wherein the upper surface of the sealing element comprises an elongate channel.

12. A component according to claim 11 wherein the channel extends between front and rear walls of the vaporising chamber.

13. A component according to any one of claims 11 or 12 wherein the vaporiser comprises a heating filament mounted on an elongate wick and the axis of the elongate wick is parallel to and vertically spaced above the channel.

14. A component according to any one of the preceding claims wherein the component is a consumable component for receipt in a smoking substitute device.

15. An aerosol delivery system, comprising: an aerosol delivery component as defined in any of the claims 1 to 14; and a device comprising a power supply.

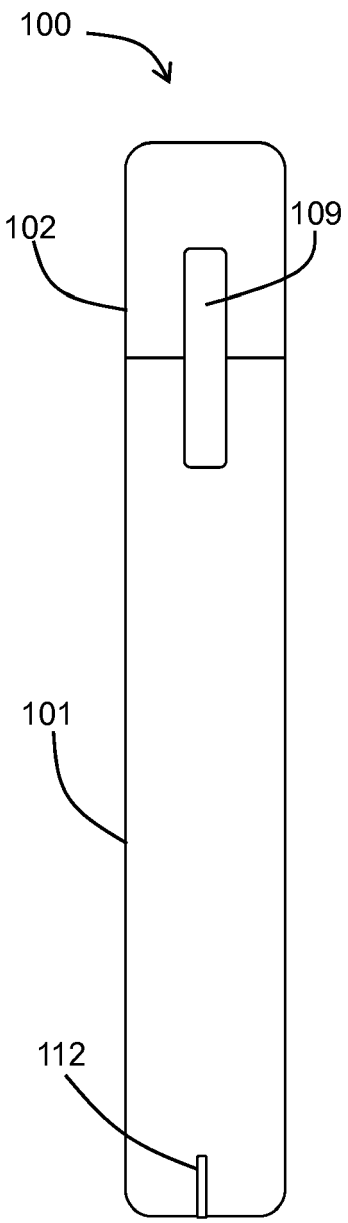


FIG 1A

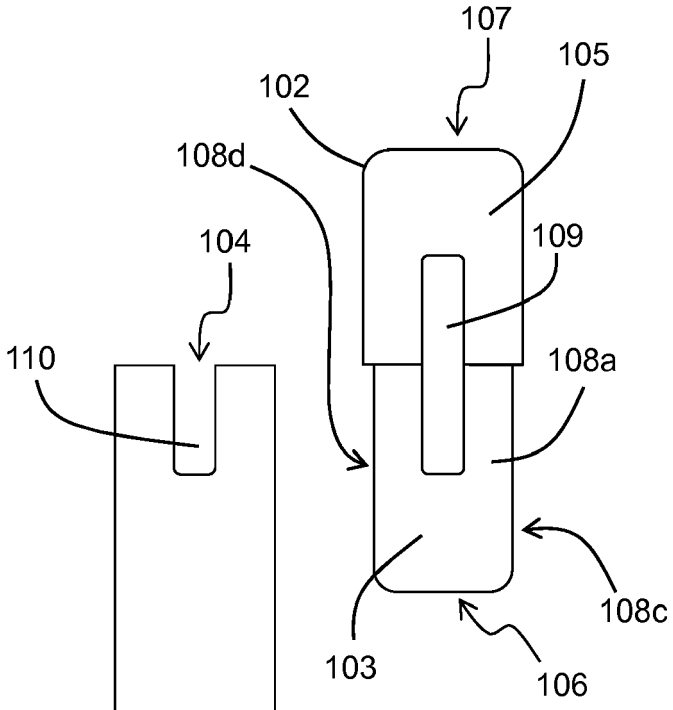


FIG 1C

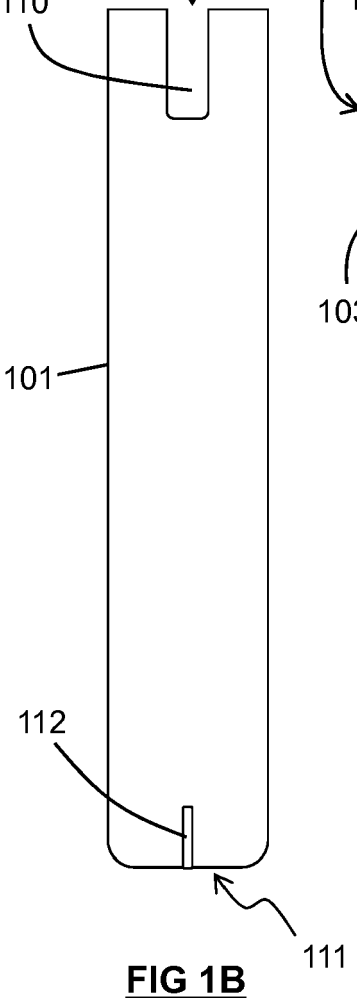


FIG 1B

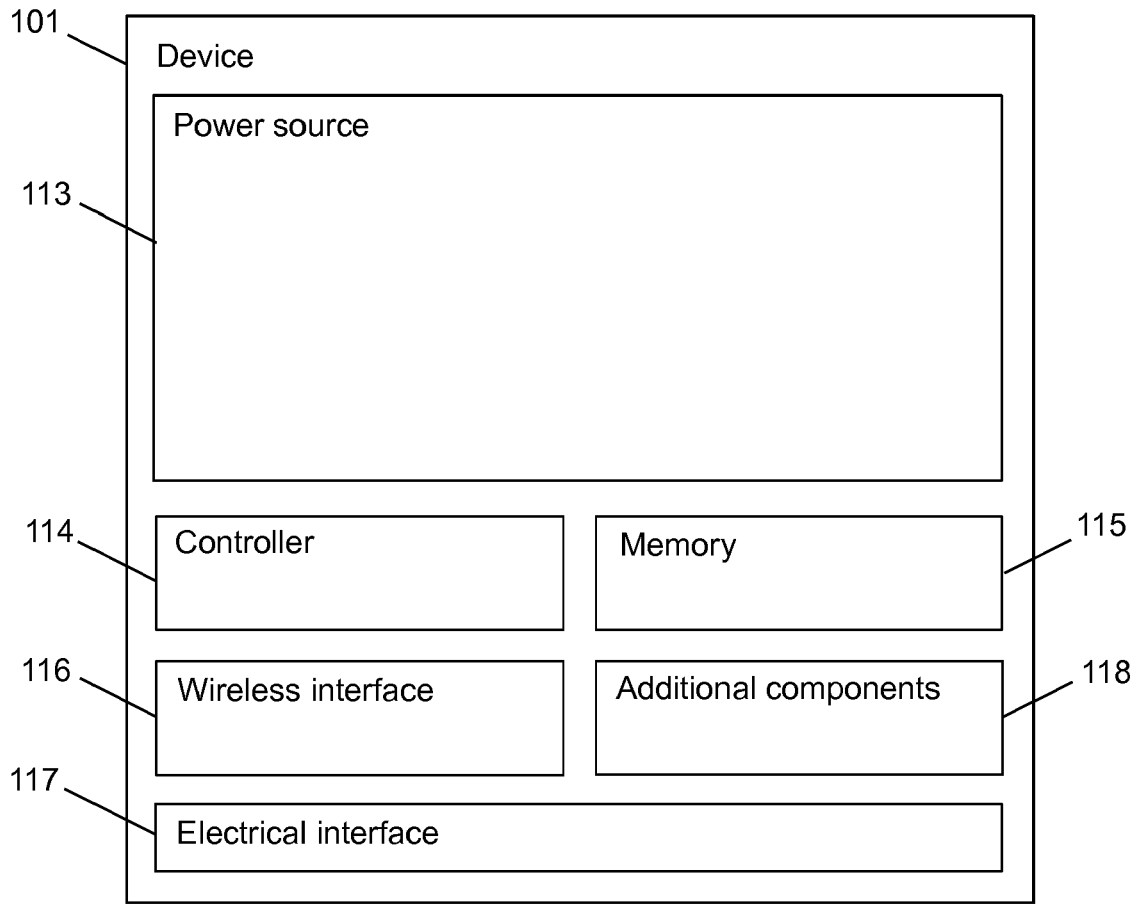

101
Device
Power source
113
114
Controller
Memory
115
116
Wireless interface
Additional components
118
117
Electrical interface

FIG 2A

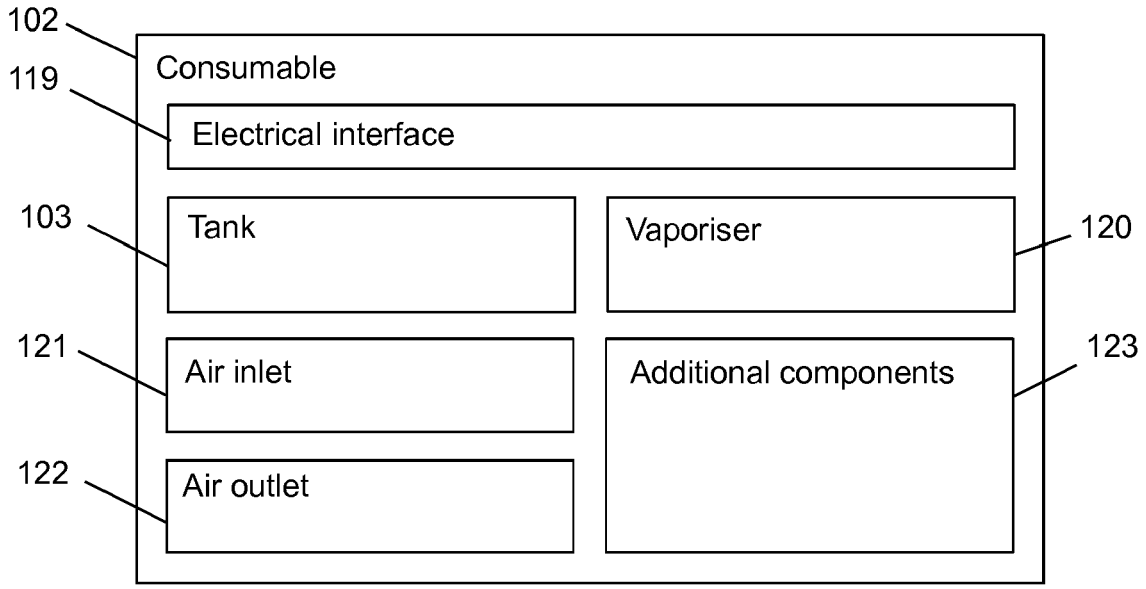

102
Consumable
119
Electrical interface
103
Tank
Vaporiser
120
121
Air inlet
Additional components
123
122
Air outlet

FIG 2B

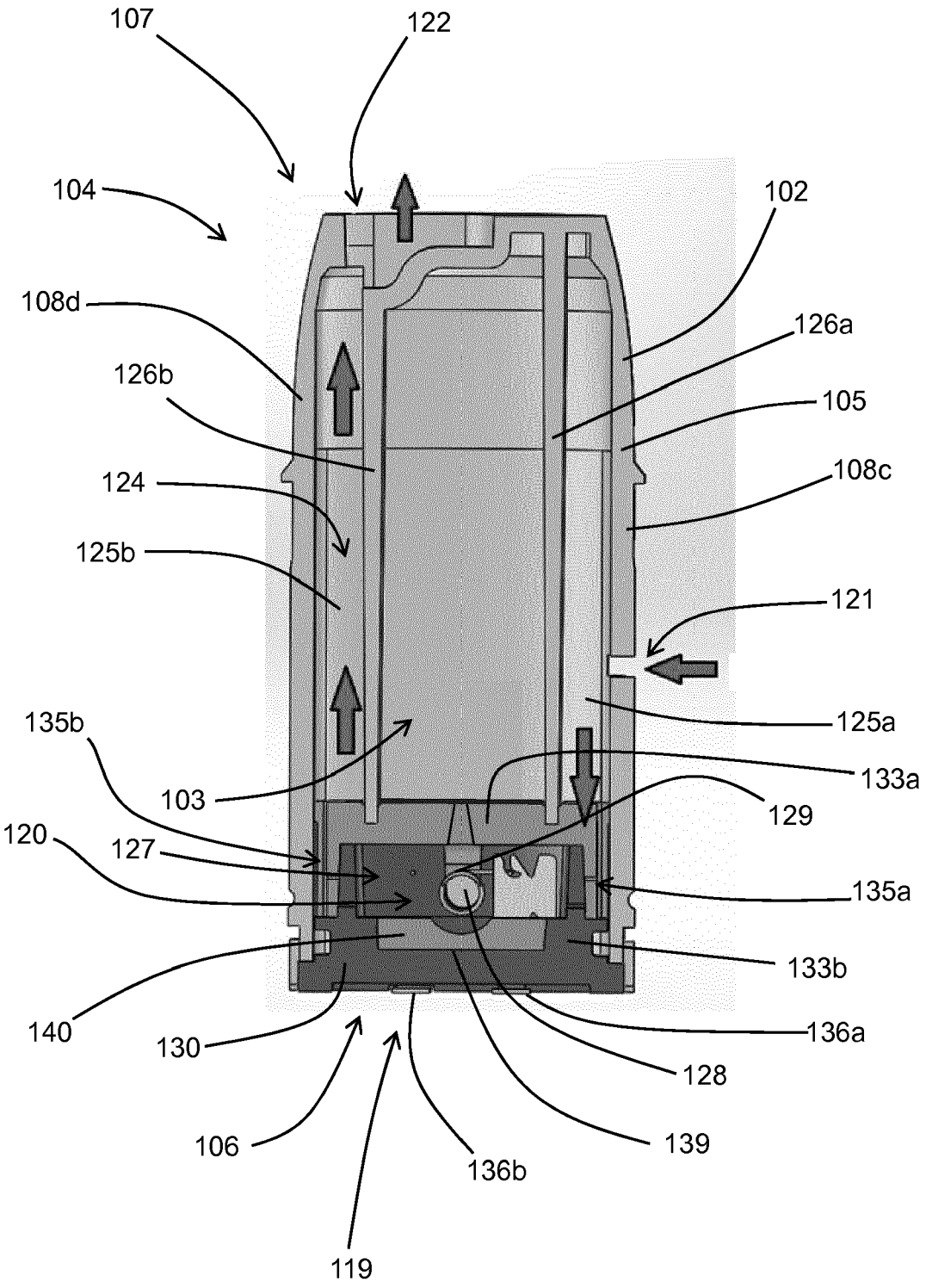

107
122
104
102
108d
126a
126b
105
124
108c
125b
121
125a
135b
133a
103
129
120
127
135a
133b
140
136a
130
128
106
139
136b
119

FIG 3A

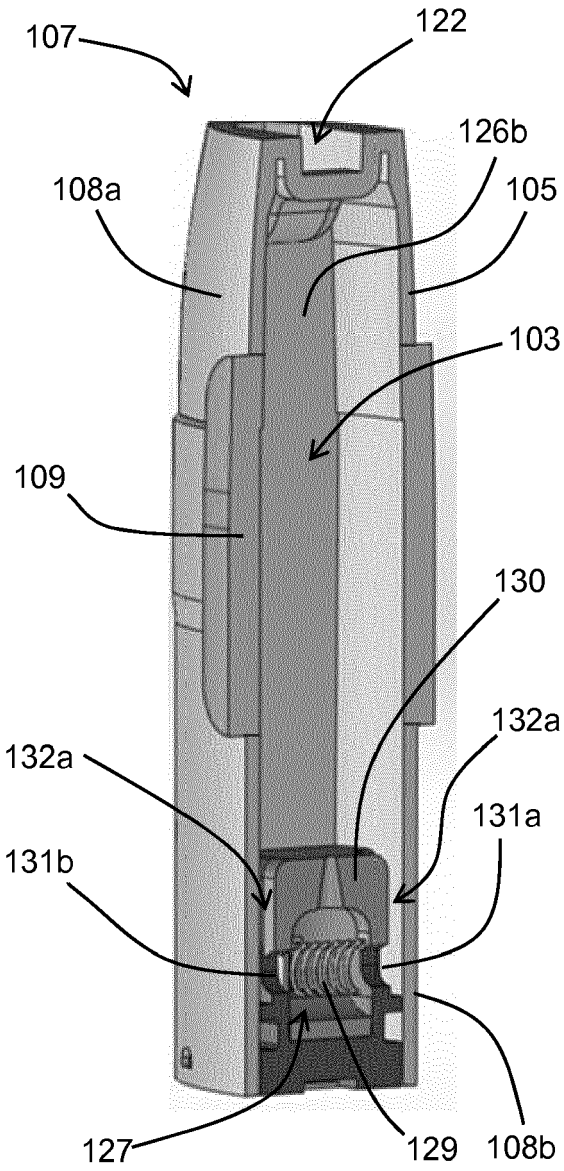

107
122
126b
108a
105
103
109
130
132a
132a
131a
131b
127
129
108b

FIG 3B

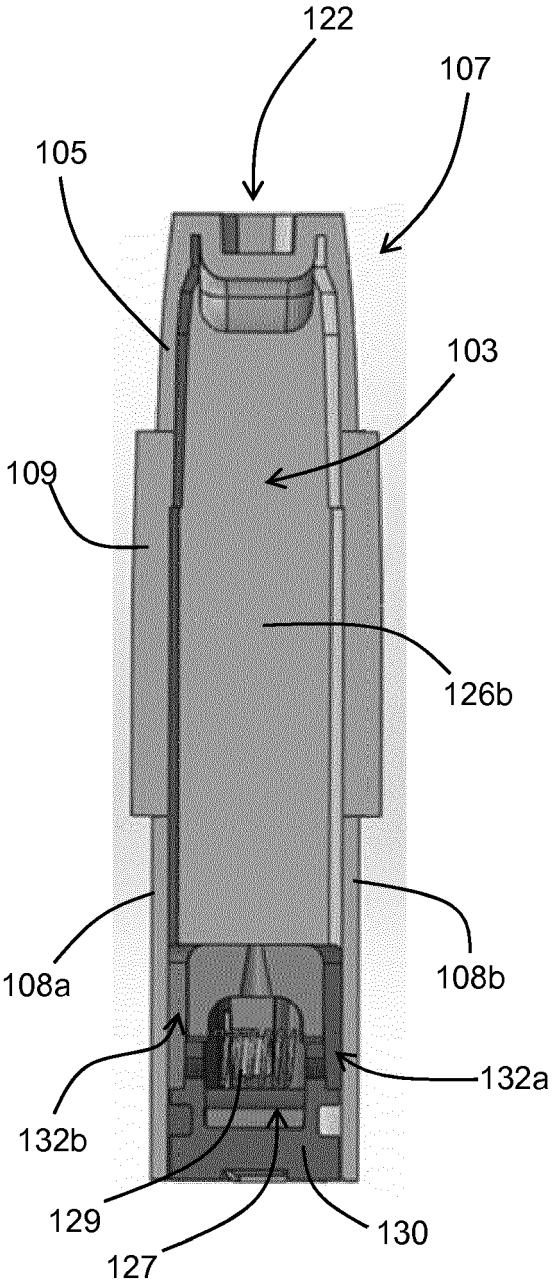

122
107
105
103
109
126b
108a
108b
132a
132b
129
127
130

FIG 3C

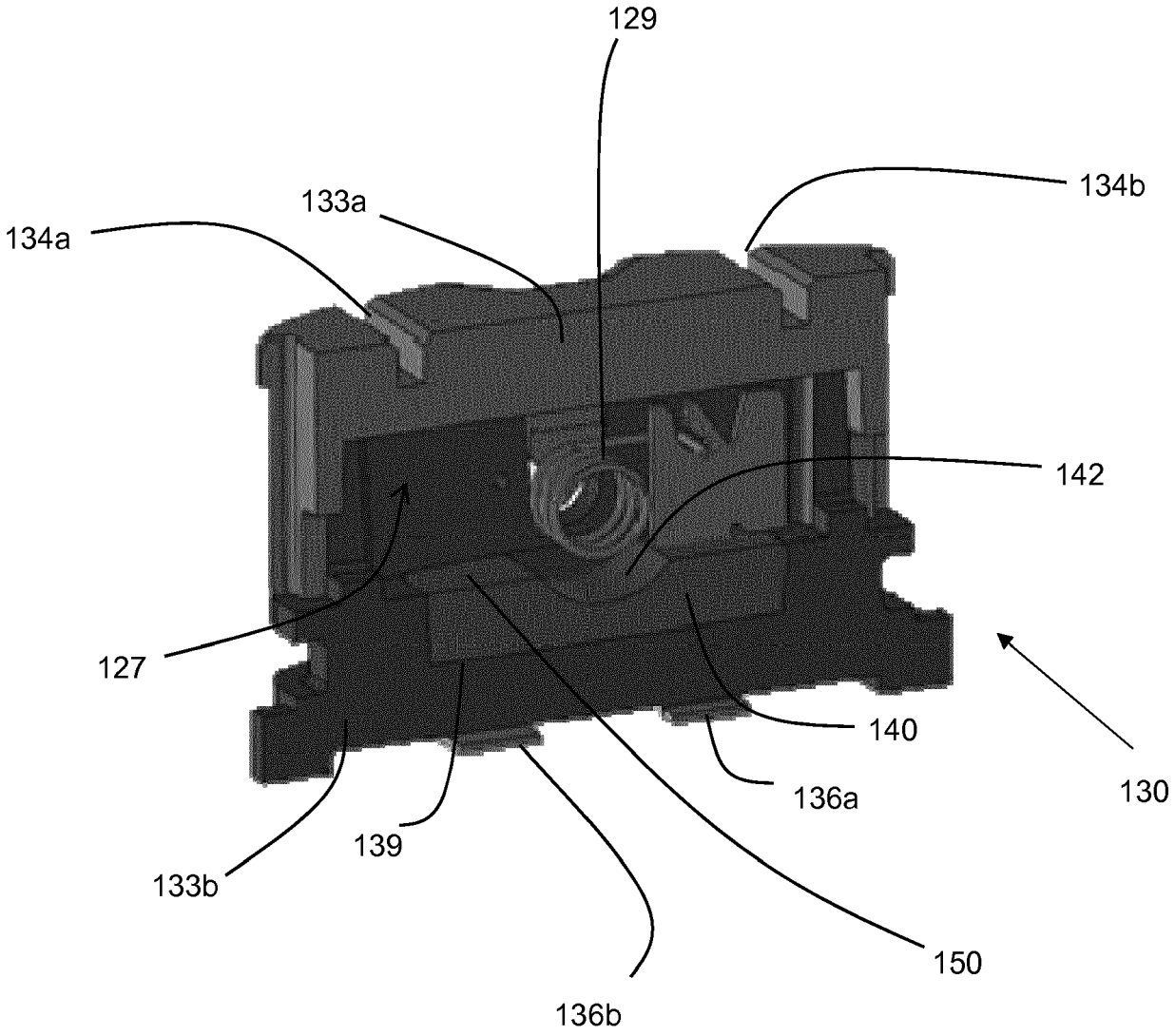


FIG 4A

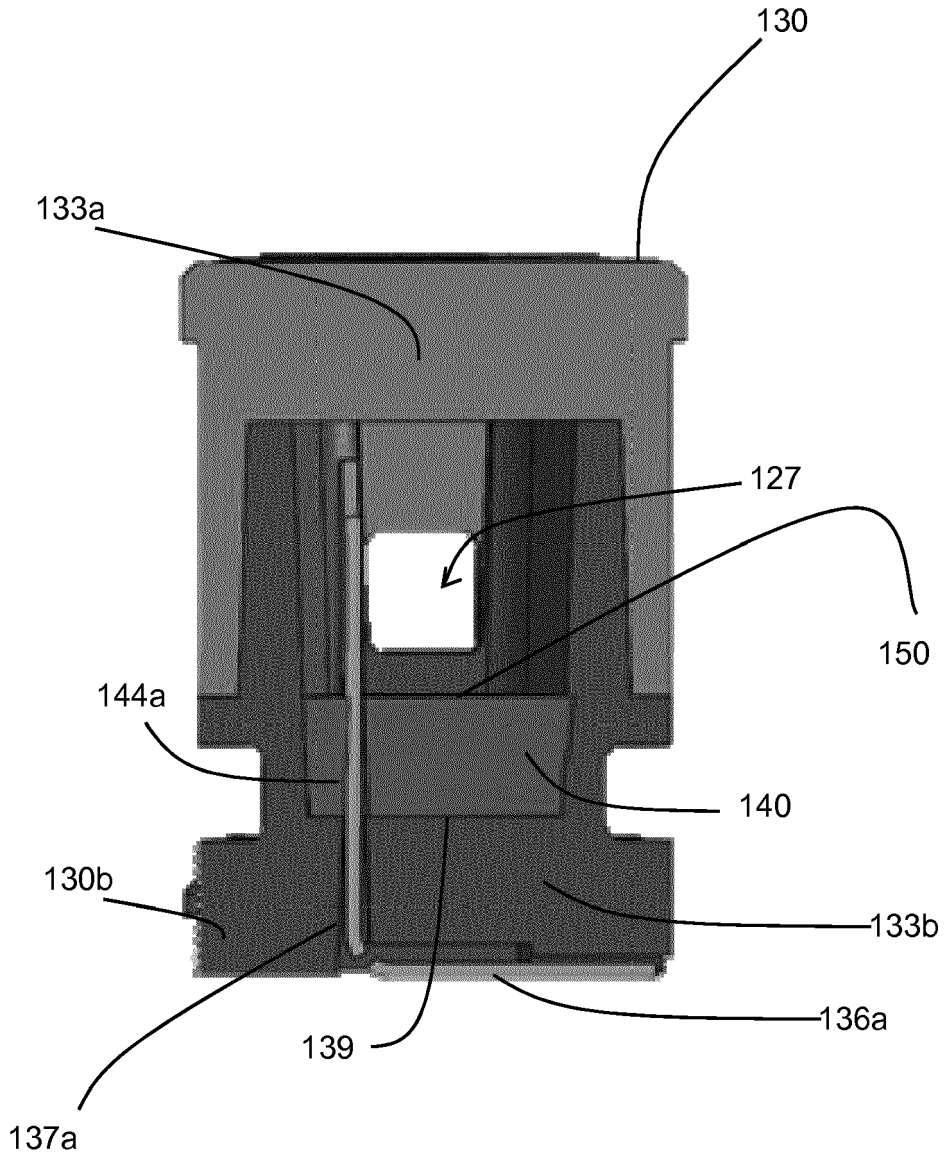


FIG 4B

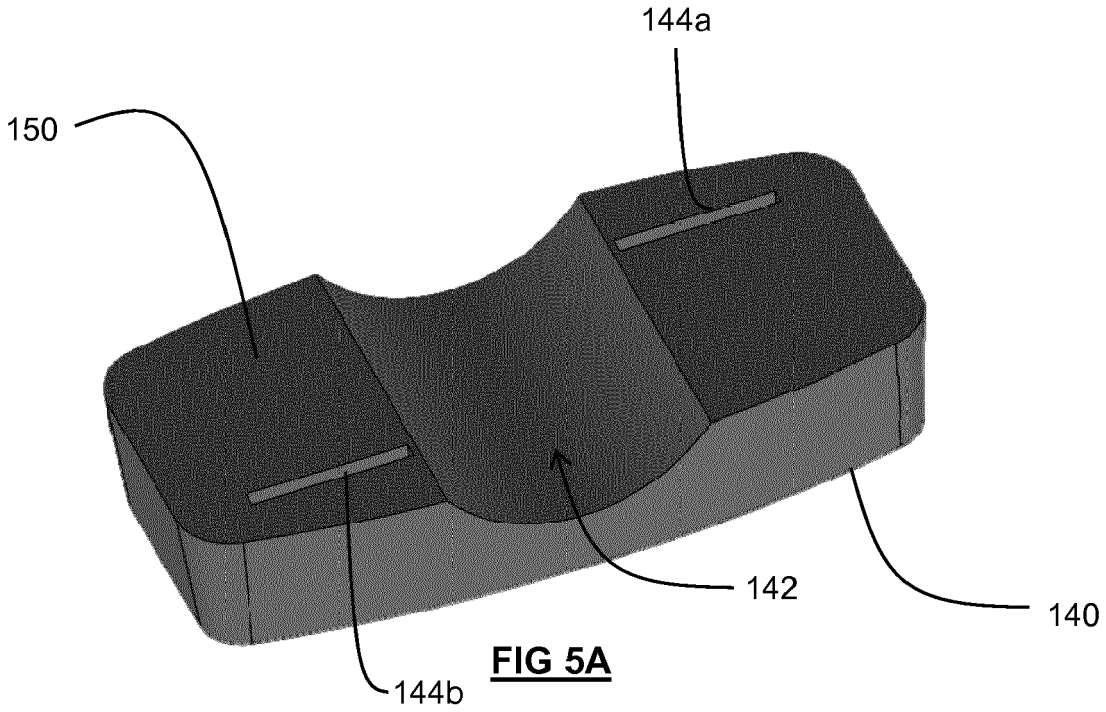


FIG 5A

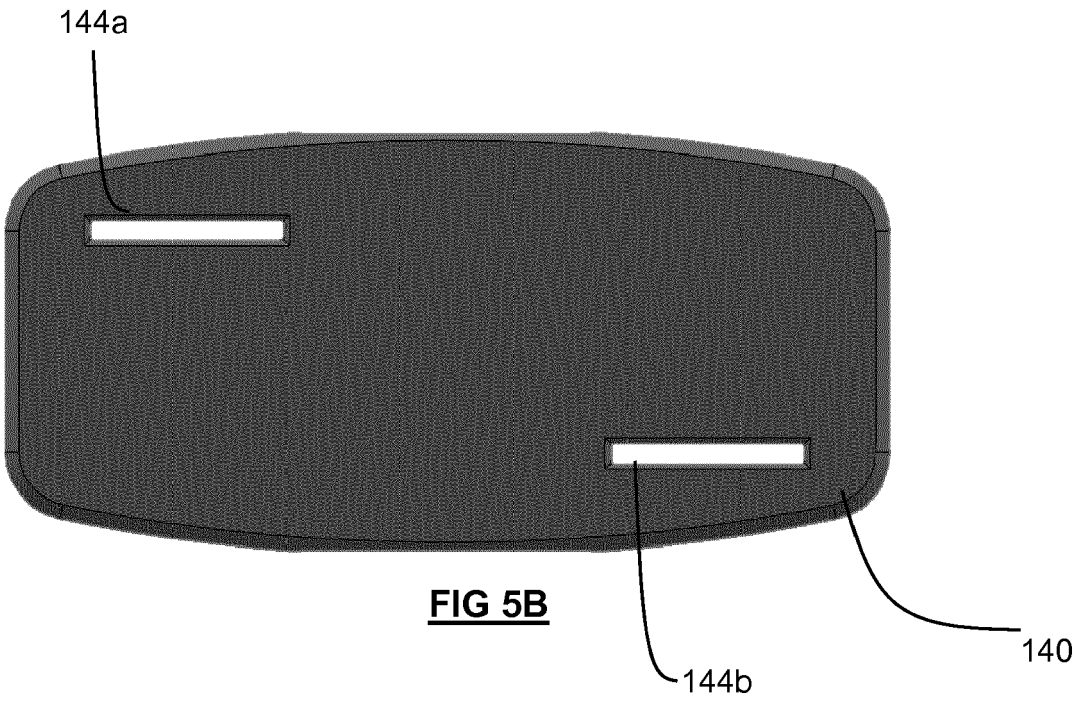


FIG 5B

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EUROPEAN SEARCH REPORT

Application Number
EP 19 19 8595

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A24F
A61M

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	24 March 2020	Mier Abascal, Ana

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