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(54) **AEROSOL DELIVERY COMPONENT**

(57) The present disclosure relates to an aerosol delivery component comprising:  
 a longitudinally-extending flow passage extending from a vaporiser to an air outlet, wherein the longitudinally-extending flow passage comprises a constriction;

a first aerosol precursor reservoir in fluid communication with the constriction;  
 wherein the component further comprises a liquid transfer element in fluid communication with the first aerosol precursor reservoir and circumscribing the constriction.

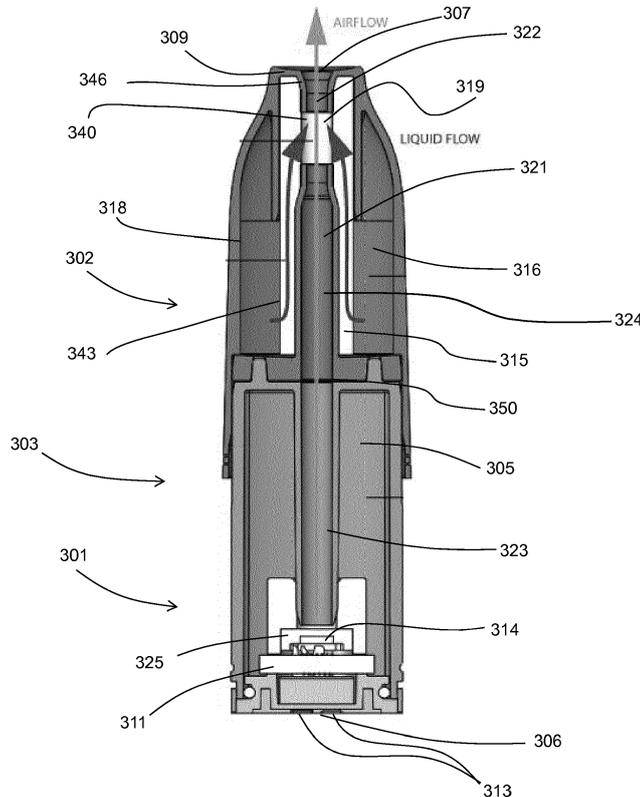


Fig. 3

## Description

### Field of the Invention

[0001] The present invention relates to an aerosol delivery component and system, and particularly, although not exclusively, to an aerosol delivery component/system configured to deliver a first and a second aerosol.

### Background

[0002] One form of an aerosol delivery device is a smoking-substitute system, which is an electronic system that permits the user to simulate the act of smoking by producing an aerosol or vapour that is drawn into the lungs through the mouth and then exhaled. The inhaled aerosol or vapour typically bears nicotine and/or other flavourings without the odour and health risks associated with traditional smoking and tobacco products. In use, the user experiences a similar satisfaction and physical sensation to those experienced from a traditional smoking or tobacco product, and exhales an aerosol or vapour of similar appearance to the smoke exhaled when using such traditional smoking or tobacco products.

[0003] 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 heating element to produce an aerosol/vapour which is inhaled by a user. The e-liquid typically includes a base liquid as well as nicotine and/or flavourings. The resulting vapour therefore also typically contains nicotine and/or flavourings. The base liquid may include propylene glycol and/or vegetable glycerine.

[0004] A typical vaping smoking substitute system includes a mouthpiece, a power source (typically a battery), a tank for containing e-liquid, as well as a heating element. In use, electrical energy is supplied from the power source to the heating element, which heats the e-liquid to produce an aerosol (or "vapour") which is inhaled by a user through the mouthpiece.

[0005] 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 sealed tank and heating element. The tank 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 base unit which includes the power source, wherein the base unit is configured to be physically and electrically coupled to a consumable including the tank and the heating element. The consumable may also be referred to as a cartomizer. In this way, when the tank of a consumable has been emptied, the consumable is disposed of. The base unit can be reused by connecting it to a new, replacement, consumable. Another subset of closed system vaping smoking substitute systems are completely disposable, and intended for one-use only.

[0006] There are also "open system" vaping smoking

substitute systems which typically have a tank that is configured to be refilled by a user. In this way the system can be used multiple times.

[0007] An example vaping smoking substitute system is the myblu® e-cigarette. The myblu® e-cigarette is a closed system which includes a base unit and a consumable. The base unit and consumable are physically and electrically coupled together by pushing the consumable into the base unit. The base unit includes a rechargeable battery. The consumable includes a mouthpiece, a sealed tank which contains e-liquid, as well as a heating element, which for this system is a heating filament coiled around a portion of a wick. The wick is partially immersed in the e-liquid, and conveys e-liquid from the tank to the heating filament. The device is activated when a micro-processor on board the base unit detects a user inhaling through the mouthpiece. When the system is activated, electrical energy is supplied from the power source to the heating element, which heats e-liquid from the tank to produce a vapour which is inhaled by a user through the mouthpiece.

[0008] For a smoking substitute system it is desirable to deliver nicotine into the user's lungs, where it can be absorbed into the bloodstream. As explained above, in the vaping approach, e-liquid is heated by a heating element to produce an aerosol/vapour which is inhaled by a user. Many e-cigarettes also deliver flavour to the user, to enhance the experience. Flavour compounds are contained in the e-liquid that is heated. Heating of the flavour compounds may be undesirable as the flavour compounds are inhaled into the user's lungs. Toxicology restrictions are placed on the amount of flavour that can be contained in the e-liquid. This can result in some e-liquid flavours delivering a weak and underwhelming taste sensation to consumers in the pursuit of safety.

[0009] In aerosol delivery devices, there is a desire to deliver the e-liquid and/or the flavour compounds appropriately and efficiently. There may also be a desire to store the e-liquid and the flavour compounds separately. However, in order to do this, the devices can have somewhat complex designs.

[0010] Accordingly there is a need for an improved aerosol delivery device/system which addresses at least some of the problems of the known devices and systems.

### Summary of the Invention

[0011] According to a first aspect there is provided an aerosol delivery component comprising:

a longitudinally-extending flow passage extending from a vaporiser to an air outlet, wherein the longitudinally-extending flow passage comprises a constriction;

a first aerosol precursor reservoir in fluid communication with the constriction;

wherein the component further comprises a liquid transfer element in fluid communication with the first

aerosol precursor reservoir and circumscribing the constriction.

**[0012]** By providing an aerosol delivery component with a first aerosol precursor reservoir and a liquid transfer element in fluid communication with the first aerosol precursor reservoir and circumscribing the constriction, the delivery component can efficiently deliver any aerosol precursor in the first aerosol precursor reservoir. The delivery component can also have a more streamlined and simplified design, resulting in a reduced number of parts and reduced manufacturing cost.

**[0013]** Optional features will now be set out. These are applicable singly or in any combination with any aspect.

**[0014]** The first aerosol precursor reservoir of the first aspect may circumscribe the flow passage.

**[0015]** The aerosol delivery component according to the first aspect may include a second aerosol precursor reservoir. The second aerosol precursor reservoir may circumscribe the flow passage.

**[0016]** According to a second aspect, there is provided an aerosol delivery component comprising:

a longitudinally-extending flow passage extending from a vaporiser to an air outlet, wherein the longitudinally-extending flow passage comprises a constriction;

a first aerosol precursor reservoir in fluid communication with the constriction;

a second aerosol precursor reservoir in fluid communication with the vaporiser;

wherein the longitudinally-extending flow passage is circumscribed by both the first and second aerosol precursor reservoirs.

**[0017]** The aerosol delivery component according to the second aspect may include a liquid transfer element in fluid communication with the first aerosol precursor reservoir. The liquid transfer element may circumscribe the constriction.

**[0018]** According to the first and second aspects, the aerosol delivery component comprises a flow passage for fluid flow through the component. The flow passage is elongate and is longitudinally-extending within the component. The flow passage has a linear path through the component.

**[0019]** The aerosol delivery component of the first and second aspects may include an air inlet preferably located at an upstream end of the component and which may be provided by a component inlet opening at the upstream end of the component. According to the first and second aspects, the aerosol delivery component comprises an air outlet which is preferably located at a downstream end of the component and which may be provided by an outlet aperture provided in a mouthpiece of the component and may therefore hereinafter be described as a mouthpiece aperture.

**[0020]** The flow passage may extend from (and may

fluidly connect) the air inlet to the air outlet. Thus, the flow passage may provide an airflow passage (i.e. a substantially linear airflow passage) through the aerosol delivery component. In this respect, a user may draw fluid (e.g. air) from the air inlet into and through the flow passage of the aerosol delivery component by inhaling at the mouthpiece aperture. The air inlet and air outlet may be axially aligned with one another.

**[0021]** The aerosol delivery component is generally elongate, having a length dimension which is larger than its width/depth dimension. The term "longitudinal" is used with reference to the length dimension of the component i.e. running lengthwise with respect to the component rather than across.

**[0022]** The terms "upstream" and "downstream" are used with reference to the direction of airflow (from inlet to outlet) through the component during normal use of the component (i.e. by way of inhalation at the mouthpiece aperture).

**[0023]** The aerosol delivery component may be a smoking substitute component (e.g. an e-cigarette component).

**[0024]** The aerosol delivery component may be a consumable part of an aerosol delivery system e.g. a consumable for a smoking substitute system. In this regard, the component may be termed "a consumable".

**[0025]** The aerosol delivery component according to the first and second aspects includes a vaporiser (described further below). The vaporiser may be located in a vaporising chamber preferably located towards the upstream end of the device between the air inlet and the air outlet.

**[0026]** The flow passage extends from (and may fluidly connect) the vaporiser to the air outlet. Thus, as the user draws air from the air inlet into and through the flow passage, air may pass through the vaporising chamber.

**[0027]** According to the first and second aspects, the flow passage may be generally linear. The flow passage may be substantially parallel to a central longitudinal axis of the component and may be substantially aligned with the central longitudinal axis of the component.

**[0028]** According to the first and second aspects, the flow passage includes a constriction (i.e. a constricted or narrowed portion). At least a portion of the constriction may be formed by the walls of the flow passage narrowing inwardly in a radial direction.

**[0029]** The flow passage may include an aerosolisation chamber within which an aerosol is generated (described further below). The aerosolisation chamber is preferably located at the constriction. In other words, the constriction includes the aerosolisation chamber.

**[0030]** In preferred embodiments of the first and second aspects, the aerosolisation chamber forms the narrowest portion of the flow passage. The aerosolisation chamber may be located proximate to the mouthpiece aperture of the component. In particular, the aerosolisation chamber may be located closer to the mouthpiece aperture than to the vaporiser.

**[0031]** According to the first and second aspects, the aerosol delivery component may comprise a passive aerosolisation portion configured to generate a first aerosol in such a way that it does not use heat.

**[0032]** The passive aerosolisation portion may comprise the constriction e.g. the aerosolisation chamber. The active aerosolisation portion may comprise the vapouriser/vaporising chamber.

**[0033]** According to the first and second aspects, the aerosol delivery component includes a first aerosol precursor reservoir (for containing a first aerosol precursor) in fluid communication with the constriction. The first aerosol precursor reservoir (hereinafter referred to as the first reservoir) may extend longitudinally along at least a portion of the longitudinal length of the aerosol delivery component. In preferred embodiments of the first and second aspect, the first reservoir is located within the passive aerosolisation portion of the aerosol delivery component (and extends longitudinally along at least a portion of the passive aerosolisation portion).

**[0034]** In the first aspect and according to some embodiments of the second aspect, the aerosol delivery component includes a liquid transfer element in fluid communication with the first reservoir and which circumscribes the constriction. The liquid transfer element is preferably provided in the passive aerosolisation portion.

**[0035]** The liquid transfer element may be elongate. It may be annular (e.g. an elongate annular tube). It may extend longitudinally along at least a portion of the longitudinal length (e.g. the entire length) of the passive aerosolisation portion.

**[0036]** The flow passage, in particular the flow passage within the passive aerosolisation portion may include a conduit extending from a conduit opening to the constriction e.g. to the aerosolisation chamber. The conduit may be defined by tubular walls which may narrow radially to the constriction/aerosolisation chamber. The passive aerosolisation chamber may include the mouthpiece aperture and a mouthpiece extension which forms the downstream-most portion of the flow passage. The mouthpiece extension may be tubular and may depend from the mouthpiece aperture towards the constriction/aerosolisation chamber. It may constrict (radially) towards the constriction/aerosolisation chamber. In other words, the mouthpiece extension may flare outwardly in the downstream direction such that a diameter of the mouthpiece aperture is greater than a diameter of the constriction and of the aerosolisation chamber.

**[0037]** The conduit, the aerosolisation chamber and the mouthpiece extension may be substantially parallel to a central longitudinal axis of the passive aerosolisation portion and may be substantially aligned with the central longitudinal axis of the passive aerosolisation portion.

**[0038]** The first reservoir may be defined by a tank for containing the first aerosol precursor. The first aerosol precursor may be a liquid flavourant/flavoured aerosol precursor or an e-liquid. For example, it may comprise a liquid flavourant having a menthol, liquorice, chocolate,

fruit flavour (including e.g. citrus, cherry etc.), vanilla, spice (e.g. ginger, cinnamon) and/or tobacco flavour.

**[0039]** The first aerosol precursor may be stored in the form of a free liquid. Alternatively, a porous body, matrix or substrate may be disposed within the first reservoir, which may contain the first aerosol precursor.

**[0040]** The first reservoir may form part of the passive aerosolisation portion.

**[0041]** The first reservoir may circumscribe the liquid transfer element i.e. the first reservoir may at least partly or fully surround the liquid transfer element, such that the first reservoir may be generally annular.

**[0042]** The first reservoir (i.e. the central longitudinal axis of the first reservoir) may be substantially aligned with the central longitudinal axis of the passive aerosolisation portion.

**[0043]** According to the second aspect and in some embodiments of the first aspect, the flow passage is circumscribed by the first reservoir (e.g. the conduit and aerosolisation chamber may be partly or completely surrounded by the first reservoir).

**[0044]** The liquid transfer element (in either of the first or second aspect) may be formed of a wicking or porous material. The liquid transfer element may be in fluid communication and/or in contact with the first aerosol precursor (e.g. via an opening of the first reservoir). Thus, the liquid transfer element may be configured to draw (e.g. via a wicking/capillary action) the first aerosol precursor from the first reservoir into the liquid transfer element.

**[0045]** According to the first aspect and in some embodiments of the second aspect, the liquid transfer element circumscribes the constriction i.e. the liquid transfer element may at least partly surround (e.g. may completely/fully surround) the constriction, such that the liquid transfer element may be generally annular. In particular, the liquid transfer element may circumscribe the aerosolisation chamber (e.g. fully surround the aerosolisation chamber) such that internal walls of the liquid transfer element may define the aerosolisation chamber within the constriction. Thus, airflow through the passive aerosolisation portion may pass through the conduit, the aerosolisation chamber and the mouthpiece extension prior to being discharged through the mouthpiece aperture. The internal walls of the liquid transfer element may circumscribe the aerosolisation chamber such that the aerosolisation chamber may be generally cylindrical and the diameter of the aerosolisation chamber may be equal to the diameter of the constriction.

**[0046]** The constriction, including the aerosolisation chamber, may form the narrowest portion of the flow passage. This constriction of the flow passage increases the velocity of air and/or vapour passing through the constriction and the aerosolisation chamber. In this respect, the constriction may be referred to as a Venturi opening. In addition to increasing the airflow velocity, the constriction reduces the air pressure of the airflow flowing through the constriction and the aerosolisation chamber. This low pressure and high velocity facilitate the generation via

Venturi effect of an aerosol from the first aerosol precursor held in the liquid transfer element. This first aerosol may be entrained in the airflow passing through the aerosolisation chamber and through the mouthpiece extension before being discharged from the mouthpiece aperture of the aerosol delivery component (i.e. for subsequent receipt in a user's mouth).

**[0047]** As mentioned above, the liquid transfer element may be an elongate annular tube and (in addition to circumscribing the constriction), the liquid transfer element may circumscribe (e.g. partly or completely surround) the entire length of the conduit.

**[0048]** The liquid transfer element may be supported between the first reservoir and the conduit. That is, the liquid transfer element may completely surround the conduit and the first reservoir may completely surround the liquid transfer element such that the conduit and the first reservoir hold the liquid transfer element in position within the aerosol delivery component.

**[0049]** The liquid transfer element may comprise a conveying portion and an aerosol generating portion. The conveying portion may include a portion of the liquid transfer element that abuts against the opening of the first reservoir. In this way, the conveying portion may be configured to convey the first aerosol precursor from the first reservoir to the aerosolisation chamber. The aerosol generating portion may include a portion of the liquid transfer element located proximate to (and in fluid communication with) the aerosolisation chamber so as to be exposed to the airflow within the aerosolisation chamber. The aerosol generating portion may be configured to generate the first aerosol when exposed to airflow within the aerosolisation chamber.

**[0050]** The aerosol delivery component of the first and second aspects may further comprise an active aerosolisation portion configured to generate a second aerosol using applied energy such as heat. The passive aerosolisation portion may be downstream of the active aerosolisation portion. The active aerosolisation portion includes the vaporiser.

**[0051]** According to the second aspect and some embodiments of the first aspect, the aerosol delivery component includes a second aerosol precursor reservoir (for containing a second aerosol precursor) in fluid communication with the vaporiser. The second aerosol precursor reservoir (hereinafter referred to as the second reservoir) may extend longitudinally along at least a portion of the longitudinal length of the aerosol delivery component. In preferred embodiments of the first and second aspects, the second reservoir is located within the active aerosolisation portion of the aerosol delivery component.

**[0052]** The second reservoir (i.e. a central longitudinal axis of the second reservoir) may be substantially aligned with the central longitudinal axis of the active aerosolisation portion.

**[0053]** The first and second reservoirs may be axially spaced (i.e. longitudinally spaced) from one another. In particular, the first reservoir may be located downstream

from the second reservoir.

**[0054]** The active aerosolisation portion may be a cartomizer. The active aerosolisation portion utilizes applied energy e.g. heat to vaporise the second aerosol precursor.

**[0055]** The passive aerosolisation portion may be engageable with the active aerosolisation portion (cartomizer), for example, by way of an interference fit, snap-engagement, bayonet locking arrangement, etc.

**[0056]** The flow passage, in particular the flow passage within the active aerosolisation portion, may include a vapour outlet channel for fluid flow therethrough.

**[0057]** The vapour outlet channel may extend from (and fluidly connect) the component inlet opening to the conduit opening of the passive aerosolisation portion of the component. The vapour outlet channel and vaporising chamber may fluidly connect the component inlet opening and the conduit inlet within the passive aerosolisation portion of the component.

**[0058]** The vapour outlet channel may be substantially parallel to a central longitudinal axis of the active aerosolisation portion and may be substantially aligned with the central longitudinal axis of the active aerosolisation portion.

**[0059]** According to the second aspect and some embodiments of the first aspect, the flow passage is circumscribed by the second reservoir, i.e. the vapour outlet channel may be circumscribed by the second reservoir. The second reservoir may at least partly surround (e.g. may completely / fully surround) the vapour outlet channel, such that the second reservoir may be generally annular. Preferably, internal walls of the second reservoir form the vapour outlet channel.

**[0060]** In some embodiments of the first and second aspects, the vapour outlet channel is substantially aligned with the central longitudinal axis of the second reservoir.

**[0061]** The active and passive aerosolisation portions may be integrally formed. Alternatively, they may be separately formed and engageable with one another.

**[0062]** The active and passive aerosolisation portions may be a single consumable component of the aerosol delivery system (when integrally formed) or may each define separate consumable components of the aerosol delivery system (when engageable with one another).

**[0063]** The passive aerosolisation portion and the active aerosolisation portion may be integrally formed or secured together such that the vapour outlet channel (in the active aerosolisation portion), and the conduit, the aerosolisation chamber and the mouthpiece extension (in the passive aerosolisation portion) align to form the flow passage longitudinally extending through the aerosol delivery component. Thus, the flow passage may extend longitudinally through the passive and active aerosolisation portions and through the first and second reservoirs.

**[0064]** An airflow may be drawn into and through the vapour outlet channel in the active aerosolisation portion,

and subsequently through the conduit, the aerosolisation chamber and the mouthpiece extension in the passive aerosolisation portion.

**[0065]** The second reservoir may be defined by a container for containing the second aerosol precursor (which may be an e-liquid). The second aerosol precursor may, for example, comprise a base liquid and a physiologically active compound e.g. nicotine. The base liquid may include an aerosol former such as propylene glycol and/or vegetable glycerine.

**[0066]** At least a portion of the second reservoir may be translucent or transparent. For example, the second reservoir may comprise a window to allow a user to visually assess the quantity of second aerosol precursor in the second reservoir. The cartomizer may be referred to as a "clearomizer" if it includes a window.

**[0067]** The first aerosol may be sized to inhibit pulmonary penetration. The first aerosol may be formed of particles with a mass median aerodynamic diameter that is greater than or equal to 15 microns, e.g. greater than 30 microns, or greater than 50 microns, or may be greater than 60 microns, or may be greater than 70 microns.

**[0068]** The first aerosol may be sized for transmission within at least one of a mammalian oral cavity and a mammalian nasal cavity. The first aerosol may be formed by particles having a maximum mass median aerodynamic diameter that is less than 300 microns, or e.g. less than 200 microns, or less than 100 microns. Such a range of mass median aerodynamic diameter can produce aerosols which are sufficiently small to be entrained in an airflow caused by a user drawing air through the aerosol delivery component and to enter and extend through the oral and or nasal cavity to activate the taste and/or olfactory receptors.

**[0069]** The size of aerosol formed without heating may be typically smaller than that formed by condensation of a vapour.

**[0070]** It is noted that the mass median aerodynamic diameter is a statistical measurement of the size of the particles/droplets in an aerosol. That is, the mass median aerodynamic diameter quantifies the size of the droplets that together form the aerosol. The mass median aerodynamic diameter may be defined as the diameter at which 50% of the particles/droplets by mass in the aerosol are larger than the mass median aerodynamic diameter and 50% of the particles/droplets by mass in the aerosol are smaller than the mass median aerodynamic diameter. The "size of the aerosol", as may be used herein, refers to the size of the particles/droplets that are comprised in the particular aerosol.

**[0071]** The aerosol delivery component i.e. the active aerosolisation portion may comprise the vaporiser. The vaporiser may be located in the vaporising chamber.

**[0072]** The vaporiser may comprise a wick. The vaporiser may further comprise a heater. The wick may comprise a porous material. A portion of the wick may be exposed to fluid flow in the vaporising chamber. The wick may also comprise one or more portions in contact with

the second aerosol precursor stored in the second reservoir. For example, opposing ends of the wick may protrude into the second reservoir and a central portion (between the ends) may extend across the vaporising chamber so as to be exposed to air flow in the vaporising chamber. Thus, fluid may be drawn (e.g. by capillary action) along the wick, from the second reservoir to the exposed portion of the wick.

**[0073]** The heater may comprise a heating element, which 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. The heating element may be electrically connected (or connectable) to a power source. 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 reservoir) to be heated so as to form a vapour and become entrained in fluid/air flowing through the vaporising chamber. This vapour may subsequently cool to form an aerosol in the vapour outlet channel. This aerosol is hereinafter referred to as the second aerosol. This aerosol generation may be referred to as "active" aerosol generation, because it makes use of heat to generate the aerosol.

**[0074]** This second aerosol may subsequently flow from the vapour outlet channel to (and through) the conduit of the passive aerosolisation portion of the component. Thus, the fluid received through the mouthpiece aperture of the aerosol delivery component may be a combination of the first aerosol and the second aerosol.

**[0075]** The second aerosol generated is sized for pulmonary penetration (i.e. to deliver an active ingredient such as nicotine to the user's lungs). The second aerosol is formed of particles having a mass median aerodynamic diameter of less than or equal to 10 microns, preferably less than 8 microns, more preferably less than 5 microns, yet more preferably less than 1 micron. Such sized aerosols tend to penetrate into a human user's pulmonary system, with smaller aerosols generally penetrating the lungs more easily. The second aerosol may also be referred to as a vapour.

**[0076]** In a third aspect there is provided an aerosol delivery system (e.g. a smoking substitute system) comprising a base unit having a power source, and a component as described above with respect to the first aspect.

**[0077]** The component may be engageable/engaged with the base unit such that the vaporiser of the component/consumable is connected to the power source of the base unit.

**[0078]** For example, the active aerosolisation portion (cartomizer) may be configured for engagement with the base unit.

**[0079]** The base unit and the component (e.g. the active aerosolisation portion of the consumable) may be configured to be physically coupled together. For example, the component may be at least partially received in

a recess of the base unit, such that there is snap engagement between the base unit and the component. Alternatively, the base unit and the component may be physically coupled together by screwing one onto the other, or through a bayonet fitting.

**[0080]** Thus, the component may comprise one or more engagement portions for engaging with a base unit. In this way, one end of the component (i.e. the end of the active aerosolisation component comprising the component inlet) may be coupled with the base unit, whilst an opposing end (i.e. the end of the passive aerosolisation component comprising the outlet aperture) of the component may define the mouthpiece.

**[0081]** The base unit or the component may comprise a power source or be connectable to a power source. The power source may be electrically connected (or connectable) to the heater. The power source may be a battery (e.g. a rechargeable battery). An external electrical connector in the form of e.g. a USB port may be provided for recharging this battery.

**[0082]** The component may comprise an electrical interface for interfacing with a corresponding electrical interface of the base unit. One or both of the electrical interfaces may include one or more electrical contacts. Thus, when the base unit is engaged with the component, the electrical interface may be configured to transfer electrical power from the power source to a heater of the component. The electrical interface may also be used to identify the component from a list of known types. The electrical interface may additionally or alternatively be used to identify when the component is connected to the base unit.

**[0083]** The base unit may alternatively or additionally be able to detect information about the consumable via an RFID reader, a barcode or QR code reader.

**[0084]** The base unit may comprise a controller, which may include a microprocessor. The controller may be configured to control the supply of power from the power source to the heater (e.g. via the electrical contacts). 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.

**[0085]** The base unit 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.

**[0086]** 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 the heater in response to airflow detection by the sensor. The control may be in the form of activation of the heater in response to a detected airflow. The airflow sensor may form part of the component or the base unit.

**[0087]** In some embodiments, the aerosol delivery component may be a non-consumable component in which one or both of the first and second aerosol precursors of the component may be replenished by re-filling the first and second reservoirs of the component (rather than replacing the consumable component). In this embodiment, the component described above may be integral with the base unit. For example, the only consumable portion may be the first and/or second aerosol precursor contained in the first and second reservoirs of the component. Access to the first and second reservoirs (for re-filling of the aerosol precursor) may be provided via e.g. an opening to the first and second reservoirs that is sealable with a closure (e.g. a cap).

**[0088]** In a fourth aspect there is provided a method of using a smoking substitute system as described above with respect to the second aspect, the method comprising engaging the component with the base unit so as to connect the vapouriser of the component with the power source of the base unit.

**[0089]** The method may comprise engaging the passive aerosolisation portion of the component (e.g. flavour pod) with the active aerosolisation portion of the component (e.g. cartomizer) such that the conduit of the passive aerosolisation portion is in fluid communication with the vapour outlet channel of the active aerosolisation portion.

**[0090]** The invention includes the combination of the aspects and preferred features described except where such a combination is clearly impermissible or expressly avoided.

### **Summary of the Figures**

**[0091]** So that the invention may be understood, and so that further aspects and features thereof may be appreciated, embodiments illustrating the principles of the invention will now be discussed in further detail with reference to the accompanying figures, in which:

Figures 1A and 1B is a schematic drawing of an aerosol delivery system according to a first embodiment;

Figures 2A and 2B is a schematic drawing of an aerosol delivery system according to a second embodiment; and

Figure 3 is a cross-sectional view of a consumable, according to a third embodiment.

### **Detailed Description of the Invention**

**[0092]** Aspects and embodiments of the present inven-

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

**[0093]** Referring to figures 1A and 1B, there is shown a schematic view of an aerosol delivery system in the form of a smoking substitute system 10. In this example, the smoking substitute system 10 comprises an active aerosolisation portion in the form of cartomizer 101 and a passive aerosolisation portion in the form of flavour pod 102 connected to a base unit 100. In this example, the base unit 100 includes elements of the smoking substitute system 10 such as a battery, an electronic controller, and a pressure transducer (not shown). The cartomizer 101 may engage with the base unit 100 via a push-fit engagement, a screw-thread engagement, or a bayonet fit, for example.

**[0094]** The flavour pod 102 is configured to engage with the cartomizer 101 and thus with the base unit 100. The flavour pod 102 may engage with the cartomizer 101 via a push-fit engagement, a screw-thread engagement, or a bayonet fit, for example. Figure 1B illustrates the cartomizer 101 engaged with the base unit 100, and the flavour pod 102 engaged with the cartomizer 101. As will be appreciated, in this example, the cartomizer 101 and the flavour pod 102 are distinct elements.

**[0095]** As will be appreciated from the following description, in other embodiments the cartomizer 101 and the flavour pod 102 may be combined into a single integrated component that implements the combined functionality of the cartomizer 101 and flavour pod 102. In other examples, the cartomizer may be absent, with only a flavour pod 102 present.

**[0096]** As is set forth above, reference to a "consumable" component may mean that the component is intended to be used once until exhausted, and then disposed of as waste or returned to a manufacturer for re-processing.

**[0097]** Referring to figures 2A and 2B, there is shown a smoking substitute system 20 comprising a base unit 200 and a consumable component 203. The consumable component 203 combines the functionality of the active aerosolisation portion (cartomizer 201) and the passive aerosolisation portion (flavour pod 202). In Figure 2A, the consumable component 203 and the base unit 200 are shown separated from one another. In Figure 2B, the consumable component 203 and the base unit 200 are engaged with each other to form the smoking substitute system 20.

**[0098]** Referring to Figure 3, there is shown a consumable component 303 engagable with a base unit (not shown) via a push-fit engagement. The consumable component 303 may be considered to have two portions - an active aerosolisation (cartomizer) portion 301 and a passive aerosolisation (flavour pod) portion 302, both of which are located within a single consumable component 303 (as in figures 2A and 2B). It should, however, be appreciated that in a variation, the cartomizer portion 301 and flavour pod portion 302 may be separate (but en-

gagable) portions.

**[0099]** The component 303 includes a flow passage 324 for fluid flow through the component. The flow passage 324 is longitudinally-extending within the component 303 and provides an airflow passage through the component 303 from an air inlet 306 located at an upstream end of the component to an air outlet located at a downstream end of the component 303 and provided by a mouthpiece aperture 307 located at the mouthpiece 309 of the component 303. In this respect, a user may draw fluid (e.g. air) from the air inlet into and through the flow passage 324 by inhaling at the mouthpiece aperture 307.

**[0100]** The component 303 includes a vaporiser 314 located in a vaporising chamber 325 located towards the upstream end of the component 303. The flow passage 324 extends from and fluidly connects the vaporiser 314 to the air outlet. Thus, as the user draws air from the air inlet 306 into and through the flow passage 324, air passes through the vaporising chamber 325.

**[0101]** The flow passage 324 is generally cylindrical and includes tubular walls. The flow passage 324 is substantially aligned with the central longitudinal axis of the component 303.

**[0102]** The flow passage 324 includes a constriction 340 and at least a portion of the constriction is formed by walls of the flow passage narrowing inwardly in a radial direction.

**[0103]** The flow passage 324 also includes an aerosolisation chamber 319 located at the constriction 340. In other words, the constriction 340 includes the aerosolisation chamber 319.

**[0104]** The constriction 340 and the aerosolisation chamber 319 form the narrowest portion of the flow passage 324. The constriction and the aerosolisation chamber are located closer to the mouthpiece aperture 307 than to the vaporiser 314.

**[0105]** The consumable component 303 includes a passive aerosolisation (flavour pod) portion 302 configured to generate a first (flavoured) aerosol for output from the mouthpiece aperture 307.

**[0106]** Located within the passive aerosolisation portion 302 is a first reservoir 316 (defined by a tank 318) for containing a first aerosol precursor (i.e. a liquid flavourant/flavoured aerosol precursor) and in fluid communication with the constriction 340. The first reservoir 316 extends longitudinally along a portion of the passive aerosolisation portion 302.

**[0107]** Also located within the passive aerosolisation portion 302 is a liquid transfer element 315 in fluid communication with the first reservoir 316 and which circumscribes the constriction 340. The liquid transfer element is 315 is substantially aligned with the central longitudinal axis of the passive aerosolisation portion 302.

**[0108]** Also located within the passive aerosolisation portion 302 is the aerosolisation chamber 319.

**[0109]** The flow passage 324 in particular the flow passage within the passive aerosolisation portion 302 in-

cludes a conduit 321 extending from a conduit opening 350 to the constriction 340 and the aerosolisation chamber 319. The conduit 321 is defined by tubular walls which narrow radially to the constriction 340 / aerosolisation chamber 319. The aerosolisation chamber 319 includes the mouthpiece aperture 307 and a mouthpiece extension 322 which forms the downstream-most portion of the flow passage 324. The mouthpiece extension 322 is tubular and depends from the mouthpiece aperture 307 towards the constriction 340 / aerosolisation chamber 319. It constricts radially towards the constriction 340 / aerosolisation chamber 319.

**[0110]** The conduit 321, the aerosolisation chamber 319 and the mouthpiece extension 322 are aligned and together form the flow passage 324 portion within the passive aerosolisation portion 302. The conduit 321, the aerosolisation chamber 319 and the mouthpiece extension 322 are substantially aligned with the central longitudinal axis of the passive aerosolisation portion 302.

**[0111]** In particular, the conduit 321, the aerosolisation chamber 319 and the mouthpiece extension 322 extend between and fluidly connect the inlet 350 of the passive aerosolisation portion to the mouthpiece aperture 307.

**[0112]** The first reservoir 316 is generally annular and fully surrounds the liquid transfer element 315. The first reservoir 316 also fully surrounds the fluid passage i.e. the conduit 321, the aerosolisation chamber 319 and the mouthpiece extension 322 are completely surrounded by the first reservoir 316.

**[0113]** A central longitudinal axis of the first reservoir is substantially aligned with the central longitudinal axis of the passive aerosolisation portion 302.

**[0114]** The mouthpiece extension 322 includes a transition surface 346 that flares outwardly in the downstream direction such that the diameter of the mouthpiece aperture 307 is greater than a diameter of the constriction 340 and the aerosolisation chamber 319.

**[0115]** The liquid transfer element 315 is formed of wicking material and is in fluid communication with the liquid flavourant by abutting against an opening 343 of the first reservoir 316. The liquid transfer element 315 is configured to draw via wicking/capillary action, the liquid flavourant from the first reservoir into the liquid transfer element 315.

**[0116]** The liquid transfer element 315 is generally shaped as an annular tube and completely surrounds the constriction 340 and the aerosolisation chamber 319 such that the internal walls of the liquid transfer element 315 define the aerosolisation chamber 319 within the constriction. Thus, airflow through the passive aerosolisation portion 302 passes through the conduit 321, the aerosolisation chamber 319 and the mouthpiece extension 322 prior to being discharged through the mouthpiece aperture 307.

**[0117]** The internal walls of the liquid transfer element 315 circumscribe the aerosolisation chamber 319 such that the aerosolisation chamber 319 is generally cylindrical and the diameter of the aerosolisation chamber 319

is equal to the diameter of the constriction 340.

**[0118]** The liquid transfer element 315 completely surrounds the conduit and the first reservoir completely surrounds the liquid transfer element 315 such that the conduit 321 and the first reservoir 316 hold the liquid transfer element 315 in position within the passive aerosolisation portion 302 of the component 303.

**[0119]** The liquid transfer element 315 includes a conveying portion that abuts against the opening of the first reservoir. In this way, the conveying portion is configured to convey the first aerosol precursor (i.e. the liquid flavourant) from the first reservoir to the aerosolisation chamber 319. The liquid transfer element 315 also includes an aerosolisation portion proximate to and in fluid communication with the aerosolisation chamber 319 which is configured to generate the flavoured aerosol when exposed to airflow within the aerosolisation chamber 319.

**[0120]** The porous nature of the liquid transfer element 315 means that first (flavoured) aerosol precursor in the storage chamber 316 is drawn into the liquid transfer element 315. As the flavoured aerosol precursor in the liquid transfer element 315 is depleted in use, further flavoured aerosol precursor is drawn from the first reservoir 316 into the liquid transfer element 315 via a wicking action.

**[0121]** The component 303 includes an active aerosolisation portion in the form of a cartomizer 301 and configured to generate a second aerosol using heat. The passive aerosolisation portion 302 is downstream of the active aerosolisation portion 301.

**[0122]** The cartomizer portion 301 of the consumable component 303 includes a second reservoir 305 (defined by a container) for storing a second (e-liquid) aerosol precursor (which may contain nicotine) and which is in fluid communication with the vaporiser. The second reservoir 305 extends longitudinally along the entire longitudinal length of the active aerosolisation portion (cartomizer) 301.

**[0123]** The first 316 and second 305 reservoirs are axially spaced with the first reservoir located downstream from the second reservoir.

**[0124]** The active aerosolisation portion 301 includes a vapour outlet channel 323 which defines the flow passage 324 within the active aerosolisation portion 301. The vapour outlet channel 323 extends from the component inlet opening 306 to the inlet 350 of the conduit through the passive aerosolisation portion 302. The vapour outlet channel 323 is substantially aligned with the central longitudinal axis of the active aerosolisation portion 301.

**[0125]** The vapour outlet channel 323 is completely surrounded by the second reservoir 305 such that the second reservoir is generally annular. The internal walls of the second reservoir 305 form the vapour outlet channel 323.

**[0126]** The passive aerosolisation portion 302 and the active aerosolisation portion 301 are integrally formed or secured together such that the vapour outlet channel

323, the conduit 321, the aerosolisation chamber 319 and the mouthpiece extension 322 align to form the flow passage 324.

**[0127]** A wick 311 extends into the second reservoir so as to be in contact with (i.e. partially submerged in) the e-liquid aerosol precursor. The wick 311 is formed from a porous wicking material (e.g. a polymer) that draws the e-liquid aerosol precursor from the second reservoir 305 into a central region of the wick 311 that is located in the vaporising chamber 325.

**[0128]** A heater 314 is configured to heat the central region of the wick 311. The heater 314 includes a resistive heating filament that is coiled around the central region of the wick 311. The wick 311 and the heater 314 generally define a vaporiser, and together with the second reservoir 305 act as an active aerosol generator. The vaporiser (i.e. wick 311 and heater 314) is at least partially located within the airflow passage.

**[0129]** So that the consumable component 303 may be supplied with electrical power for activation of the heater 314, the consumable component 303 includes a pair of consumable electrical contacts 313. The consumable electrical contacts 313 are configured for electrical connection to a corresponding pair of electrical supply contacts in the base unit (not shown). The consumable electrical contacts 313 are electrically connected to the electrical supply contacts (not shown) when the consumable component 303 is engaged with the base unit. The base unit includes an electrical power source, for example a battery.

**[0130]** When the heater 314 is activated by passing an electric current through the heating filament in response to the user drawing on the mouthpiece 309 (the drawing of air may be detected by a pressure transducer), the e-liquid located in the wick 311 adjacent to the heating filament is heated and vaporised to form a vapour in the vaporising chamber 325. The vapour condenses to form the e-liquid aerosol within the vapour outlet channel 323.

**[0131]** The base unit supplies electrical current to the consumable electrical contacts 113. This causes an electric current flow through the heating filament of the heater 314 and the heating filament heats up. As described, the heating of the heating filament causes vaporisation of the e-liquid in the wick 311 to form the e-liquid aerosol.

**[0132]** In use, when a user draws on the mouthpiece 309, air flow is generated through the air flow passage through the device. Air (comprising the e-liquid aerosol from the cartomizer portion 301 as explained above) flows through the vapour outlet channel 323 and into the conduit 321.

**[0133]** Further downstream, the air/vapour flows through the aerosolisation chamber 319 (and past the aerosol generating portion 322 of the liquid transfer element 315).

**[0134]** The constriction 340 including the aerosolisation chamber 319 form the narrowest portion of the flow passage. This constriction of the flow passage increases the velocity of air / vapour passing through the constric-

tion and the aerosolisation chamber 319. The constriction also reduces the air pressure of the airflow flowing through the constriction and the aerosolisation chamber 319. This low pressure and high velocity facilitate the generation of flavoured aerosol from the liquid transfer element 315 via Venturi effect. As such, as air flows past the aerosolisation chamber 319, liquid flavourant held in the liquid transfer element 315 is drawn out as an aerosol and entrained in the airflow passing through the aerosolisation chamber and through the mouthpiece extension before being discharged together with the aerosolised e-liquid through the mouthpiece aperture 307 into the user's mouth.

**[0135]** As the flavoured aerosol precursor becomes entrained within the airflow, the liquid transfer element 315 draws (by wicking action) further flavoured aerosol precursor from the first reservoir 316 to the liquid transfer element 315.

**[0136]** The features disclosed in the foregoing description, or in the following claims, or in the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for obtaining the disclosed results, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

**[0137]** While the invention has been described in conjunction with the exemplary embodiments described above, many equivalent modifications and variations will be apparent to those skilled in the art when given this disclosure. Accordingly, the exemplary embodiments of the invention set forth above are considered to be illustrative and not limiting. Various changes to the described embodiments may be made without departing from the scope of the invention as defined in the claims.

**[0138]** For the avoidance of any doubt, any theoretical explanations provided herein are provided for the purposes of improving the understanding of a reader. The inventors do not wish to be bound by any of these theoretical explanations.

**[0139]** Any section headings used herein are for organizational purposes only and are not to be construed as limiting the subject matter described.

**[0140]** 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.

**[0141]** 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 par-

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%.

**[0142]** 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 longitudinally-extending flow passage extending from a vaporiser to an air outlet, wherein the longitudinally-extending flow passage comprises a constriction;
  - a first aerosol precursor reservoir in fluid communication with the constriction;
  - wherein the component further comprises a liquid transfer element in fluid communication with the first aerosol precursor reservoir and circumscribing the constriction.
2. An aerosol delivery component according to claim 1, wherein the first aerosol precursor reservoir circumscribes the flow passage.
3. An aerosol delivery component according to claim 1 or 2, further including a second aerosol precursor reservoir in fluid communication with the vaporiser and circumscribing the flow passage.
4. An aerosol delivery component comprising:
  - a longitudinally-extending flow passage extending from a vaporiser to an air outlet, wherein the longitudinally-extending conduit comprises a constriction;
  - a first aerosol precursor reservoir in fluid communication with the constriction;
  - a second aerosol precursor reservoir in fluid communication with the vaporiser;
  - wherein the longitudinally-extending flow passage is circumscribed by both the first and second aerosol precursor reservoirs.
5. An aerosol delivery component according to claim 4, further comprising a liquid transfer element in fluid communication with the first aerosol precursor reservoir and circumscribing the constriction.
6. An aerosol delivery component according to any preceding claim, wherein the flow passage is a linear flow passage substantially aligned with a central longitudinal axis of the component.
7. An aerosol delivery component according to any one of claims 1 to 3 and 5 to 6, wherein the liquid transfer element is annular and defines the constriction comprising an aerosolisation chamber.
8. An aerosol delivery component according to any preceding claim, wherein the first aerosol precursor reservoir is annular and surrounds the flow passage.
9. An aerosol delivery component according to any one of claims 3 to 8, wherein the second aerosol precursor reservoir is annular and surrounds the flow passage.
10. An aerosol delivery component according to any preceding claim, wherein the constriction is closer to a mouthpiece aperture than the vaporiser.
11. An aerosol delivery component according to any one of claims 3 to 10, wherein the first and second reservoirs are longitudinally spaced.
12. An aerosol delivery component according to any one of claims 1 to 3 and 5 to 11 wherein the liquid transfer element is annular and surrounds the flow passage.
13. An aerosol delivery component according to any preceding claim wherein the component is a smoking substitute component.
14. An aerosol delivery system comprising an aerosol delivery component according to any one of the preceding claims and a base unit comprising a power source.
15. A method of operating an aerosol delivery system comprising inserting an aerosol delivery component according to any one of the preceding claims into a base unit comprising a power source.

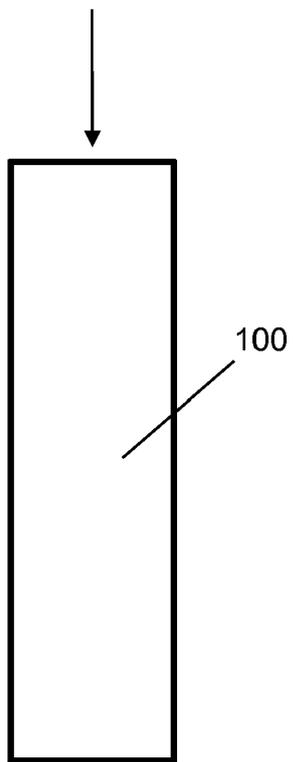
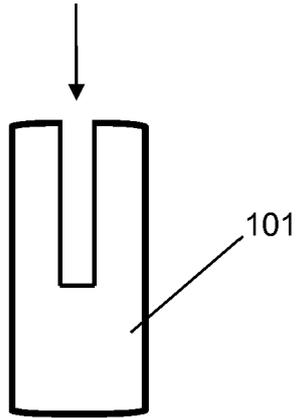
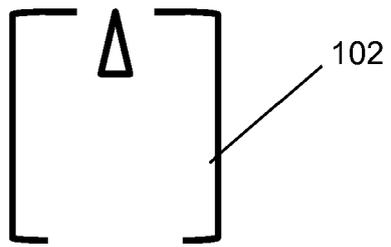


Fig. 1A

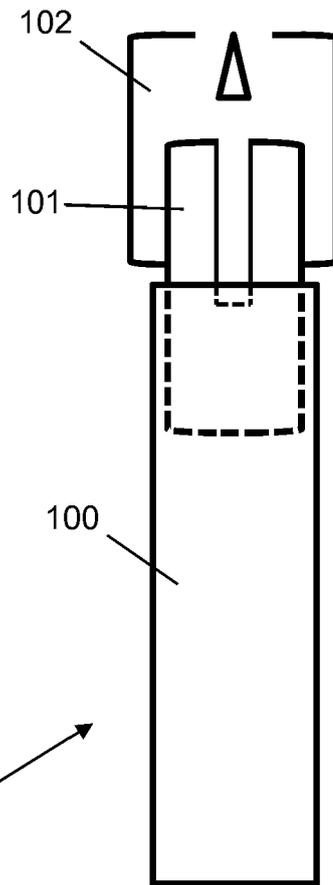


Fig. 1B

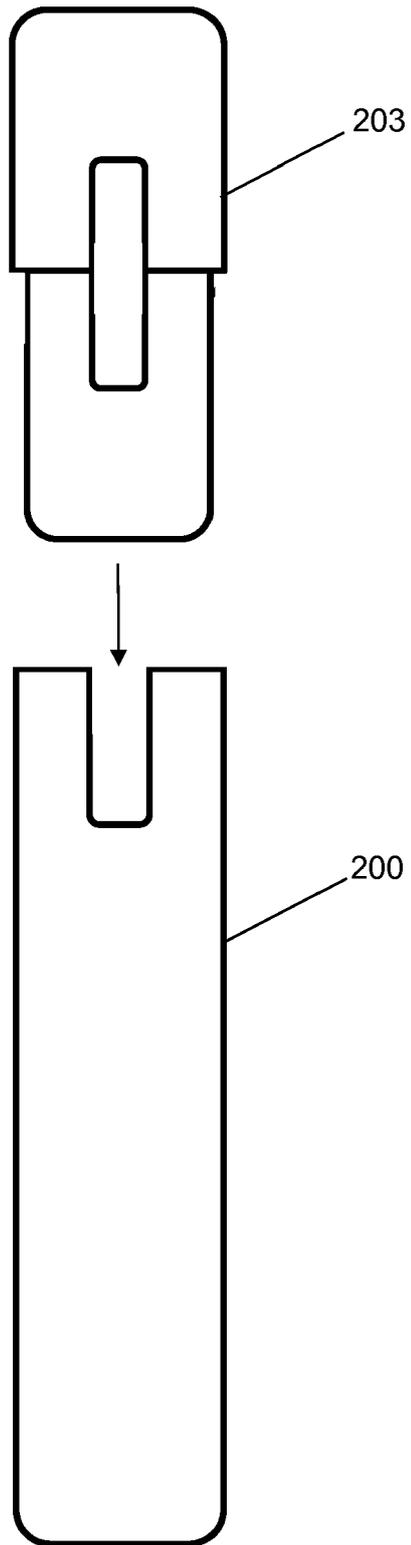


Fig. 2A

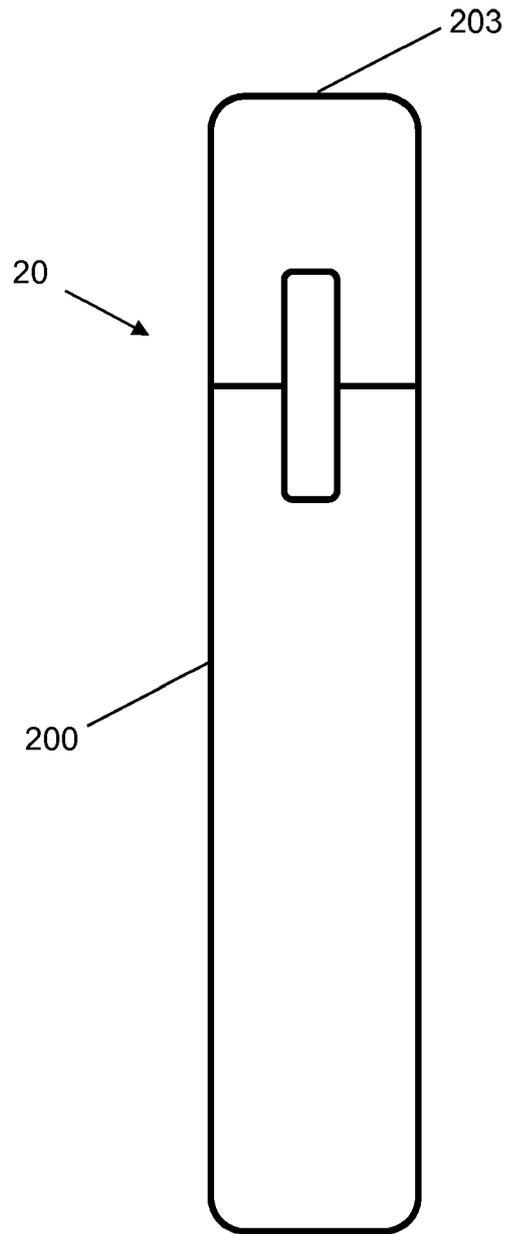


Fig. 2B





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Application Number  
EP 19 21 1470

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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			A24F A61M
Place of search		Date of completion of the search	Examiner
Munich		27 April 2020	Klintebäck, Daniel
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X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	

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