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(54) **SMOKING SUBSTITUTE APPARATUS**

RAUCHERSATZVORRICHTUNG

APPAREIL DE SUBSTITUTION AU TABAC

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(56) References cited:
EP-A2- 2 961 285
US-A1- 2013 074 857
US-A1- 2014 166 029

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Description

Field of the Invention

[0001] The present invention relates to a substitute smoking apparatus and, in particular, a smoking substitute apparatus that is able to deliver flavour to a user.

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 byproducts. 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 include electronic systems that permit a user to simulate the act of smoking by producing an aerosol (also referred to as a "vapour") that is drawn into the lungs through the mouth (inhaled) and then exhaled. The inhaled aerosol typically bears nicotine and/or a flavourant 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 with combustible 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. There are a number of different categories of smoking substitute systems, each utilising a different smoking substitute approach.

[0008] One approach 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 device (referred to herein as an electronic cigarette or "e-cigarette" device) 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 a flavourant. The resulting vapour therefore also typically contains nicotine and/or a flavourant. The base liquid may include propylene glycol and/or vegetable glycerine.

[0009] A typical e-cigarette device includes a mouthpiece, a power source (typically a battery), a tank for containing e-liquid, as well as a heating device. In use, electrical energy is supplied from the power source to the heating device, which heats the e-liquid to produce an aerosol (or "vapour") which is inhaled by a user through the mouthpiece.

[0010] E-cigarettes 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 prefilled 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 main body which includes the power source, wherein the main body is configured to be physically and electrically coupled to a consumable including the tank and the heating element. In this way, when the tank of a consumable has been emptied, that consumable is disposed of. The main body 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.

[0011] 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 device can be used multiple times.

[0012] An example vaping smoking substitute system is the myblu™ e-cigarette. The myblu™ e-cigarette is a closed system which includes a main body and a consumable. The main body and consumable are physically and electrically coupled together by pushing the consumable into the main body. The main body includes a rechargeable battery. The consumable includes a mouthpiece, a sealed tank which contains e-liquid, as well as a heater, which for this device 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 microprocessor on board the main body detects a user inhaling through the mouthpiece. When the device is activated, electrical energy is supplied from the power source to the heating device, which heats e-liquid from the tank to produce a vapour which is inhaled by a user through the mouthpiece.

[0013] 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 so-called "vaping" approach, e-liquid is heated by a heating device to produce an aerosol vapour which is inhaled by a user. Many e-cigarettes also deliver flavour to the user to enhance the experience. In such e-cigarettes, flavour compounds are contained in the e-liquid that is heated. However, toxicology restrictions are placed on the amount of flavour that can be contained in the e-liquid, and this can result in some e-liquid flavours delivering a weak and underwhelming taste sensation to consumers in the pursuit of safety.

[0014] US 2013/074857 A1 describes an inhaler com-

ponent comprising: a housing with a housing cover; a mouthpiece with a mouthpiece opening for the supply of an inhalable medium into the oral cavity of a user; a flavour reservoir capable of communicating with the environment by diffusion, containing a flavouring, for the release of the flavouring into the environment and for the olfactory perception of the same by the user.

[0015] There may be a need for improved design of smoking substitute systems, in particular in regards to the delivery of flavour to a user.

[0016] The present disclosure has been devised in the light of the above considerations.

Summary of the Invention

[0017] At its most general, the present invention relates to a smoking substitute apparatus including separate first and second airflows respectively directed past an aerosol generator and a flavour delivery portion.

[0018] According to a first aspect there is provided a smoking substitute apparatus comprising: a first passage for flow of an aerosol; a second passage comprising a flavour delivery portion; and a mouthpiece in fluid communication with the first and second passages; wherein the first and second passages are arranged such that upon inhalation from the mouthpiece aerosol is drawn to the mouthpiece through the first passage, and upon exhalation into the mouthpiece air from the mouthpiece is directed through the second passage and past the flavour delivery portion.

[0019] The separation of the flavour delivery portion and the aerosol flow may allow e.g. e-liquid (in aerosol form) and the flavourant to be delivered separately to a user. This may provide versatility in how the flavour is delivered to the user and, for example, what form it make take (both when delivered and pre-delivery).

[0020] The smoking substitute apparatus may be in the form of a consumable. The consumable may be configured for engagement with a main body (i.e. so as to form a closed substitute smoking system). For example, the consumable may comprise components of the system that are disposable, and the main body may comprise non-disposable or non consumable components (e.g. power supply, controller, sensor, etc.) that facilitate the delivery of aerosol by the consumable. In such an embodiment, an aerosol former (e.g. e-liquid) may be replenished by replacing a used consumable with an unused consumable.

[0021] Alternatively, the smoking substitute apparatus may be a non-consumable device (e.g. that is in the form of an open substitute smoking system). In such embodiments an aerosol former (e.g. e-liquid) of the system may be replenished by re-filling the device with the aerosol former (rather than replacing a consumable component of the device).

[0022] The smoking substitute apparatus may comprise a reservoir configured to store an aerosol former, such as an e-liquid. The e-liquid may, for example, comprise a base liquid and nicotine. The base liquid may include propylene glycol and/or vegetable glycerine. The e-liquid may be flavourless. That is, the e-liquid may not contain any flavourants and may consist solely of a base liquid of propylene glycol and/or vegetable glycerine and nicotine.

[0023] The reservoir may be in the form of a tank. At least a portion of the tank may be translucent. For example, the tank may comprise a window to allow a user to visually assess the quantity of e-liquid in the tank. A housing of the smoking substitute apparatus may comprise a corresponding aperture (or slot) or window that may be aligned with a translucent portion (e.g. window) of the tank. The reservoir may be referred to as a "clearomizer" if it includes a window, or a "cartomizer" if it does not.

[0024] The first passage may be at least partially defined by the tank. The tank may substantially (or fully) define the first passage. In this respect, the tank may surround the passage.

[0025] The first passage may comprise an aerosol generator. The aerosol generator may comprise a wick and a heater. The wick may comprise a porous material. A portion of the wick may be exposed to an airflow in the first passage. The wick may also comprise one or more portions in contact with liquid stored in the reservoir. For example, opposing ends of the wick may protrude into the reservoir and a central portion (between the ends) may extend across the first passage so as to be exposed to air flow in the first passage. Thus, air may be drawn (e.g. by capillary action) along the wick, from the reservoir to the exposed portion of the wick.

[0026] 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 tank) to be heated so as to form a vapour and become entrained in fluid flowing through the first passage. This vapour may subsequently cool to form an aerosol in the passage.

[0027] In other embodiments the heater may be separate to the wick. For example, when the smoking substitute apparatus is a consumable, a main body (to which the consumable may be engaged) may comprise the heater. In such an embodiment, the heater may come into contact, or into proximity with, the wick when the consumable is engaged with the main body (i.e. so as to heat the wick during operation).

[0028] The smoking substitute apparatus may comprise a flow diverter. The flow diverter may be in the form of a valve. The flow diverter may be in the form of a directional control valve. The flow diverter may be movable to divert flow between the first and second passages. The flow diverter may be movable between a first position

in which airflow between the aerosol generator and the mouthpiece is permitted, and a second position in which airflow between the aerosol generator and the mouthpiece is restricted. In the second position the flow diverter may prevent (or substantially prevent) airflow between the aerosol generator and the mouthpiece. In this respect, in the second position the flow diverter may substantially obstruct the first passage (i.e. at a location between the aerosol generator and the mouthpiece).

[0029] In the second position airflow between the mouthpiece and the flavour delivery portion may be permitted. In the second position the flow diverter may divert airflow received from the mouthpiece to the second passage (i.e. and past the flavour delivery portion).

[0030] In the first position the flow diverter may restrict airflow between the mouthpiece and the flavour delivery portion. In the first position the flow diverter may prevent (or substantially prevent) airflow between the mouthpiece and the flavour delivery portion. Similarly, in the first position the flow diverter may restrict, prevent (or substantially prevent) airflow between the aerosol generator and the flavour delivery portion (when the aerosol generator and flavour delivery portion are in fluid communication).

[0031] The flow diverter may be hingeably mounted. The fluid diverter may be mounted to a wall of the first or second passage. In the first position the fluid diverter may extend from its mounting towards the mouthpiece so as to obstruct the inlet of the second passage. The flow diverter may be biased towards the first position. The flow diverter may be biased by, for example, a spring. The flow diverter may alternatively be biased towards the second position.

[0032] The flow diverter may alternatively comprise a combination of one-way valves (e.g. duckbill valves). For example, one valve may be provided for allowing flow past the aerosol generator in a single direction (e.g. an inhale direction) and another may be provided for allowing flow past the flavour delivery portion in a single direction (e.g. an exhale direction).

[0033] The flow diverter may be configured to be moved between the first and second positions by exhalation and/or inhalation (i.e. by a user) at the mouthpiece.

[0034] The flow diverter may be configured to be moved from the first position to the second position by exhalation into the mouthpiece. That is, a pressure differential across at least a portion of the flow diverter (due to exhalation into the mouthpiece) may cause the flow diverter to move from the first position to the second position.

[0035] The flow diverter may be configured to be moved from the second position to the first position by an inhalation from the mouthpiece. That is, a pressure differential across at least a portion of the flow diverter (due to an inhalation from the mouthpiece) may cause movement of the flow diverter from the second position to the first position.

[0036] The flow diverter may comprise an actuator configured to move the flow diverter between the first and second positions. The actuator may be configured to move the flow diverter between the first and second positions in response to a control signal from a controller (e.g. comprising a microprocessor). The actuator may be configured to move the flow diverter from the first position to the second position in response to an exhalation into the mouthpiece. The actuator may be configured to move the flow diverter from the second position to the first position in response to an inhalation from the mouthpiece. For example, the actuator may be configured to move the flow diverter in response to the detection (e.g. by a sensor) of an inhalation or exhalation at the mouthpiece.

[0037] The first passage may extend between an inlet and an opposing mouthpiece opening of the mouthpiece (for inhalation/exhalation by a user). The first passage may be elongate and substantially linear so as to define a longitudinal axis. Where the smoking substitute apparatus is a consumable the first passage may extend from the mouthpiece at one end of the consumable to an opposing end of the consumable. This opposing end may be configured for engagement with a main body. When engaged in this way, the first passage may be in fluid communication with one or more further passages (e.g. defined between the consumable and the main body when engaged) so as to allow air to be drawn into the inlet of the first passage.

[0038] The second passage may comprise an outlet. The outlet may be arranged to discharge an airflow (i.e. a flavoured airflow) towards a user's nose (i.e. nasal cavity) upon exhalation into the mouthpiece. The outlet may be arranged discharge an airflow in a direction that is at an angle with respect to the longitudinal axis of the first passage. The outlet may be spaced from the mouthpiece. That is, the outlet may not form part of the mouthpiece and, as such, may remain unobstructed when a user inhales and/or exhales at the mouthpiece. The outlet may be formed in an in use upper surface of the device.

[0039] The second passage may be connected to the first passage. The second passage may branch from the first passage. Thus, the second passage may comprise an inlet arranged to receive an airflow from the first passage. The inlet of the second passage may be located (axially) between the mouthpiece and the aerosol generator. The second passage may extend generally laterally from the first passage. The second passage may follow a generally curved profile. The fluid diverter may be located (axially) between the inlet of the second passage and the aerosol generator.

[0040] The flavour delivery portion may comprise a sintered polymer, a ceramic matrix, an open-cell foam and/or a cotton-based fibrous media. The flavourant may be deposited on one or more surfaces of the flavour delivery portion. Alternatively or additionally, the flavour delivery portion may be impregnated with flavourant. The flavour delivery portion may comprise a channel (i.e. a pre-formed channel) through which air may flow. The channel may be the second passage, or may form part

of the second passage. The channel may follow e.g. a linear, angular, helical or curved profile.

[0041] The flavourant may be in e.g. liquid or powder form. The term "flavourant" is used to describe a compound or combination of compounds that provide flavour and/or aroma. For example, the flavourant may be configured to interact with a sensory receptor of a user (such as an olfactory or taste receptor). The flavourant may include one or more volatile substances.

[0042] The flavourant may be natural or synthetic. For example, the flavourant may include menthol, liquorice, chocolate, fruit flavour (including e.g. citrus, cherry etc.), vanilla, spice (e.g. ginger, cinnamon) and tobacco flavour. The flavourant may dispersed throughout e.g. a base fluid. The flavourant may be evenly dispersed or may be provided in isolated locations and/or varying concentrations.

[0043] Where the smoking substitute apparatus is in the form consumable, the consumable may be configured to be physically coupled with a main body. For example, the consumable may be at least partially received in a recess of the main body, such that there is an interference fit between the main body and the consumable. Alternatively, the main body and the consumable may be physically coupled together by screwing one onto the other, or through a bayonet fitting.

[0044] The smoking substitute apparatus (or main body for engagement with the device) may comprise a power source. The power source may be electrically connected (or connectable) to a heater of the smoking substitute apparatus. The power source may be a battery (e.g. a rechargeable battery). A connector in the form of e.g. a USB port may be provided for recharging this battery.

[0045] When the smoking substitute apparatus is in the form of a consumable, the smoking substitute apparatus may comprise an electrical interface for interfacing with a corresponding electrical interface of the main body. One or both of the electrical interfaces may include one or more electrical contacts. Thus, when the main body is engaged with the consumable, the electrical interface may be configured to transfer electrical power from the power source to a heater of the consumable.

[0046] The electrical interface may also be used to identify the smoking substitute apparatus (in the form of a consumable) from a list of known types. For example, the consumable may comprise a certain concentration of nicotine and the electrical interface may be used to identify this. The electrical interface may additionally or alternatively be used to identify when a consumable is connected to the main body. The electrical interface may be used for identifying a flavour associated with the flavour delivery portion.

[0047] Again, where the smoking substitute apparatus is in the form of a consumable, the main body may comprise a further interface, which may, for example, be in the form of an RFID reader, a barcode or QR code reader. This interface may be able to identify a characteristic (e.g. a type) of a consumable engaged with the main body. In this respect, the consumable 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 electronic interface in the main body. Again, this interface may provide the main body with an indication of the flavour associated with the flavour delivery portion.

[0048] The controller (which may form part of the smoking substitute apparatus or a main body engaged with the smoking substitute apparatus) may be configured to control the supply of power from the power source to the heater of the smoking substitute apparatus (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.

[0049] The main body or smoking substitute apparatus 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.

[0050] A puff sensor may be provided that is configured to detect a puff (i.e. inhalation from a user). The puff 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 puff sensor may, for example, be in the form of a pressure sensor or an acoustic sensor. That is, the controller may control power supply to the heater of the consumable in response to a puff detection by the sensor. The control may be in the form of activation of the heater in response to a detected puff. That is, the smoking substitute apparatus may be configured to be activated when a puff is detected by the puff sensor. When the smoking substitute apparatus is in the form of a consumable, the puff sensor may form part of the consumable or the main body.

[0051] An inhale/exhale sensor (or plurality of sensors) may be provided that is configured to detect an inhale or exhale is received at the mouthpiece. This sensor may be able to differentiate between an inhale and an exhale. The sensor may be operatively connected to the controller so as to provide a signal to the controller indicative of an inhale and/or exhale at the mouthpiece. The controller may control the fluid diverter in response to this signal. When the smoking substitute apparatus is in the form of a consumable, the puff sensor may form part of the consumable or the main body.

[0052] The smoking substitute apparatus may further comprise a user interface (UI). The UI may comprise a button, touchscreen, switch, etc. When the smoking substitute apparatus is in the form of a consumable, the UI may form part of the consumable or a main body for engagement with the consumable may comprise a UI.

[0053] 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

[0054] So that the invention may be understood, and so that further aspects and features thereof may be appreciated, embodiments illustrating the principles of the invention will now be discussed in further detail with reference to the accompanying figures, in which:

Figure 1A is a front view of a smoking substitute system, according to a first embodiment, in an engaged position;

Figure 1B is a front view of smoking substitute system of the first embodiment in a disengaged position;

Figure 1C is a section view of a smoking substitute apparatus of the first embodiment in a first position; and

Figure 1D is a section view of a smoking substitute apparatus of the first embodiment in a second position.

Detailed Description of the Invention

[0055] Aspects and embodiments of the present invention will now be discussed with reference to the accompanying figures.

[0056] Figures 1A and 1B illustrate a smoking substitute system in the form of an e-cigarette system 101. The system 101 comprises a main body 102 (i.e. an e-cigarette device) of the system 101, and a smoking substitute apparatus in the form of an e-cigarette consumable (or "pod") 103. In the illustrated embodiment the consumable 103 (smoking substitute apparatus) is removable from the main body (e-cigarette), so as to be a replaceable component of the system 101. In other words, the e-cigarette system 101 is a closed system.

[0057] As is apparent from Figures 1A and 1B, the consumable 103 is configured to engage the main body 102. Figure 1A shows the main body 102 and the consumable 103 in an engaged state, whilst Figure 1B shows the main body 102 and the consumable 103 in a disengaged state. When engaged, a portion of the consumable 103 is received in a cavity of the main body 102 and is retained in the engaged position by way of a snap-engagement mechanism. In other embodiments, the main body 102 and consumable 103 may be engaged by screwing one into (or onto) the other, through a bayonet fitting, or by way of an interference fit.

[0058] The system 101 is configured to vaporise an aerosol-former, which in the illustrated embodiment, is in the form of a nicotine-based e-liquid 104. The e-liquid 104 comprises nicotine and a base liquid including propylene glycol and/or vegetable glycerine. In the present embodiment, the e-liquid 104 is flavourless (and does not include any added flavourant). That is, if the e-liquid 104 were to be inhaled (i.e. in aerosol form) by a user, it would not have a particularly perceptible flavour or taste.

[0059] As is more apparent from Figures 1C and 1D, this e-liquid 104 is stored within a reservoir in the form of a tank 105 that forms part of the consumable 103. In the illustrated embodiment, the consumable 103 is a "single-use" consumable 103. That is, upon exhausting the e-liquid 104 in the tank 105, the intention is that the user disposes of the entire consumable 103. In other embodiments, the e-liquid (i.e. aerosol former) may be the only part of the system that is truly "single-use". That is, the tank may be refillable with e-liquid or the e-liquid may be stored in a non-consumable component of the system. For example, the e-liquid may be stored in a tank located in the device or stored in another component that is itself not single-use (e.g. a refillable cartomizer).

[0060] The tank 105 surrounds, and thus defines a portion of, a first passage 106 that extends between an inlet 107 and a mouthpiece opening 108 at opposing ends of the consumable 103. In this respect, the first passage comprises an upstream end at the end of the consumable that engages with the main body 102, and a downstream end 108 at an opposing end of the consumable 103, which defines a mouthpiece 109 (comprising the mouthpiece opening 108) of the system 101. When the consumable 103 is engaged with the main body 102, a user can inhale (i.e. take a puff) via the mouthpiece 109 so as to draw air through the first passage 106, and so as to form an airflow (indicated by arrows in Figure 1C) in a direction from the inlet 107 to the mouthpiece opening 108 of the first passage 106. Although not illustrated, the first passage 106 may be at least partly defined by a tube (e.g. a metal tube) extending through the consumable 103.

[0061] The smoking substitute system 101 is configured to vaporise the e-liquid 104 (and subsequently aerosolise the e-liquid) for inhalation by a user. To provide this, the consumable 103 comprises a heater having of a porous wick 110 and a resistive heating element in the form of a heating filament 111 that is helically wound around a portion of the porous wick 110. The porous wick 110 extends across the first passage 106 (i.e. transverse to a longitudinal axis of the first passage106) and opposing ends of the wick 110 extend into the tank 105 (so as to be submerged in the e-liquid 104). In this way, e-liquid 104 contained in the tank 105 is conveyed from the opposing ends of the porous wick 110 to a central portion of the porous wick 110 so as to be exposed to the airflow in the first passage 106 (i.e. caused by a user inhaling).

[0062] The helical filament 111 is wound about this exposed central portion of the porous wick 110 and is electrically connected to an electrical interface in the form of electrical contacts 112 mounted at the end of the consumable that is proximate the main body 102 (when en-

gaged). When the consumable 103 is engaged with the main body 102, the electrical contacts 112 contact corresponding electrical contacts (not shown) of the main body 102. The main body electrical contacts are electrically connected to a power source (not shown) of the main body 102, such that (in the engaged position) the filament 111 is electrically connected to the power source. In this way, power can be supplied by the main body 102 to the filament 111 in order to heat the filament 111. This heat is transferred from the filament 111 to the porous wick 110 which causes e-liquid 104 conveyed by the porous wick 110 to increase in temperature to a point at which it vaporises. The vaporised e-liquid becomes entrained in the airflow and, between the vaporisation point at the filament 111 and the mouthpiece opening 108 of the first passage 106, condenses to form an aerosol. This aerosol is then inhaled, via the mouthpiece 109, by a user of the system 101.

[0063] The power source of the main body 102 may be in the form of a battery (e.g. a rechargeable battery). The main body 102 may comprise a connector in the form of e.g. a USB port for recharging this battery. The main body 102 may also comprise a controller that controls supply of power from the power source to the main body electrical contacts (and thus to the filament 111). That, is the controller may be configured to control a voltage applied across the main body electrical contacts, and thus the voltage applied across the filament 111. In this way, the filament 111 may only be heated under certain conditions (e.g. during a puff and/or only when the system is in an active state). In this respect, the main body 102 may include a puff sensor (not shown) that is configured to detect a puff (i.e. inhalation). The puff sensor may be operatively connected to the controller so as to be able to provide a signal, to the controller, which is indicative of a puff state (i.e. puffing or not puffing).

[0064] The consumable 103 further comprises a second passage 113. The second passage comprises a flavour delivery portion 114 in fluid communication (i.e. via the second passage 113) with the mouthpiece 109 and, in particular, with the mouthpiece opening 108 of the mouthpiece 109. The flavour delivery portion 114 may comprise a sintered polymer, a ceramic matrix, an open-cell foam and/or a cotton-based fibrous media. Flavourant may be deposited on one or more surfaces of the flavour delivery portion 110. Alternatively or additionally, the flavour delivery portion 110 may be impregnated with flavourant. In the illustrated embodiment the flavour delivery portion 110 comprises a channel that forms part of the second passage 113.

[0065] The flavourant may be provided in solid or liquid form. It may include menthol, liquorice, chocolate, fruit flavour (including e.g. citrus, cherry etc.), vanilla, spice (e.g. ginger, cinnamon) and tobacco flavour. The flavourant may be evenly dispersed or may be provided in isolated locations and/or varying concentrations.

[0066] The second passage 113 comprises an outlet 115 that, as will be described further below, is arranged to discharge an airflow (i.e. a flavoured airflow) towards a user's nose (i.e. nasal cavity) upon exhalation into the mouthpiece 109. In particular, the outlet 115 is formed in an in use upper surface 116 of the consumable 103 and is arranged so as to discharge an airflow (as depicted with arrows in Figure 1D) in a direction that is at an angle with respect to a longitudinal axis of the first passage 106. The outlet 115 is spaced from the mouthpiece 109 such that it does not form part of the mouthpiece 109 and, as such, may remain unobstructed when a user inhales or exhales at the mouthpiece 109.

[0067] The second passage 113 is connected to, and branches from, the first passage 106. Thus, the second 113 passage comprises an inlet 117 arranged to receive an airflow from the first passage 106 (as is shown in Figure 1D) and that is located axially between the mouthpiece 109 and the wick 110. The second passage 113 extends generally laterally from the first passage 106 and follows a generally curved profile. In particular, this curved profile is such that an airflow entering the mouthpiece opening 108 and passing into the second passage 113 is gradually redirected from flowing in an axial direction (i.e. parallel to the longitudinal axis of the first passage 106) to a lateral direction (i.e. perpendicular to the axial direction).

[0068] As is apparent from a review of Figures 1C and 1D, the first 106 and second 113 passages are arranged such that upon inhalation from the mouthpiece 109 (i.e. through the mouthpiece opening 108) air flows past the wick 110 to the mouthpiece opening 108. Further, upon exhalation into the mouthpiece opening 108 air flows from the mouthpiece 109 and past the flavour delivery portion 114. In this way, flavourant of the flavour delivery portion 114 may be entrained in the air flowing past the flavour delivery portion 114. This flavoured airflow may then be discharged from the outlet 115 of the second passage 113 towards a user's nasal cavity. Thus, exhalation by a user leads to the user smelling the flavoured (or scented) air. If an exhalation is performed prior to an inhalation, the flavour or aroma of the flavoured air may be smelled by a user prior to and during the inhalation. This may alter a user's overall experience during the inhalation.

[0069] In order to provide different inhalation and exhalation flow paths, the illustrated embodiment comprises a flow diverter 118. The flow diverter is movable between a first position (shown in Figure 1C) and a second position (shown in Figure 1D). In the first position airflow from the wick 110 to the mouthpiece 109 is permitted (i.e. such that air can be inhaled through the mouthpiece opening 108 by a user), whilst airflow from the mouthpiece 109 to the flavour delivery portion 114 is prevented. In the second position airflow between the wick 110 and the mouthpiece 109 is prevented, whilst airflow from the mouthpiece 109 to the flavour delivery portion 114 is permitted.

[0070] The flow diverter 118 is hingably mounted to a wall of the first passage 106 at the side of the second

passage inlet 117 that is closer to the wick 110. In this way, in the first position the flow diverter 118 extends from its hingable mounting towards the mouthpiece opening 108 so as to extend across (and obstruct) the second passage inlet 117. In the second position, the flow diverter 118 extends diagonally across the first passage 106 so as to obstruct the first passage 106. The angle of the flow diverter 118 with respect to the longitudinal axis of the first passage 106 facilitates flow of air from the first passage 106 into the second passage 113 (through the second passage inlet 117). Whilst not shown, the flow diverter 118 may be biased to the first or second position.

[0071] The flow diverter 118 may be configured to be moved between the first and second positions by exhalation and/or inhalation (i.e. by a user) at the mouthpiece. For example, the flow diverter 118 may be configured to be moved from the first position to the second position by exhalation into the mouthpiece opening 108 of the mouthpiece 109 and/or may be configured to be moved from the second position to the first position by an inhalation from the mouthpiece 109.

[0072] The flow diverter 118 may alternatively or additionally comprise an actuator configured to move the flow diverter 118 between the first and second positions. The actuator may be configured to move the flow diverter 118 between the first and second positions in response to a control signal from the controller. For example, the actuator may be configured to move the flow diverter 118 in response to the detection (e.g. by a sensor) of an inhalation or exhalation at the mouthpiece.

[0073] Although not shown, the main body 102 and consumable 103 may comprise a further interface which may, for example, be in the form of an RFID reader, a barcode or QR code reader. This interface may be able to identify a characteristic (e.g. a type) of a consumable 103 engaged with the main body 102. In this respect, the consumable 103 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. For example, the interface may allow the detection of the flavour associated with the flavour delivery portion 114. The controller may control e.g. the power supply in response to the detected flavour.

[0074] 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.

[0075] Any section headings used herein are for organizational purposes only and are not to be construed as limiting the subject matter described.

[0076] 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.

[0077] 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%.

[0078] 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 claims.

Claims

1. A smoking substitute apparatus (101) comprising:

   a first passage (106) for flow of an aerosol;
   a second passage (113) comprising a flavour delivery portion (114); and
   a mouthpiece (109) in fluid communication with the first (106) and second (113) passages;
   characterised in that the first (106) and second (113) passages are arranged such that upon inhalation from the mouthpiece (109) aerosol is drawn to the mouthpiece (109) through the first passage (106), and upon exhalation into the mouthpiece (109) air from the mouthpiece (109) is directed through the second passage (113) and past the flavour delivery portion (114).

2. A smoking substitute system according to claim 1 wherein the first passage (106) comprises an aerosol generator (110).

3. A smoking substitute apparatus according to claim 1 or 2 comprising a flow diverter (118) movable between:

   a first position in which flow between the aerosol generator (110) and the mouthpiece (109) is permitted; and
   a second position in which flow between the mouthpiece (109) and the aerosol generator (110) is restricted; wherein optionally, in the sec-

ond position, airflow between the mouthpiece (109) and the flavour delivery portion (114) is permitted.

4. A smoking substitute apparatus according to claim 3 wherein, in the second position, the flow diverter (118) diverts airflow received from the mouthpiece (109) to the second passage (113).

5. A smoking substitute apparatus according to claim 3 or 4 wherein, in the first position, the flow diverter (118) restricts airflow between the mouthpiece (109) and the flavour delivery portion (114).

6. A smoking substitute apparatus according to any one of claims 3 to 5 wherein the flow diverter (118) is biased towards the first position; or wherein the flow diverter (118) is biased towards the second position.

7. A smoking substitute apparatus according to any one of claims 3 to 5 wherein the flow diverter (118) is configured to be moved from the first position to the second position by an exhalation into the mouthpiece (109); and/or wherein the flow diverter (118) is configured to be moved from the second position to the first position by an inhalation from the mouthpiece (109).

8. A smoking substitute apparatus according to any one of claim 3 to 6 wherein the flow diverter (118) comprises an actuator configured to move the flow diverter (118) between the first and second positions; wherein the actuator is optionally configured to move the flow diverter (118) between the first and second positions in response to a control signal from a controller.

9. A smoking substitute apparatus according to claim 8 wherein the actuator is configured to move the flow diverter (118) from the first position to the second position in response to an exhalation into the mouthpiece; and/or wherein the actuator is configured to move the flow diverter (118) from the second position to the first position in response to an inhalation from the mouthpiece (109).

10. A smoking substitute apparatus according to any one of the preceding claims wherein the first passage (106) extends between an inlet (107) and an opposing mouthpiece opening (108) of the mouthpiece (109).

11. A smoking substitute apparatus according to any one of the preceding claims wherein the second passage (113) comprises an outlet (115) arranged to discharge an airflow towards a user's nose upon exhalation into the mouthpiece (109).

12. A smoking substitute apparatus according to any one of the preceding claims wherein the second passage (113) branches from the first passage (106).

13. A smoking substitute apparatus according to any one of the preceding claims wherein the flavour delivery portion (114) comprises one or more of sintered polymer, a ceramic matrix, an open-cell foam or a cotton-based fibrous media.

14. A smoking substitute apparatus according to any one of the preceding claims wherein the flavour delivery portion (114) is coated with or impregnated with a flavourant.

15. A smoking substitute apparatus according to any one of the preceding claims that is in the form of a consumable (103) for a smoking substitute device.

Patentansprüche

1. Rauchersatzvorrichtung (101), umfassend:

einen ersten Durchlass (106) für das Durchströmen eines Aerosols;
einen zweiten Durchlass (113), der einen Aromaabgabeabschnitt (114) umfasst; und
ein Mundstück (109) in Fluidkommunikation mit dem ersten (106) und zweiten (113) Durchlass;
dadurch gekennzeichnet, dass der erste (106) und zweite (113) Durchlass so angeordnet sind, dass beim Inhalieren durch das Mundstück (109) Aerosol durch den ersten Durchlass (106) in das Mundstück (109) gezogen wird und beim Exhalieren in das Mundstück (109) Luft aus dem Mundstück (109) durch den zweiten Durchlass (113) und am Aromaabgabeabschnitt (114) vorbeigeleitet wird.

2. Rauchersatzsystem nach Anspruch 1, wobei der erste Durchlass (106) einen Aerosolgenerator (110) umfasst.

3. Rauchersatzvorrichtung nach Anspruch 1 oder 2, das einen Strömungsverteiler (118) umfasst, der zwischen

einer ersten Stellung, in der ein Strom zwischen dem Aerosolgenerator (110) und dem Mundstück (109) ermöglicht wird; und
einer zweiten Stellung, in der der Strom zwischen dem Mundstück (109) und dem Aerosolgenerator (110) eingeschränkt wird, bewegbar ist; wobei in der zweiten Stellung ein Luftstrom zwischen dem Mundstück (109) und dem Aromaabgabeabschnitt (114) ermöglicht wird.

4. Rauchersatzvorrichtung nach Anspruch 3, wobei in der zweiten Stellung der Strömungsverteiler (118) einen vom Mundstück (109) empfangenen Luftstrom zum zweiten Durchlass (113) umleitet.

5. Rauchersatzvorrichtung nach Anspruch 3 oder 4, wobei in der ersten Stellung der Strömungsverteiler (118) einen Luftstrom zwischen dem Mundstück (109) und dem Aromaabgabeabschnitt (114) einschränkt.

6. Rauchersatzvorrichtung nach einem der Ansprüche 3 bis 5, wobei der Strömungsverteiler (118) in die erste Position vorgespannt ist; oder wobei der Strömungsverteiler (118) in die zweite Stellung vorgespannt ist.

7. Rauchersatzvorrichtung nach einem der Ansprüche 3 bis 5, wobei der Strömungsverteiler (118) ausgelegt ist, um durch eine Exhalation in das Mundstück (109) von der ersten Stellung in die zweite Stellung bewegt zu werden; und/oder wobei der Strömungsverteiler (118) ausgelegt ist, um durch eine Inhalation durch das Mundstück (109) von der zweiten Stellung in die erste Stellung bewegt zu werden.

8. Rauchersatzvorrichtung nach einem der Ansprüche 3 bis 6, wobei der Strömungsverteiler (118) einen Aktuator umfasst, der ausgelegt ist, um den Strömungsverteiler (118) zwischen der ersten und zweiten Stellung zu bewegen; wobei der Aktuator gegebenenfalls ausgelegt ist, um den Strömungsverteiler (118) als Reaktion auf ein Steuersignal von einer Steuervorrichtung zwischen der ersten und der zweiten Position zu bewegen.

9. Rauchersatzvorrichtung nach Anspruch 8, wobei der Aktuator ausgelegt ist, um den Strömungsverteiler (118) als Reaktion auf eine Exhalation in das Mundstück von der ersten Stellung in die zweite Stellung zu bewegen; und/oder wobei der Aktuator ausgelegt ist, um den Strömungsverteiler (118) als Reaktion auf eine Inhalation durch das Mundstück (109) von der zweiten Stellung in die erste Stellung zu bewegen.

10. Rauchersatzvorrichtung nach einem der vorangegangenen Ansprüche, wobei sich der erste Durchlass (106) zwischen einem Einlass (107) und einer entgegengesetzten Mundstücköffnung (108) des Mundstücks (109) erstreckt.

11. Rauchersatzvorrichtung nach einem der vorangegangenen Ansprüche, wobei der zweite Durchlass (113) einen Auslass (115) umfasst, der angeordnet ist, um bei einer Exhalation in das Mundstück (109) einen Luftstrom zur Nase eines Benutzers hin abzugeben.

12. Rauchersatzvorrichtung nach einem der vorangegangenen Ansprüche, wobei der zweite Durchlass (113) vom ersten Durchlass (106) abzweigt.

13. Rauchersatzvorrichtung nach einem der vorangegangenen Ansprüche, wobei der Aromaabgabeabschnitt (114) eines oder mehrere aus einem gesinterten Polymer, einer Keramikmatrix, einem offenzelligen Schaum oder einem faserförmigen Medium auf Baumwollbasis umfasst.

14. Rauchersatzvorrichtung nach einem der vorangegangenen Ansprüche, wobei der Aromaabgabeabschnitt (114) mit einem Aromastoff beschichtet oder imprägniert ist.

15. Rauchersatzvorrichtung nach einem der vorangegangenen Ansprüche, der in Form eines Verbrauchsmaterials (103) für eine Rauchersatzvorrichtung vorliegt.

Revendications

1. Appareil à fumer de substitution (101) comprenant :

   un premier passage (106) pour l'écoulement d'un aérosol ;
   un second passage (113) comprenant une partie de distribution d'arôme (114) ; et
   un embout buccal (109) en communication fluidique avec les premier (106) et second (113) passages ;
   caractérisé en ce que les premier (106) et second (113) passages sont agencés de telle sorte que lors d'une inhalation depuis l'embout buccal (109), un aérosol est aspiré vers l'embout buccal (109) à travers le premier passage (106), et lors d'une expiration dans l'embout buccal (109), de l'air provenant de l'embout buccal (109) est dirigé à travers le second passage (113) et au-delà de la partie de distribution d'arôme (114).

2. Système à fumer de substitution selon la revendication 1, dans lequel le premier passage (106) comprend un générateur d'aérosol (110).

3. Appareil à fumer de substitution selon la revendication 1 ou 2, comprenant un dispositif de déviation d'écoulement (118) mobile entre :

   une première position dans laquelle un écoulement entre le générateur d'aérosol (110) et l'embout buccal (109) est autorisé ; et
   une seconde position dans laquelle un écoulement entre l'embout buccal (109) et le générateur d'aérosol (110) est limité ; dans lequel, facultativement, dans la seconde position, un

écoulement d'air entre l'embout buccal (109) et la partie de distribution d'arôme (114) est autorisé.

4. Appareil à fumer de substitution selon la revendication 3, dans lequel, dans la seconde position, le dispositif de déviation d'écoulement (118) dévie un écoulement d'air reçu depuis l'embout buccal (109) vers le second passage (113).

5. Appareil à fumer de substitution selon la revendication 3 ou 4, dans lequel, dans la première position, le dispositif de déviation d'écoulement (118) limite un écoulement d'air entre l'embout buccal (109) et la partie de distribution d'arôme (114).

6. Appareil à fumer de substitution selon l'une quelconque des revendications 3 à 5, dans lequel le dispositif de déviation d'écoulement (118) est sollicité vers la première position ; ou dans lequel le dispositif de déviation d'écoulement (118) est sollicité vers la seconde position.

7. Appareil à fumer de substitution selon l'une quelconque des revendications 3 à 5, dans lequel le dispositif de déviation d'écoulement (118) est configuré pour être déplacé de la première position à la seconde position par une expiration dans l'embout buccal (109) ; et/ou dans lequel le dispositif de déviation d'écoulement (118) est configuré pour être déplacé de la seconde position vers la première position par inhalation depuis l'embout buccal (109).

8. Appareil à fumer de substitution selon l'une quelconque des revendications 3 à 6, dans lequel le dispositif de déviation d'écoulement (118) comprend un actionneur configuré pour déplacer le dispositif de déviation d'écoulement (118) entre les première et seconde positions ; dans lequel l'actionneur est facultativement configuré pour déplacer le dispositif de déviation d'écoulement (118) entre les première et seconde positions en réponse à un signal de commande provenant d'un dispositif de commande.

9. Appareil à fumer de substitution selon la revendication 8, dans lequel l'actionneur est configuré pour déplacer le dispositif de déviation d'écoulement (118) de la première position à la seconde position en réponse à une expiration dans l'embout buccal ; et/ou dans lequel l'actionneur est configuré pour déplacer le dispositif de déviation d'écoulement (118) de la seconde position à la première position en réponse à une inhalation depuis l'embout buccal (109).

10. Appareil à fumer de substitution selon l'une quelconque des revendications précédentes, dans lequel le premier passage (106) s'étend entre une entrée (107) et une ouverture d'embout buccal opposée (108) de l'embout buccal (109).

11. Appareil à fumer de substitution selon l'une quelconque des revendications précédentes, dans lequel le second passage (113) comprend une sortie (115) agencée pour évacuer un écoulement d'air vers le nez d'un utilisateur lors d'une expiration dans l'embout buccal (109).

12. Appareil à fumer de substitution selon l'une quelconque des revendications précédentes, dans lequel le second passage (113) se ramifie à partir du premier passage (106).

13. Appareil à fumer de substitution selon l'une quelconque des revendications précédentes, dans lequel la partie de distribution d'arôme (114) comprend un ou plusieurs parmi un polymère fritté, une matrice de céramique, une mousse à cellules ouvertes ou un support fibreux à base de coton.

14. Appareil à fumer de substitution selon l'une quelconque des revendications précédentes, dans lequel la partie de distribution d'arôme (114) est revêtue ou imprégnée d'un agent aromatisant.

15. Appareil à fumer de substitution selon l'une quelconque des revendications précédentes, qui est sous la forme d'un produit consommable (103) pour un dispositif à fumer de substitution.

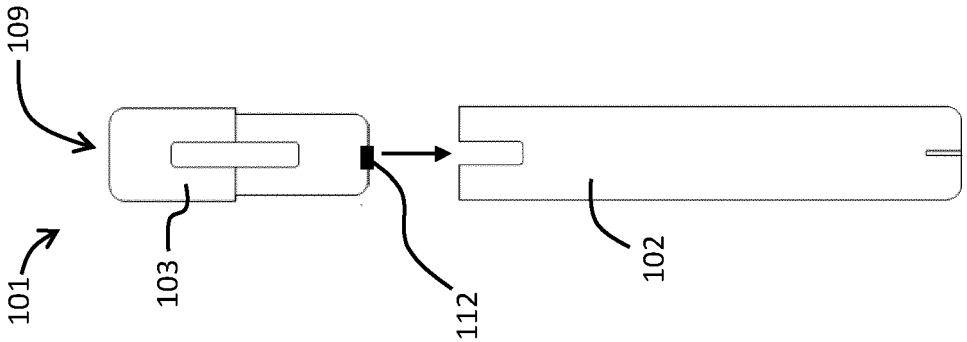

FIG 1B

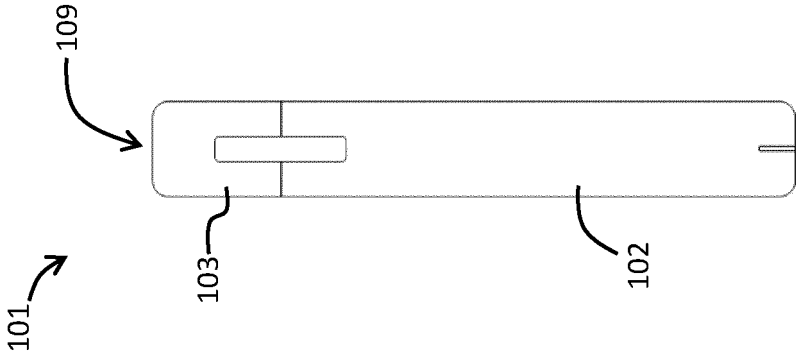

FIG 1A

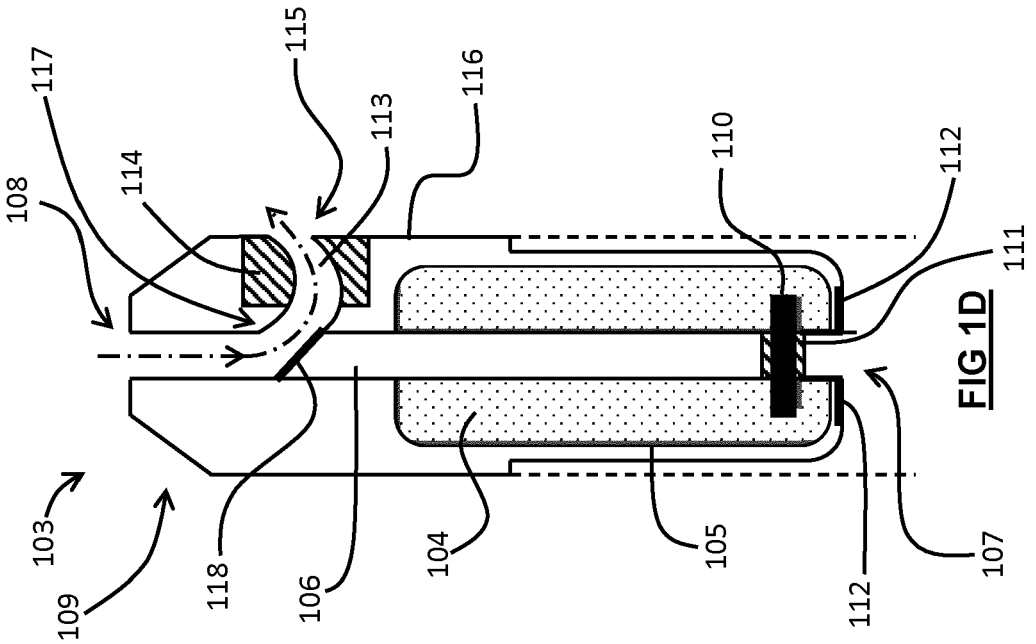
108
117
114
115
113
116
110
112
111
103
109
118
106
104
105
112
107

FIG 1D

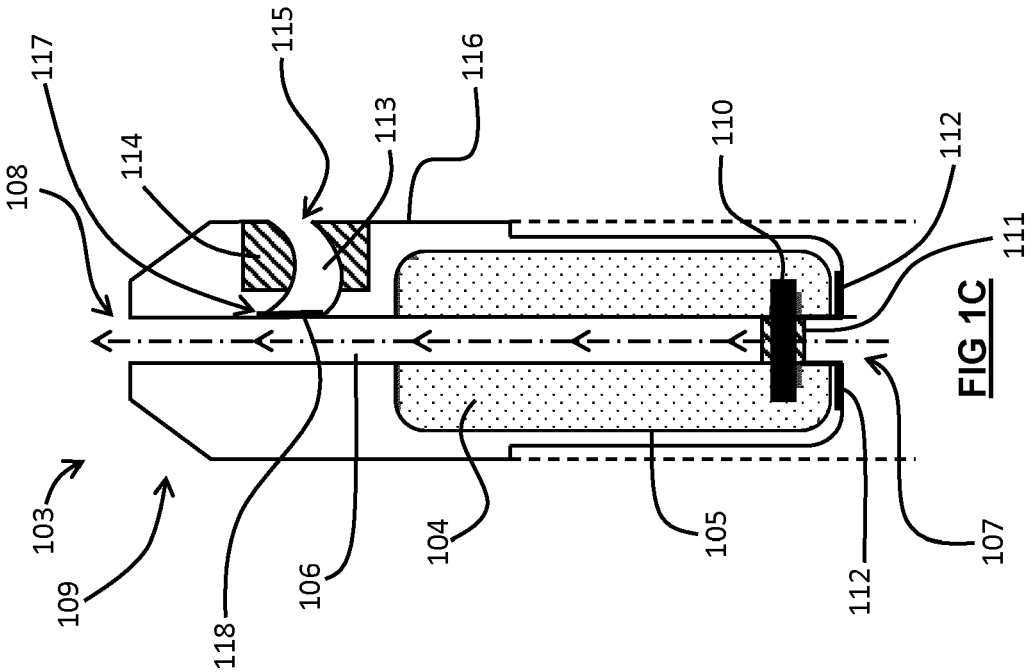
108
117
114
115
113
116
110
112
111
103
109
118
106
104
105
112
107

FIG 1C

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 2013074857 A1 **[0014]**