

(19)



(11)

EP 4 520 205 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
12.03.2025 Bulletin 2025/11

(51) International Patent Classification (IPC):
A24F 40/50^(2020.01) A24F 40/53^(2020.01)

(21) Application number: **23196058.4**

(52) Cooperative Patent Classification (CPC):
A24F 40/50; A24F 40/53; A24F 40/10; A24F 40/60

(22) Date of filing: **07.09.2023**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA
Designated Validation States:
KH MA MD TN

(71) Applicant: **IMPERIAL TOBACCO LIMITED**
Bristol BS3 2LL (GB)

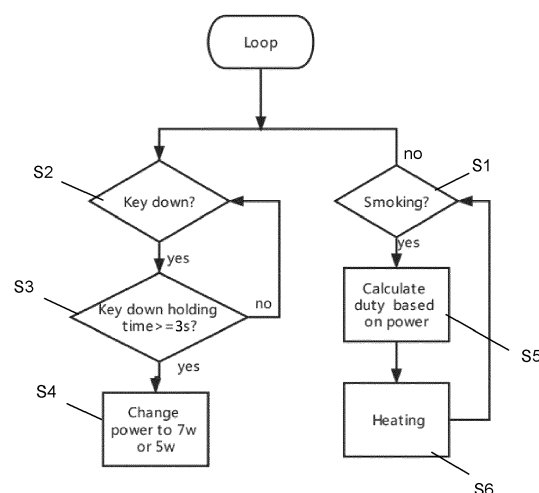
(72) Inventor: **The designation of the inventor has not yet been filed**

(74) Representative: **Mewburn Ellis LLP**
Aurora Building
Counterslip
Bristol BS1 6BX (GB)

(54) AEROSOL DELIVERY DEVICE WITH POWER CONTROL

(57) The present disclosure relates to an aerosol delivery device and system e.g. a smoking substitute device and system. In particular, an aerosol delivery device comprising a puff sensor configured to detect a user drawing an airflow through the device, a user input device for receiving a input from a user, a power supply, and a controller configured to control the supply of power from the power supply to an aerosol generator for generating an aerosol from a precursor, the controller further configured to switch between a first power mode and a

second power mode in response to receipt of a power change user input by the user input device, the controller configured to control the supply of a first power to the aerosol generator in the first power mode and a second power to the aerosol generator in the second power mode, wherein the second power is higher than the first power, and wherein the controller is configured to prevent switching between the first power mode and the second power mode in response to the puff sensor detecting a user drawing an airflow through the device.

**FIG 3****EP 4 520 205 A1**

Description

Technical field

[0001] The present disclosure relates to an aerosol delivery device and an aerosol delivery system such as a smoking substitute device/system.

Background

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

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

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

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

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

[0007] The popularity and use of smoking substitute systems has grown rapidly in the past few years. Some smoking substitute systems are designed to resemble a traditional cigarette and are cylindrical in form with a mouthpiece at one end. Other smoking substitute systems do not generally resemble a cigarette (for example, the smoking substitute device may have a generally box-like form).

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

[0009] One approach for a smoking substitute system is the so-called "vaping" approach, in which a vaporisable liquid, typically referred to (and referred to herein) as "e-liquid", is heated by a heater to produce an aerosol vapour which is inhaled by a user. An e-liquid typically

includes a base liquid as well as nicotine and/or flavourings. The resulting vapour therefore typically contains nicotine and/or flavourings. The base liquid may include propylene glycol and/or vegetable glycerine.

5 [0010] A typical vaping smoking substitute system includes a mouthpiece, a power source (typically a battery), a tank or liquid reservoir for containing e-liquid, as well as a heater. In use, electrical energy is supplied from the power source to the heater, which heats the e-liquid to
10 produce an aerosol (or "vapour") which is inhaled by a user through the mouthpiece.

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

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

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

[0014] Another example vaping smoking substitute system is the blu PRO™ e-cigarette. The blu PRO™ e cigarette is an open system which includes a device, a (refillable) tank, and a mouthpiece. The device and tank are physically and electrically coupled together by screwing one to the other. The mouthpiece and refillable tank are physically coupled together by screwing one into the other, and detaching the mouthpiece from the refillable tank allows the tank to be refilled with e-liquid. The system is activated by a button on the device. When the system is activated, electrical energy is supplied from
50

the power source to a vaporiser, which heats e-liquid from the tank to produce a vapour which is inhaled by a user through the mouthpiece.

[0015] An alternative to the "vaping" approach is the so-called Heated Tobacco ("HT") approach in which tobacco (rather than an e-liquid) is heated or warmed to release vapour. HT is also known as "heat not burn" ("HNB"). The tobacco may be leaf tobacco or reconstituted tobacco. In the HT approach the intention is that the tobacco is heated but not burned, i.e. the tobacco does not undergo combustion.

[0016] The heating, as opposed to burning, of the tobacco material is believed to cause fewer, or smaller quantities, of the more harmful compounds ordinarily produced during smoking. Consequently, the HT approach may reduce the odour and/or health risks that can arise through the burning, combustion and pyrolytic degradation of tobacco.

[0017] A typical HT smoking substitute system may include a device and a consumable component. The consumable component may include the tobacco material. The device and consumable component may be configured to be physically coupled together. In use, heat may be imparted to the tobacco material by a heating element of the device, wherein airflow through the tobacco material causes components in the tobacco material to be released as vapour. A vapour may also be formed from a carrier in the tobacco material (this carrier may for example include propylene glycol and/or vegetable glycerine) and additionally volatile compounds released from the tobacco. The released vapour may be entrained in the airflow drawn through the tobacco.

[0018] As the vapour passes through the consumable component (entrained in the airflow) from the location of vaporization to an outlet of the component (e.g. a mouthpiece), the vapour cools and condenses to form an aerosol for inhalation by the user. The aerosol may contain nicotine and/or flavour compounds.

[0019] A drawback with known smoking substitute systems is that they may lack safety features.

[0020] 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

[0021] According to a first aspect, there is provided an aerosol delivery system (e.g., a smoking substitute system) comprising a puff sensor configured to detect a user drawing an airflow through the system, an aerosol generator configured to generate an aerosol from a precursor, a user input device for receiving a input from a user, a power supply, and a controller configured to control the supply of power from the power supply to the aerosol generator, the controller further configured to switch between a first power mode and a second power mode in response to receipt of a power change user input by the user input device, the controller configured to control the

supply of a first power to the aerosol generator in the first power mode and a second power to the aerosol generator in the second power mode, wherein the second power is higher than the first power, and wherein the controller is configured to prevent switching between the first power mode and the second power mode in response to the puff sensor detecting a user drawing an airflow through the system.

[0022] In this way, the safety of the aerosol delivery system may be improved. For example, preventing switching between the first power mode and the second power mode in response to a user drawing an airflow through the system may prevent a user unexpectedly receiving more vapour than they are expecting (more vapour may be generated when the higher second power is supplied to the aerosol generator than when the lower first power is supplied) or receiving vapour at a higher temperature than they are expecting if a user makes an accidental power change user input.

[0023] Optional features will now be set out. These are applicable singly or in any combination with any aspect.

[0024] The controller controlling the supply of the first power to the aerosol generator in the first power mode may be referred to as the controller operating in the first power mode. The controller controlling the supply of the second power to the aerosol generator in the second power mode may be referred to as the controller operating in the second power mode.

[0025] Switching between the first power mode and the second power mode may mean switching from the first power mode to the second power mode and/or switching from the second power mode to the first power mode.

[0026] The controller being configured to prevent switching between the first and second power modes may mean that the controller does not switch between the first and second power modes, even upon receipt of a power change user input by the user input device. The controller being configured to prevent switching between the first and second power modes in response to the puff sensor detecting a user drawing an airflow through the system may mean that that the controller is configured to only switch between the first and second power modes if the puff sensor does not detect a user drawing airflow through the system.

[0027] The system may comprise an airflow path there-through, the airflow path extending from an air inlet to an outlet. The puff sensor will be within or in fluid communication with the airflow path. The airflow path may pass the aerosol generator between the air inlet and the outlet. The airflow path may comprise a first portion extending from the air inlet towards the aerosol generator. A second portion of the airflow path may pass the aerosol generator (e.g., over or around the aerosol generator) to a conduit that extends to the outlet (which may be in a mouthpiece portion). References to "downstream" in relation to the airflow path are intended to refer to the direction towards the outlet/mouthpiece portion. Thus the second portion of the airflow path is downstream of the first portion of the

airflow path. Conversely, references to "upstream" are intended to refer to the direction towards the air inlet. Thus the first portion of the airflow path (and the air inlet) is upstream of the second portion of the airflow path (and the outlet).

[0028] The controller being configured to switch between the first and second power modes in response to receipt of a power change user input by the user input device may include the controller being configured to determine whether the power change user input is received by the user input device. If the controller determines that the power change user input is received by the user input device, the controller may switch between the first and second power modes.

[0029] The user input device may be configured to send a user input signal to the controller when the user input device receives a user input.

[0030] The controller being configured to determine whether the power change user input is received by the user input device may include the controller being configured to determine whether a user input signal is received by the controller from the user input device. The controller being configured to determine whether the power change user input is received by the user input device may further include the controller being configured to determine from the user input signal a duration of a user input received by the user input device and to determine whether the duration of the user input is greater than or equal to a pre-determined duration. By determining that the duration of the user input is greater than or equal to a pre-determined duration, the controller may determine that the power change user input is received by the user input device.

[0031] The predetermined duration of the user input may be at least 1 second, for example at least 2 seconds or at least 3 seconds such as at least 4 seconds or at least 5 seconds. Advantageously, such predetermined durations may reduce the likelihood of a user accidentally switching between the first and second power modes or the first and second locked modes.

[0032] The controller may be configured to determine whether the puff sensor detects a user drawing airflow through the system. The controller may be configured to prevent switching between the first and second power modes in response to determining that the puff sensor detects a user drawing airflow through the system (e.g. along the airflow path).

[0033] The puff sensor may be configured to send an airflow signal to the controller in response to the puff sensor detecting a user drawing airflow through the system.

[0034] The puff sensor may, for example, be in the form of a pressure sensor or an acoustic sensor.

[0035] The controller being configured to determine whether the puff sensor detects a user drawing airflow through the system may comprise the controller being configured to determine whether an airflow signal is received from the puff sensor. By determining that an

airflow signal is received by the controller, the controller may determine that the puff sensor detects a user drawing an airflow through the system (e.g. along the airflow path).

[0036] The controller may be configured to continue operating in the power mode in which it is currently operating when the controller prevents switching between the first and second power modes. For example, if the controller is operating in the first power mode and a power change user input is received while the puff sensor detects an airflow through the system, the controller may prevent switching from the first power mode to the second power mode and the controller may continue to operate in the first power mode.

[0037] The controller may be configured such that power may be supplied from the power supply to the aerosol generator immediately following switching between the first and second power modes. Advantageously then, switching between the first and second power modes may not inhibit a user from using the aerosol generating system to generate an aerosol.

[0038] The aerosol generator may comprise a heating element. Alternatively, the aerosol generator may comprise an ultrasonic or flow expansion unit, or an induction heating system. As discussed above, preventing switching between the first power mode and the second power mode in response to a user drawing an airflow through the system may improve the safety of the system. When the aerosol generator comprises a heating element or an induction heating system, for example, the system may prevent a user unexpectedly receiving more vapour or receiving vapour at a higher temperature than they are expecting if a user makes an accidental power change user input. When the aerosol generator comprises an ultrasonic or flow expansion unit, the system may prevent a user unexpectedly receiving more vapour than they are expecting if a user makes an accidental power change user input.

[0039] The aerosol delivery system may be a vaping system (e.g., a vaping smoking substitute system). The system may comprise a tank for housing the aerosol precursor (e.g. a liquid aerosol precursor). The aerosol precursor may comprise an e-liquid, for example, comprising a base liquid and e.g. nicotine. The base liquid may include propylene glycol and/or vegetable glycerine. The conduit discussed above may extend through the tank with the conduit walls defining an inner region of the tank. In this respect, the tank may surround the conduit e.g. the tank may be annular. The tank may be transparent or translucent.

[0040] The aerosol generator may be within an aerosol generator chamber.

[0041] The aerosol generator may comprise a wick. The wick may form the base of the tank so that the aerosol precursor may be in contact with the wick. The wick may comprise one or more channels on its upper surface (facing the tank), the channels being in fluid communication with the tank.

[0042] The wick may have a length and width defining its upper surface with a depth aligned with the longitudinal axis of the system. Thus the upper surface and opposing lower surface of the wick may lie in respective planes that are perpendicular to the longitudinal axis of the system and longitudinal to the first and third portions of the airflow path.

[0043] The wick may comprise a porous material e.g. a ceramic material. A portion of the wick e.g. at least a portion of the lower surface and/or at least a portion of at least one side wall extending between the upper and lower surface (in a depth direction) may be exposed to airflow in the second portion of the airflow path.

[0044] The heating element may be in the form of a heater track on the wick e.g. on the lower surface of the wick. The heating element may be electrically connected (or connectable) to the power supply. Thus, in operation, the power supply 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 airflow along the airflow path. This vapour may subsequently cool to form an aerosol e.g. in the conduit.

[0045] The controller may be configured to determine whether a user activation of the system is detected. The controller being configured to determine whether a user activation of the system is detected may include the controller being configured to determine whether a user activation signal is received by the controller from a sensor which detects the user activation. By determining that a user activation signal is received by the controller, the controller may determine that a user activation of the system is detected.

[0046] The controller may be configured to enable power to be supplied from the power supply to the aerosol generator (e.g. heating element/heater track) in the first and second power modes in response to determining that a user activation is detected. The controller may be configured to prevent power being supplied to the aerosol generator in the first and second power modes when the controller does not determine that a user activation is detected. In this way, the aerosol generator may only receive power, and thus may only generate aerosol, when a user performs a user activation. The controller being configured to control the supply of the first and second power in the first and second power modes may include the controller being configured to enable power to be supplied to the aerosol generator in response to the controller determining that a user activation is detected and/or the controller being configured to prevent the power being supplied to the aerosol generator when the controller does not determine that a user activation is not detected.

[0047] Enabling power to be supplied from the power supply to the aerosol generator may mean completing an electrical circuit which includes the aerosol generator and the power supply such that current can flow between the

aerosol generator and the power supply. For example, enabling power to be supplied from the power supply to the aerosol generator may include closing a switch between the aerosol generator and the power supply. Preventing/stopping power being supplied from the power supply to the aerosol generator may mean breaking an electrical circuit which includes the aerosol generator and the power supply such that current cannot flow between the aerosol generator and the power supply. For example, stopping power being supplied from the power supply to the aerosol generator may include opening or maintaining open a switch between the aerosol generator and the power supply.

[0048] The power supply may be a battery. The power supply may be a capacitor. The power supply may be a rechargeable power source. The system may comprise a charging connection for connection to an external power supply for recharging of the power supply within the system.

[0049] The user activation may be a user drawing an airflow through the system. The puff sensor may be configured to detect the user activation. The user activation signal may be an airflow signal, which may be the airflow signal discussed above. Therefore, the controller may be configured to enable power to be supplied from the power supply to the aerosol generator (e.g. heating element/heater track) in the first or the second power mode in response to the puff sensor detecting a user drawing an airflow through the system. Advantageously then, the controller may prevent switching between the first and second power modes in response to a user activation (of drawing an airflow through the system). In this way, the safety of the aerosol delivery system may be improved, because a user may be prevented from unexpectedly receiving more vapour or receiving vapour at a higher temperature than they are expecting if a user makes an accidental power change user input during a user activation.

[0050] The controller may be configured to switch between the first power mode and at least one locked mode. The controller may be configured to switch between the second power mode and at least one locked mode. Switching between the first power mode and the at least one locked mode may mean switching from the first power mode to the at least one locked mode and/or from the at least one locked mode to the first power mode. Switching between the second power mode and the at least one locked mode may mean switching from the second power mode to the at least one locked mode and/or from the at least one locked mode to the second power mode.

[0051] The controller may be configured to prevent power being supplied from the power supply to the aerosol generator in the at least one locked mode. The controller may be configured to prevent power being supplied from the power supply to the aerosol generator in the at least one locked mode when there is a detection of a user activation. Therefore, in some examples, when the con-

troller is in the at least one locked mode, power is not supplied from the power supply to the aerosol generator even when there is a detection of a user activation. This contrasts with the first and second power modes, for which, in some examples, power is supplied from the power supply to the aerosol generator in response to a detection of a user activation. Advantageously then, the controller may enter into a locked mode which may improve the safety of the aerosol delivery system. For example, the locked mode may prevent a child from being able to activate the aerosol delivery system.

[0052] The controller may be configured to switch between the first power mode and a first locked mode and to switch between the second power mode and a second locked mode. The first locked mode may be a locked mode which the controller may switch to from the first power mode (and may switch from to the first power mode). The second locked mode may be a locked mode which the controller may switch to from the second power mode (and may switch from to the second power mode).

[0053] The at least one locked mode may comprise a plurality of locked modes e.g. including the first locked mode and the second locked mode.

[0054] The controller may be configured to switch between the first locked mode and the second locked mode. Switching between the first locked mode and the second locked mode may mean switching from the first locked mode to the second locked mode and/or from the second locked mode to the first locked mode. In this way, while the controller is in a locked mode a user may switch which power mode the controller will operate in when the controller switches from a locked mode into a power mode.

[0055] The controller may be configured to switch from the at least one locked mode to the first or second power mode in response to receipt of an unlocking user input by the user input device. Advantageously then, the user input device may be used for both the power change user input and the unlocking user input. The controller may be configured to switch from the first or second power mode to the at least one locked mode in response to receipt of a locking user input by the user input device. The controller may be configured to switch from the first or second power mode to the at least one locked mode a predetermined locking time after a user activation is detected. The predetermined locking time may be, for example, greater than or equal to 10 seconds, for example, greater than or equal to 30 seconds, such as greater than or equal to 1 minute. Advantageously then, the controller may automatically switch into a locked mode when a user has not used the system for a predetermined amount of time. This may improve the safety of the system.

[0056] The controller may be configured to switch between the first locked mode and the second locked mode in response to receipt of the power change user input by the user input device. Advantageously then, the user input device may be used for both switching between the first and second locked modes and for switching

between the first and second power modes. Further, the power change user input may be used for both switching between the first and second locked modes and for switching between the first and second power modes.

[0057] The user input device may comprise a button or switch.

[0058] A user input may include a button or switch press.

[0059] The power change user input may include a button or switch press lasting longer than the predetermined duration, which may be the predetermined duration of the user input discussed above.

[0060] The unlocking user input may include a plurality of button/switch presses within a predetermined period.

Each of the plurality of button/switch presses may last longer than a predetermined press time. The plurality of button/switch presses may include at least 3 presses, for example at least 4 presses or at least 5 presses, such as at least 6 presses. The predetermined period may be 2 seconds or less, for example 2 seconds or 1 second. The predetermined period may be 1 second or less, for example 1 second. The predetermined press time may be at least 10 ms, for example at least 20 ms, such as at least 50 ms. In this way, it may be difficult for a child to switch the controller from a locked mode into a power mode, but it may be straight-forward for an adult to switch the controller from a locked mode into the power mode.

[0061] The aerosol delivery system may further comprise a user feedback element. The user feedback element may comprise one or more of a visual feedback element, a haptic feedback element and/or an acoustic feedback element. The visual feedback element may include an LED. The haptic feedback element may include an electric motor and a weight mounted eccentrically on a shaft of the electric motor.

[0062] The user feedback element may provide power switch feedback to a user when the controller switches, or in response to the controller switching, between the first power mode and the second power mode, and/or when the controller switches, or in response to the controller switching, between the first locked mode and the second locked mode. In this way, a user may receive feedback which indicates that the controller has switched between the first power mode and the second power mode, and/or that the controller has switched between the first locked mode and the second locked mode. The power switch feedback may include a first power switch feedback and a second power switch feedback. The first power switch feedback may be provided when the controller switches, or in response to the controller switching, from the second power mode to the first power mode, or when the controller switches, or in response to the controller switching, from the second locked mode to the first locked mode. The second power switch feedback may be provided when the controller switches, or in response to the controller switching, from the first power mode to the second power mode, or when the controller switches, or in response to the controller switching, from the first locked

mode to the second locked mode. The first power switch feedback and the second power switch feedback may be different. For example, the first power switch feedback may include a first LED colour, for example, white, and the second power switch feedback may include a second LED colour, for example, blue. The first and/or second power switch feedback may additionally or alternatively include haptic feedback and/or acoustic feedback.

[0063] The user feedback element may provide current feedback to a user when power is supplied, or in response to power being supplied, from the power supply to the aerosol generator. In this way, a user may receive feedback which indicates that power is being supplied from the power supply to the aerosol generator. The current feedback may comprise a first current feedback indicating that the first power is being supplied (i.e., that the controller is operating in the first power mode) and a second current feedback indicating that the second power is being supplied (i.e., that the controller is operating in the second power mode). The first current feedback and the second current feedback may be different. For example, the first current feedback may include a first LED colour, for example, white, and the second current feedback may include a second LED colour, for example, blue. In this way, a user may receive feedback which indicates which power is being supplied to the aerosol generator (i.e., which power mode the controller is operating in).

[0064] The controller may be configured to control the supply of the first power and the second power by pulse-width modulation of the power from the power supply. The duty cycle of the pulse-width modulation may be different in the first and second power modes. In this way, the different power modes may be achieved using the same power source. The controller being configured to control the supply of the first power in the first power mode and the second power in the second power mode may include the controller being configured to control a pulse-width modulation of the power from the power supply. The controller may be configured to calculate a duty cycle of the pulse-width modulation based on whether the controller is operating in the first power mode or the second power mode. The controller may be configured to calculate the duty cycle when the controller determines that the puff sensor detects a user drawing airflow through the system. The controller may be configured to control the supply of power to the aerosol generator in the first and second power modes by pulse-width modulating the power from the power supply in accordance with the duty cycle.

[0065] The first power may be between at least 2W, for example at least 3 W or 4W such as around 5W. It may be less than 7W. The second power may be at least 5W, for example at least 6W such as around 7W. It may be less than 9W.

[0066] 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.

[0067] The system 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.

[0068] The system may comprise a movement detection unit (e.g. an accelerometer) for detecting a movement of the system. The controller may be configured to control the user feedback element (e.g. the haptic feedback element) to generate feedback (e.g. haptic feedback) in response to the detection of movement of the device by the movement detection unit.

[0069] The aerosol delivery system may comprise a device housing the puff sensor, the user input device, the power supply, and the controller. The system may further comprise a component (e.g. a consumable component) comprising an aerosol precursor. In some examples, the component may comprise the aerosol generator. In some examples, the device may comprise the aerosol generator.

[0070] The device may comprise an electrical connection (e.g. one or more contact pins) for connection of the power source to the aerosol generator (e.g. the aerosol generator in the component).

[0071] The device may comprise the charging connection discussed above for connection to an external power supply for recharging of the power supply within the device.

[0072] The device may comprise the memory discussed above.

[0073] The device may comprise the wireless interface discussed above.

[0074] The device may comprise a device body for housing the power source, the puff sensor, the user input device, and the controller. The device body may house other elements of the device. The device body may be an elongate body i.e. with a greater length than depth/width. It may have a greater width than depth.

[0075] The device body may have a length of between 5 and 30 cm e.g. between 5 and 10 cm such as between 7 and 9 cm. The maximum depth of the device body may be between 5 and 15 mm e.g. between 9 and 12 mm.

[0076] The device body may have a front surface that is curved in the transverse dimension. The device body may have a rear surface that is curved in the transverse dimension. The curvatures of the front surface and rear surface may be of the opposite sense to one another. Both front and rear surfaces may be convex in the transverse dimension. They may have an equal radius of curvature.

[0077] The device body may have a substantially oval transverse cross-sectional shape.

[0078] The device body may have a linear longitudinal

axis.

[0079] The device body may be formed of a metal e.g. of aluminium.

[0080] The device may include the user feedback element discussed above. The front and/or rear surface of the device body may include the visual user feedback element discussed above. For example, the front and/or rear surface of the device may include one or more lights e.g. one or more LEDs. The device may comprise the haptic feedback element and/or acoustic feedback element discussed above.

[0081] The device may comprise the movement detection unit discussed above.

[0082] The device may comprise a chassis within the device body and one or more of the electrical components of the device (e.g. one or more of the power source, charging connection, visual feedback element, movement detection unit, haptic feedback generation unit, controller, memory, wireless interface, puff sensor and/or electrical connection) may be mounted on or affixed to the chassis.

[0083] The component may be an aerosol-delivery (e.g. a smoking substitute) consumable i.e. in some embodiments the component may be a consumable component for engagement with the aerosol-delivery (e.g. a smoking substitute) device to form the aerosol-delivery (e.g. a smoking substitute) system.

[0084] The device may be configured to receive the consumable component. The device and the consumable component may be configured to be physically coupled together. For example, the consumable component may be at least partially received in a recess of the device (e.g. in a recess defined by the body). There may be a snap engagement between the device and the consumable component. Alternatively, the device and the consumable component may be physically coupled together by screwing one onto the other, or through a bayonet fitting.

[0085] Thus, the consumable component may comprise one or more engagement portions for engaging with the device.

[0086] The device and consumable component may be coupled together by magnetic attraction. For example, the device may comprise at least one magnet whilst the component may comprise a magnet or ferrous plate.

[0087] The consumable component may comprise an electrical interface for interfacing with a corresponding electrical interface of the device. One or both of the electrical interfaces may include one or more electrical contacts. Thus, when the device is engaged with the consumable component, the electrical interface may be configured to transfer electrical power from the power source to the vaporiser (e.g. heating element) of the consumable component. The electrical interface may also be used to identify the consumable component from a list of known types. The electrical interface may additionally or alternatively be used to identify when the consumable component is connected to the device.

[0088] The device may alternatively or additionally be able to detect information about the consumable component via an RFID reader, a barcode or QR code reader. This interface may be able to identify a characteristic (e.g. a type) of the consumable. In this respect, the consumable component may include any one or more of an RFID chip, a barcode or QR code, or memory within which is an identifier and which can be interrogated via the interface.

[0089] In other embodiments, the component may be integrally formed with the aerosol-delivery (e.g. a smoking substitute) device to form the aerosol-delivery (e.g. a smoking substitute) system.

[0090] In such embodiments, the aerosol former (e.g. e-liquid) may be replenished by re-filling a tank that is integral with the device (rather than replacing the consumable). Access to the tank (for re-filling of the e-liquid) may be provided via e.g. an opening to the tank that is sealable with a closure (e.g. a cap).

[0091] The air inlet discussed above may be provided in the device body. The outlet may be at a mouthpiece portion of the component. In this respect, a user may draw fluid (e.g. air) into and along the airflow path by inhaling at the outlet (i.e. using the mouthpiece portion). The conduit may extend along the axial centre of the component.

[0092] The aerosol generator may comprise a wick, as discussed above. The wick may have a length and width defining its upper surface with a depth aligned with the longitudinal axis of the component.

[0093] References to "upper", "lower", "above" or "below" are intended to refer to the component when in an upright/vertical orientation i.e. with elongate (longitudinal/length) axis of the component vertically aligned and with the mouthpiece vertically uppermost.

[0094] The component may comprise the tank and conduit discussed above.

[0095] In a second aspect there is provided an aerosol delivery device comprising a puff sensor configured to detect a user drawing an airflow through the device, a user input device for receiving an input from a user, a power supply, and a controller configured to control the supply of power from the power supply to an aerosol generator for generating an aerosol from a precursor, the controller further configured to switch between a first power mode and a second power mode in response to receipt of a power change user input by the user input device, the controller configured to control the supply of a first power to the aerosol generator in the first power mode and a second power to the aerosol generator in the second power mode, wherein the second power is higher than the first power, and wherein the controller is configured to prevent switching between the first power mode and the second power mode in response to the puff sensor detecting a user drawing an airflow through the device.

[0096] The aerosol delivery device may be a vaping device (e.g., a smoking substitute vaping device). The aerosol delivery device may be the device described

above with reference to the first aspect. For example, the device may comprise the aerosol generator, or the aerosol generator may be included in a component configured for engagement with the aerosol delivery device.

[0097] The puff sensor may be the puff sensor described above with reference to the first aspect.

[0098] The user input device may be the user input device described above with reference to the first aspect.

[0099] The power supply may be the power supply described above with reference to the first aspect.

[0100] The controller may be the controller described above with reference to the first aspect.

[0101] In a third aspect there is provided a method of controlling an aerosol delivery device or system having a first power mode in which a first power is supplied to an aerosol generator of the device in response to the device or system being activated and a second power mode in which a second power that is higher than the first power is supplied to the aerosol generator in response to the device or system being activated. The method may, for example, be for controlling the system of the first aspect or the device of the second aspect. The method comprises receiving a power change user input from a user input device, determining whether a user is drawing an airflow through the device or system (e.g. by determining whether a puff sensor detects such drawing of airflow), and switching between the first power mode and the second power mode in response to receipt of the power change user input if a user is not drawing an airflow through the device or system. The method further comprises preventing switching between the first power mode and the second power mode if a user is drawing an airflow through the device or system, or in response to a user drawing an airflow through the device or system.

[0102] The method may comprise in the first power mode, controlling the supply of a first power to an aerosol generator from a power source; and in the second power mode, controlling the supply of a second power to an aerosol generator from a power source.

[0103] As discussed above with reference to the first aspect, preventing switching between the first and second power modes if a user is drawing an airflow through the device or system, or in response to a user drawing an airflow through the device or system, may mean only switching between the first and second power modes if it is not determined that the puff sensor detects a user drawing airflow through the device or system.

[0104] Determining whether the puff sensor detects a user drawing airflow through the system or device may comprise determining whether an airflow signal is received from the puff sensor.

[0105] Determining whether the power change user input is received by the user input device may include determining whether a duration of the user input is greater than or equal to a pre-determined duration. The pre-determined duration of the user input may be at least 1 second, for example at least 2 seconds or at least 3 seconds such as at least 4 seconds or at least 5 seconds.

[0106] Preferably, the method may further include: determining whether a user activation is detected. Determining whether the user activation is detected may include determining whether a user activation signal is received from a sensor which detects the user activation. The method may further include: enabling power to be supplied from a power supply to an aerosol generator in the first and second power modes in response to determining that a user activation is detected. The user activation may be a user drawing an airflow through the system or device.

[0107] Preferably, the method may further include: if it is determined that a user activation is detected, calculating a duty cycle; controlling the supply of power to the aerosol generator by pulse-width modulating the power from the power supply in accordance with the duty cycle.

[0108] Optionally, the method may further include: if switching between the first and second power modes is prevented, continuing to operate in the power mode in which the controller is currently operating.

[0109] Optionally, the method may further include: determining whether a locking input is received by the user input device and/or determining whether an unlocking user input is received by the user input device. The method may further include: if it is determined that the locking input is received by the user input device, switching from the first power mode to at least one locked mode, and/or switching from the second power mode to the at least one locked mode. The method may further include: if it is determined that the unlocking input is received by the user input device, switching from the at least one locked mode to the first power mode, and/or switching from the at least one locked mode to the second power mode. The method may further include: preventing power being supplied from the power supply to the aerosol generator in the at least one locked mode when there is a detection of a user activation. The method may further include: if it is determined that the locking input is received by the user input device, switching from the first power mode to a first locked mode and/or switching from the second power mode to a second locked mode. The method may further include: if it is determined that the unlocking input is received by the user input device, switching from a first locked mode to the first power mode and/or switching from a second locked mode to the second power mode. The method may further comprise: if it is determined that a power change user input is received by the user input device, switching between the first locked mode and the second locked mode.

[0110] In a fourth aspect there is provided a method of using the aerosol-delivery (e.g. smoking substitute) system according to the first aspect, the method comprising engaging the consumable component with an aerosol-delivery (e.g. smoking substitute) device (as described above) having a power supply so as to electrically connect the power supply to the consumable component (i.e. to the aerosol generator of the consumable component).

[0111] The invention includes the combination of the

aspects and preferred features described except where such a combination is clearly impermissible or expressly avoided.

BRIEF DESCRIPTION OF THE DRAWINGS

[0112] So that further aspects and features thereof may be appreciated, embodiments will now be discussed in further detail with reference to the accompanying figures, in which:

- Fig. 1A is a front schematic view of a smoking substitute system;
- Fig. 1B is a front schematic view of a device of the system;
- Fig. 1C is a front schematic view of a component of the system;
- Fig. 2A is a schematic of the electrical components of the device;
- Fig. 2B is a schematic of the parts of the component; and
- Fig. 3 is a flow chart of a method performed by a controller of the device.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0113] Aspects and embodiments will now be discussed with reference to the accompanying figures. Further aspects and embodiments will be apparent to those skilled in the art.

[0114] Fig. 1A shows a first embodiment of a smoking substitute system 100, which is a vaping system. In this example, the smoking substitute system 100 includes a device 102 and a component 104. The component 104 may alternatively be referred to as a "pod", "cartridge" or "cartomizer". It should be appreciated that in other examples (i.e. open systems), the device may be integral with the component. In such systems, a tank of the aerosol delivery system may be accessible for refilling the device.

[0115] In this example, the smoking substitute system 100 is a closed system vaping system, wherein the component 104 includes a sealed tank 106 and is intended for single-use only. The component 104 is removably engageable with the device 102 (i.e. for removal and replacement). Fig. 1A shows the smoking substitute system 100 with the device 102 physically coupled to the component 104, Fig. 1B shows the device 102 (a vaping device) of the smoking substitute system 100 without the component 104, and Fig. 1C shows the component 104 of the smoking substitute system 100 without the device 102.

[0116] The device 102 and the component 104 are configured to be physically coupled together by pushing the component 104 into a cavity at an upper end 108 of the device 102, such that there is an interference fit between the device 102 and the component 104. In other examples, the device 102 and the component may be

coupled by screwing one onto the other, or through a bayonet fitting. In yet further examples, the cavity in the device houses a magnet and the component 104 comprises a metal portion (e.g. a metal base) and the component 104 is coupled to the device by magnetic attraction between the magnet and the metal portion of the component 104.

[0117] The component 104 includes a mouthpiece portion at an upper end 109 of the component 104, and one or more air inlets (not shown) in fluid communication with the mouthpiece portion such that air can be drawn into and through the component 104 when a user inhales through the mouthpiece portion. The tank 106 containing e-liquid is located at the lower end 111 of the component 104.

[0118] The lower end 110 of the device 102 also includes a light 116 (e.g. an LED) located behind a small translucent cover. The light 116 may be configured to illuminate when the smoking substitute system 100 is activated (as will be described in more detail below), when there is a power mode change of the system (as will be described in more detail below) and/or when charging. Whilst not shown, the component 104 may identify itself to the device 102, via an electrical interface, RFID chip, or barcode.

[0119] The lower end 110 of the device 102 also includes a charging connection 115, which is usable to charge a battery within the device 102. The charging connection 115 can also be used to transfer data to and from the device, for example to update firmware thereon.

[0120] Figs. 2A and 2B are schematic drawings of the device 102 and component 104. As is apparent from Fig. 2A, the device 102 includes a puff sensor 140, a user input device 142, a power supply 118, a controller 120, a memory 122, a wireless interface 124, an electrical interface 126, and one or more additional components 128.

[0121] The power supply 118 is preferably a battery, more preferably a rechargeable battery.

[0122] The puff sensor 142 is configured to detect an airflow in the smoking substitute system 100, e.g. caused by a user inhaling through a mouthpiece portion 136 of the component 104. The smoking substitute system 100 may be configured to be activated in response to airflow being detected by the airflow sensor. This sensor could alternatively be included in the component 104. The airflow sensor can be used to determine, for example, how heavily a user draws on the mouthpiece or how many times a user draws on the mouthpiece in a particular time period.

[0123] The user input device 142 may include a button. The user input device 142 is for receiving a power change user input from a user, in response to which the controller may switch between a first power mode and a second power mode of the system (the first and second power modes will be discussed in more detail below).

[0124] The controller 120 is configured to control the supply of power from the power supply to the aerosol

generator. The controller 120 is further configured to switch between a first power mode and a second power mode in response to receipt of a power change user input by the user input device 142. In the first power mode, the controller 120 controls the supply of a first power to the aerosol generator 132 in the component 104, and in the second power mode the controller 120 controls the supply of a second, higher power to the aerosol generator 132. (The component 104 and the aerosol generator 132 are discussed in more detail below). The controller 120 is configured to prevent switching between the first power mode and the second power mode in response to the puff sensor 140 detecting a user drawing an airflow through the system. The controller 120 may include a microprocessor, for example.

[0125] The memory 122 preferably includes non-volatile memory. The memory may include instructions which, when implemented, cause the controller 120 to perform certain tasks or steps of a method. A method which may be performed by the controller 120 is discussed in detail below.

[0126] The wireless interface 124 is preferably configured to communicate wirelessly with another device, for example a mobile device, e.g. via Bluetooth®. To this end, the wireless interface 124 could include a Bluetooth® antenna. Other wireless communication interfaces, e.g. WiFi®, are also possible. The wireless interface 124 may also be configured to communicate wirelessly with a remote server.

[0127] The electrical interface 126 of the device 102 may include one or more electrical contacts. The electrical interface 126 may be located in a base of the aperture in the upper end 108 of the device 102. When the device 102 is physically coupled to the component 104, the electrical interface 126 is configured to transfer electrical power from the power supply 118 to the component 104 (i.e. upon activation of the smoking substitute system 100).

[0128] The electrical interface 126 may also be used to identify the component 104 from a list of known components. For example, the component 104 may be a particular flavour and/or have a certain concentration of nicotine (which may be identified by the electrical interface 126). This can be indicated to the controller 120 of the device 102 when the component 104 is connected to the device 102. Additionally, or alternatively, there may be a separate communication interface provided in the device 102 and a corresponding communication interface in the component 104 such that, when connected, the component 104 can identify itself to the device 102.

[0129] The additional components 128 of the device 102 may comprise the light 116 discussed above. The additional components 128 of the device 102 may comprise a haptic feedback element. The haptic feedback element may provide haptic feedback to a user when there is a power mode change of the system (as will be described in more detail below).

[0130] The additional components 128 of the device

102 may also comprise the charging connection 115 configured to receive power from the charging station (i.e. when the power supply 118 is a rechargeable battery). This may be located at the lower end 110 of the device 102.

[0131] The additional components 128 of the device 102 may, if the power supply 118 is a rechargeable battery, include a battery charging control circuit, for controlling the charging of the rechargeable battery. However, a battery charging control circuit could equally be located in a charging station (if present).

[0132] As shown in Fig. 2B, the component 104 includes the tank 106, an electrical interface 130, an aerosol generator 132, one or more air inlets 134, a mouthpiece portion 136, and one or more additional components 138.

[0133] The electrical interface 130 of the component 104 may include one or more electrical contacts. The electrical interface 126 of the device 102 and an electrical interface 130 of the component 104 are configured to contact each other and thereby electrically couple the device 102 to the component 104 when the lower end 111 of the component 104 is inserted into the upper end 108 of the device 102 (as shown in Fig. 1A). In this way, electrical energy (e.g. in the form of an electrical current) is able to be supplied from the power supply 118 in the device 102 to the aerosol generator 132 in the component 104.

[0134] The aerosol generator 132 is configured to heat and vaporise e-liquid contained in the tank 106 using electrical energy supplied from the power supply 118 in the first power mode or in the second power mode. The aerosol generator 132 includes a heating filament and a wick. The wick draws e-liquid from the tank 106 and the heating filament heats the e-liquid to vaporise the e-liquid.

[0135] The one or more air inlets 134 are preferably configured to allow air to be drawn into the smoking substitute system 100, when a user inhales through the mouthpiece portion 136. When the component 104 is physically coupled to the device 102, the air inlets 134 receive air, which flows to the air inlets 134 along a gap between the device 102 and the lower end 111 of the component 104.

[0136] In operation, a user activates the smoking substitute system 100 by inhaling through the mouthpiece portion 136 as described above. Upon activation, the controller 120 may supply electrical energy from the power source 118 to the aerosol generator 132 (via electrical interfaces 126, 130) in a first or second power mode, which may cause the aerosol generator 132 to heat e-liquid drawn from the tank 106 to produce a vapour which is inhaled by a user through the mouthpiece portion 136.

[0137] An example of one of the one or more additional components 138 of the component 104 is an interface for obtaining an identifier of the component 104. As discussed above, this interface may be, for example, an RFID reader, a barcode, a QR code reader, or an elec-

tronic interface which is able to identify the component. The component 104 may, therefore include any one or more of an RFID chip, a barcode or QR code, or memory within which is an identifier and which can be interrogated via the electronic interface in the device 102.

[0138] Fig. 3 is a flowchart showing a method performed by the controller 120. As shown in Fig. 3, the method is performed in a loop.

[0139] At step S1, the controller 120 determines whether a user activation is detected by the puff sensor 140 i.e., whether a user is drawing an airflow through the system ("smoking"). The puff sensor 140 is configured to send an airflow signal to the controller 120 in response to the puff sensor 140 detecting a user drawing an airflow through the system. In response to an airflow signal being received by the controller 120, the controller 120 determines that a user drawing an airflow through the system is detected. If an airflow signal is not received the controller 120, the controller 120 does not determine that a user drawing an airflow through the system is detected.

[0140] If the controller 120 does not determine that a user drawing an airflow through the system is detected, power is not supplied to the aerosol generator 132.

[0141] The controller 120 determines at step S2 whether a user is pressing a button 142 on the device 102 (providing a user input). If a user is pressing the button 142 on the device 102, the controller 120 receives a user input signal and thus determines that a user is pressing the button 142 on the device 102. In this case, the controller 120 determines at step S3 whether the duration of the button press (the user input) is greater than or equal to 3 seconds. If the duration of the button press is less than 3 seconds, the button press is not a power change user input and the controller 120 does not switch between the first and second power modes. If the duration of the button press is greater than or equal to 3 seconds, the button press is a power change user input and, in response to the power change user input, at step S4 the controller 120 switches between the first and second power modes. Thus, if the controller 120 was operating in the first power mode before the button press, the controller 120 switches into the second power mode after the button press. If the controller 120 was operating in the second power mode before the button press, the controller 120 switches into the first power mode after the button press. However, the controller only switches between the first and second power modes if the controller does not determine at step S1 that a user drawing an airflow through the system is detected. That is, if the controller 120 determines at step S1 that a user drawing an airflow through the system is detected, in response to this determination, the controller 120 does not switch between the first and second power modes even if the user is pressing the button 142 on the device 102 in accordance with the power change user input. The first power, supplied from the power supply 118 to the aerosol generator 132 in the first power mode, is 5W, and the second power, supplied from the power supply 118 to the

aerosol generator 132 in the second power mode, is 7W. Although not shown in the figure, when the controller switches between the first and second power modes, power change feedback may be provided to the user with the light 116 and the haptic feedback element discussed above. The colour emitted by the light may be blue when the controller switches from the first power mode to the second power mode, and white when the controller switches from the second power mode to the first power mode.

[0142] In response to the controller 120 determining at step S1 that a user drawing an airflow through the system is detected, in step S5 the controller 120 calculates a duty cycle. The duty cycle is calculated based on whether the controller 120 is operating in the first power mode or the second power mode. In step S6, the controller controls the supply of power to the aerosol generator 132 by pulse-width modulating the power from the power supply 118 in accordance with the duty cycle 118. Thus, the user drawing an airflow through the system is a user activation which enables power to be supplied from the power supply to the aerosol generator. In the example shown in Fig. 3, the aerosol generator 132 includes a heating element which is heated by the power from the power supply 118. Although not shown in the figure, when the user is drawing an airflow through the system, current feedback which indicates which power mode the controller is operating in may be provided to the user with the light 116 discussed above. The colour emitted by the light may be blue when the controller is operating in the second power mode and white when the controller is operating in the first power mode.

[0143] It should be appreciated that the smoking substitute system 100 shown in figures 1A to 3 is just one exemplary implementation of a smoking substitute system. For example, the system could otherwise be in the form of an entirely disposable (single-use) system or an open system in which the tank is refillable (rather than replaceable).

[0144] While exemplary embodiments have been described above, many equivalent modifications and variations will be apparent to those skilled in the art when given this disclosure. Accordingly, the exemplary embodiments set forth above are considered to be illustrative and not limiting.

[0145] 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.

[0146] 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%.

[0147] 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 device comprising:

a puff sensor configured to detect a user drawing an airflow through the device;
a user input device for receiving an input from a user;
a power supply; and
a controller configured to control the supply of power from the power supply to an aerosol generator for generating an aerosol from a precursor, the controller further configured to switch between a first power mode and a second power mode in response to receipt of a power change user input by the user input device, the controller configured to control the supply of a first power to the aerosol generator in the first power mode and a second power to the aerosol generator in the second power mode, wherein the second power is higher than the first power; and,
wherein the controller is configured to prevent switching between the first power mode and the second power mode in response to the puff sensor detecting a user drawing an airflow through the device.

2. The aerosol delivery device of claim 1 wherein the controller is configured to enable power to be supplied from the power supply to the aerosol generator in the first power mode and second power mode in response to determining that a user activation is detected.

3. The aerosol delivery device of claim 2 wherein the user activation is a user drawing an airflow through the device, and wherein the puff sensor is configured to detect the user activation.

4. The aerosol delivery device of any one of claims 1 to 3 wherein the controller is further configured to switch between the first power mode and/or the second power mode and at least one locked mode, wherein the controller is configured to prevent power being supplied from the power supply to the aerosol generator in the at least one locked mode.

5. The aerosol delivery device of claim 4 wherein the controller is configured to switch between the first power mode and a first locked mode and to switch between the second power mode and a second locked mode.

6. The aerosol delivery device of claim 5 wherein the controller is further configured to switch between the first locked mode and the second locked mode in response to receipt of the power change user input by the user input device.

7. The aerosol delivery device of any of claims 4 to 6 wherein the controller is configured to switch from the at least one locked mode to the first or second power mode in response to receipt of a locking user input by the user input device.

8. The aerosol delivery device of claim 7, wherein the user input device comprises a button, and wherein the locking user input includes a plurality button presses within a predetermined period.

9. The aerosol delivery device of any one of claims 1 to 7 wherein the user input device comprises a button.

10. The aerosol delivery device of claim 8 or 9 wherein the power change user input includes a button press lasting longer than a predetermined duration.

11. The aerosol delivery device of any one of the preceding claims further comprising a user feedback element.

12. The aerosol delivery device of claim 11 wherein the user feedback element comprises one or more a visual feedback element, a haptic feedback element and/or an acoustic feedback element.

13. The aerosol delivery device of claim 11 or 12 wherein the user feedback element provides power switch feedback to a user when the controller switches between the first power mode and the second power mode, or when the controller switches between the first locked mode and the second locked mode.

14. The aerosol delivery device of any one of claims 11 to 13, wherein the user feedback element provides current feedback to a user when power is supplied from the power supply to the aerosol generator, the

current feedback comprising a first current feedback indicating that the first power is being supplied and a second current feedback indicating that the second power is being supplied.

5

15. The aerosol delivery device of any one of the preceding claims wherein the controller is configured to control the supply of the first power and the second power by pulse-width modulation of the power from the power supply.

10

16. The aerosol delivery device of claim 15 wherein the duty cycle of the pulse-width modulation is different in the first power mode than in the second power mode.

15

17. An aerosol delivery system comprising: an aerosol delivery device according to any of claims 1 to 16; and the aerosol generator.

20

18. A method of controlling an aerosol delivery device having a first power mode in which a first power is supplied to an aerosol generator of the device in response to the device being activated and a second power mode in which a second power, that is higher than the first power, is supplied to the aerosol generator in response to the device being activated, the method comprising:

25

receiving a power change user input from a user input device; 30
determining whether a user is drawing an airflow through the device;
switching between the first power mode and the second power mode in response to receipt of the power change user input if a user is not drawing an airflow through the device; and 35
preventing switching between a first power mode and a second power mode in response to a user drawing an airflow through the device. 40

45

50

55

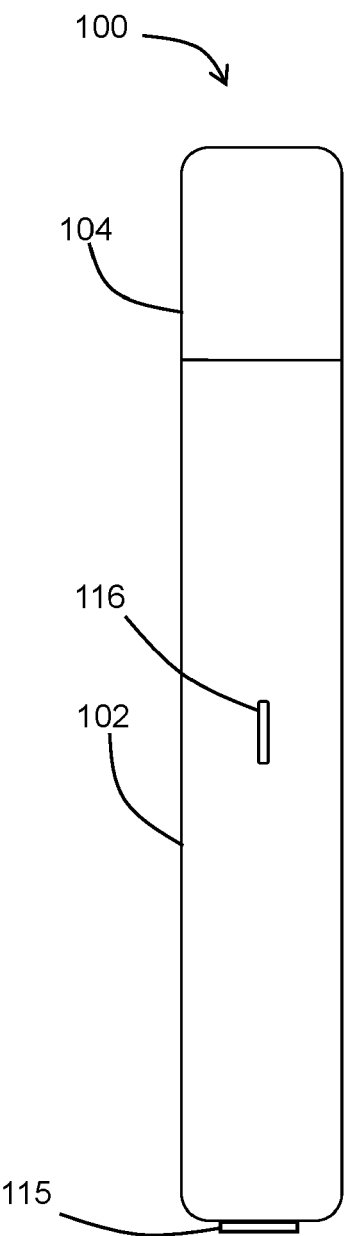


FIG 1A

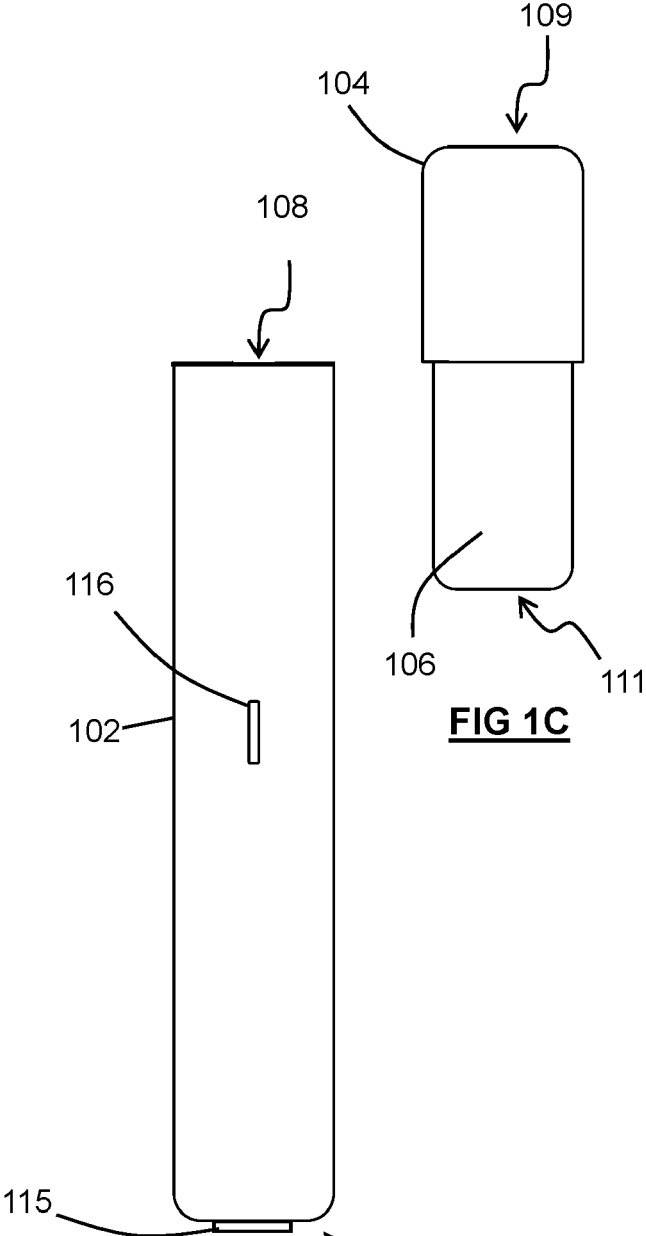


FIG 1B

FIG 1C

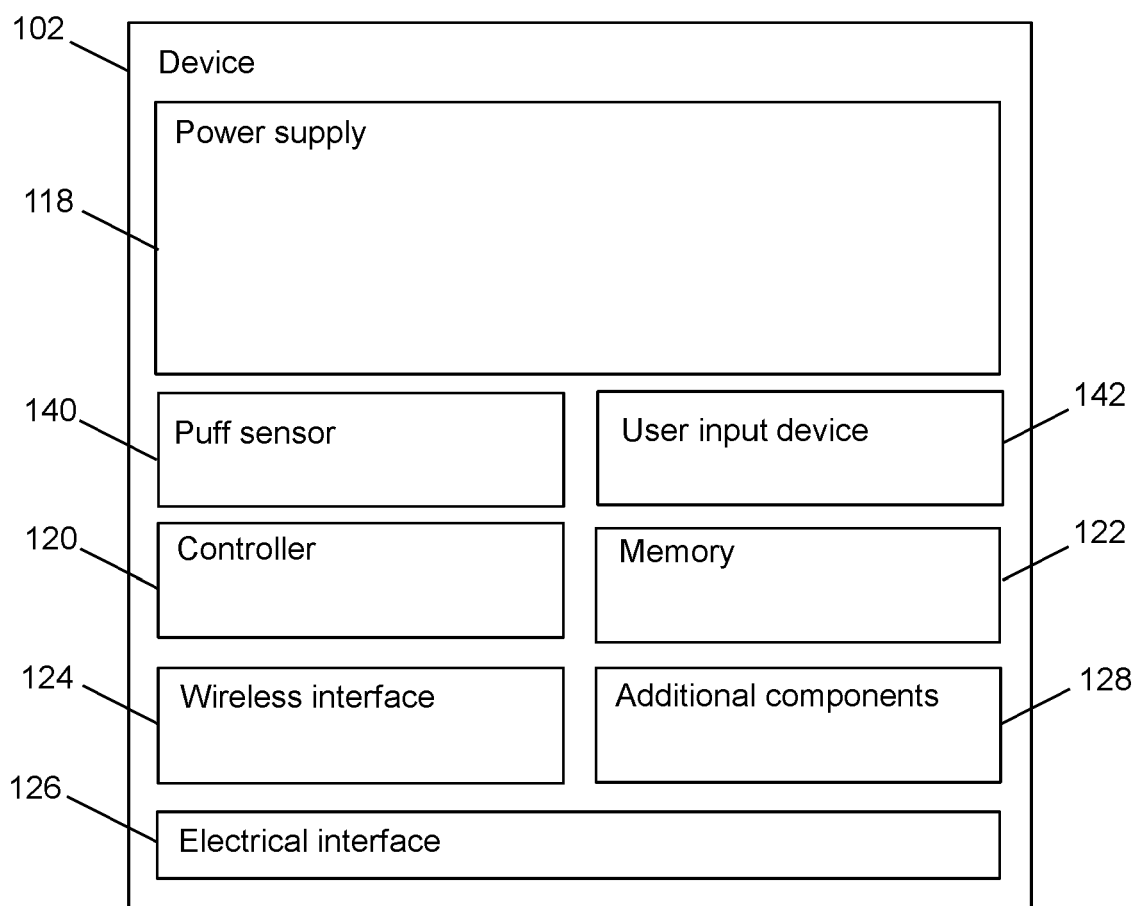


FIG 2A

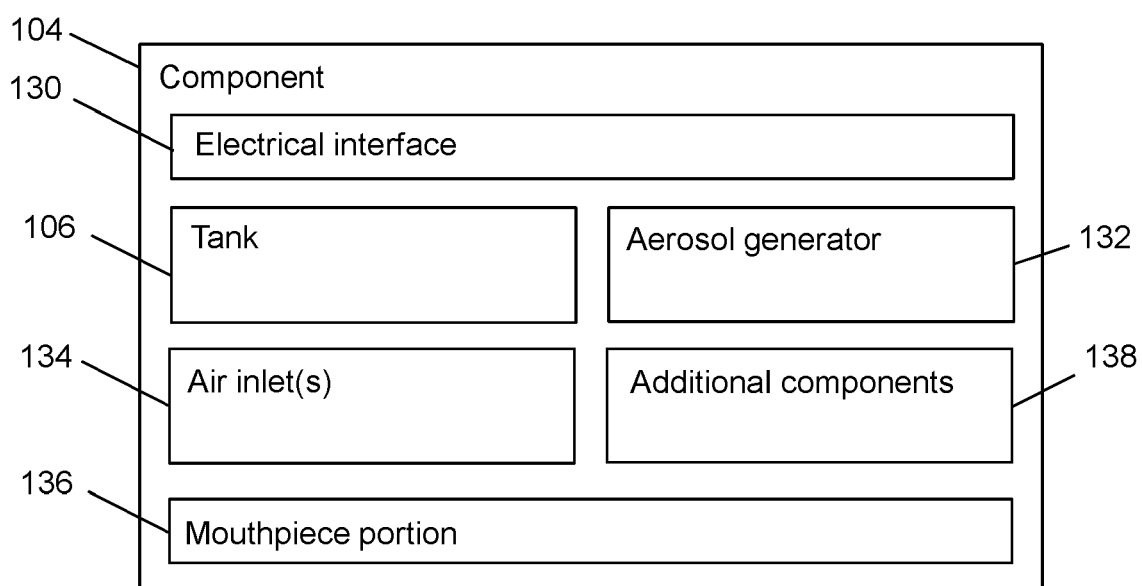
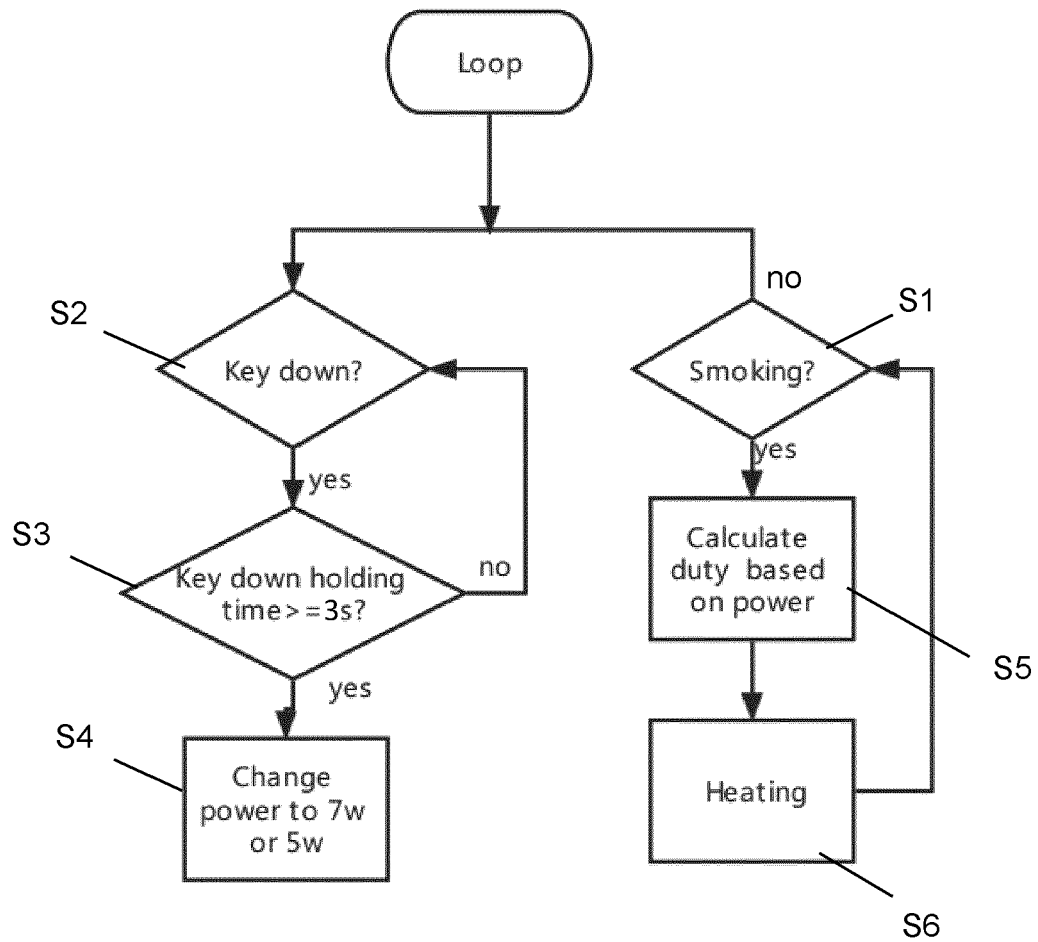


FIG 2B

**FIG 3**



EUROPEAN SEARCH REPORT

Application Number

EP 23 19 6058

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2023/041448 A1 (NERUDIA LTD) 23 March 2023 (2023-03-23) * figures 1-3, 6 * * page 25, line 7 - page 28, line 16 * * page 22, line 3 - line 6 * -----	1-18	INV. A24F40/50 A24F40/53
A	EP 3 711 500 A1 (NERUDIA LTD) 23 September 2020 (2020-09-23) * figures 2A, 2E, 3 * * paragraphs [0046], [0092], [0094], [0119], [0126], [0131] * -----	1-18	
A	US 2022/395028 A1 (LEE ET AL.) 15 December 2022 (2022-12-15) * paragraphs [0109] - [0119] * * figures 6, 11, 12 * -----	1-18	
			TECHNICAL FIELDS SEARCHED (IPC)
			A24F
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
Munich		23 January 2024	Mier Abascal, Ana
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

EPO FORM 1503 03.82 (P04C01)

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

EP 23 19 6058

5

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

23-01-2024

10

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2023041448 A1	23-03-2023	NONE	
EP 3711500 A1	23-09-2020	CN 114206140 A	18-03-2022
		EP 3711500 A1	23-09-2020
		EP 3941222 A1	26-01-2022
		JP 2022525973 A	20-05-2022
		WO 2020193194 A1	01-10-2020
US 2022395028 A1	15-12-2022	CN 113507852 A	15-10-2021
		EP 3880015 A1	22-09-2021
		JP 7369193 B2	25-10-2023
		JP 2022522601 A	20-04-2022
		KR 20210101040 A	18-08-2021
		US 2022395028 A1	15-12-2022
		WO 2021157846 A1	12-08-2021

30

35

40

45

50

55

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82