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(54) **AN AEROSOL DELIVERY DEVICE WITH VISUAL FEEDBACK MEANS**

(57) The present disclosure relates to an aerosol delivery device for use with a consumable component containing an aerosol precursor (e.g. e-liquid). The aerosol delivery device comprises: a controller; an input means; and a visual feedback means. The input means is configured to detect a trigger input from a user, and to output a trigger signal to the processor. In response to receiving the trigger signal, the controller is configured to initiate a preselected mode of operation, associated with a total available usage. When the device is operating in the preselected mode, the visual feedback means is config-

ured to indicate a remaining available usage of the device to the user. Associated advantages of this invention are that the visual feedback means is able to indicate an available usage of the aerosol delivery device (e.g. e-cigarette) to the user. This allows the users to visually keep track of their usage, and/or visually determine a usage time in a way they may be already accustomed to when using conventional tobacco-burning products. In this way, the invention provides a "temporal feel" typically only associated with conventional tobacco-burning products.

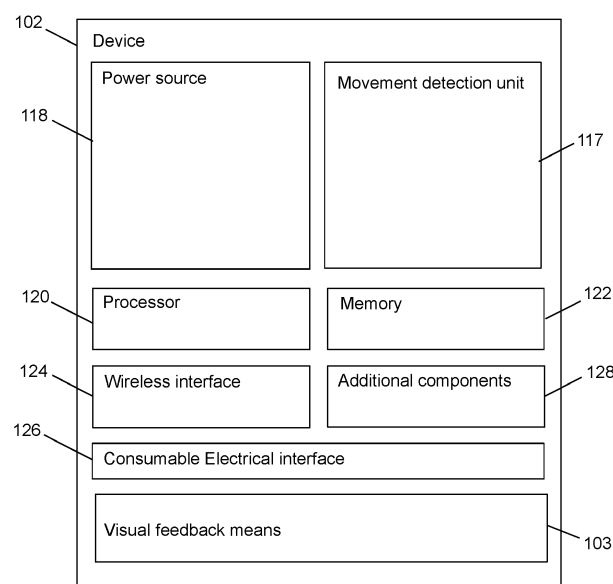


FIG 6

Description

TECHNICAL FIELD OF THE INVENTION

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

BACKGROUND TO THE INVENTION

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

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

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

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

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

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

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

[0009] One approach for a smoking substitute system is the so-called "vaping" approach, in which a vaporisable

liquid, typically referred to (and referred to herein) as "e-liquid", is heated by a heater to produce an aerosol vapour which is inhaled by a user. An e-liquid typically includes a base liquid as well as nicotine and/or flavourings.

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

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

[0011] Vaping smoking substitute systems can be configured in a variety of ways. For example, there are "closed system" vaping smoking substitute systems which typically have a heater and a sealed tank which is pre-filled with e-liquid and is not intended to be refilled by an end user. One subset of closed system vaping smoking substitute systems include a device which includes the power source, wherein the device is configured to be physically and electrically coupled to a component including the tank and the heater. In this way, 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 used multiple times.

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

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

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

[0015] 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] Potential users of e-smoking devices (e.g. tobacco smokers) have grown accustomed to the ergonomic feel, sensations, and overall appearance of conventional tobacco-burning products or smoking devices, such as cigarettes or cigars.

[0020] To illustrate one such example; when a conventional cigarette or cigar is lit at one end, and particularly after it has been smoked for a period of time, glowing embers (i.e. typically located at the lit end) are known to progressively "burn down" towards the opposite end (i.e. towards the filter tip) of that cigarette or cigar. It is also known that once these glowing embers have visibly reached (or nearly reached) the opposite end of the cigarette or cigar, at this point the user is able to determine that the cigarette or cigar has fully (or almost fully) burnt out. From this, the users are then able to determine that the conventional cigarette or cigar in question is near-

ing the end of its use. In this way, conventional cigarettes and cigars have long provided a visual indication to the users of an approximate time scale of available usage time (i.e. smoking time) left, sometimes referred to in the art as a "temporal feel".

[0021] For these reasons at least, it is a known problem in the art that many known e-smoking devices (e.g. e-cigarettes) lack the above-described temporal feel of conventional cigarettes or cigars. This has led to a number of disadvantages associated with known e-smoking devices currently on the market. This is problematic, as many potential users (e.g. smokers of conventional cigarettes or cigars), that may be considering using, or switching to, e-cigarettes, are concerned about how they would keep track of their usage, and/or visually determine a usage time, without the temporal feel that they may have grown very accustomed to. As such, many potential users may subsequently be discouraged from using (or switching to) e-cigarettes as a result of these concerns. Accordingly, there is a need for an improved aerosol delivery device/system which addresses at least some of the problems of the known devices and systems.

SUMMARY OF THE INVENTION

[0022] According to a first aspect of the invention there is an aerosol delivery device (e.g. a smoking substitute device) for use with a consumable component containing an aerosol precursor (e.g. an e-liquid): the aerosol delivery device comprising;

- a controller;
- an input means;
- a visual feedback means;

wherein:

- the input means is configured to detect a trigger input from a user, and to output a trigger signal to the processor;
- in response to receiving the trigger signal, the controller is configured to initiate a preselected mode of operation, associated with a total available usage;
- when the device is operating in the preselected mode, the visual feedback means is configured to indicate a remaining available usage of the device to the user.

[0023] An associated advantage of this first aspect of the invention is that the visual feedback means is able to indicate a remaining available usage of the aerosol delivery device to the user. This allows the users to visually keep track of their usage, and/or visually determine a usage time in a way they may be already accustomed to when using conventional tobacco-burning products. As such, many potential users may feel more comfortable using (or switching to) the device invention from conventional tobacco-burning products. Furthermore, the inven-

tion also provides an easy way for the user to determine the remaining available usage in a readily accessible way (i.e. by a visual feedback), which is further advantageous over known e-cigarette (or "vaping") devices.

[0024] In other words, the invention advantageously provides a desired "temporal feel" for the user, typically only associated with conventional tobacco-burning products. In this way, the user of the device is advantageously provided with an e-smoking experience which more closely mimics the behaviour of a conventional cigarette or cigar. As a result, this may further advantageously make the user more comfortable, or at ease with, with using an e-cigarette device.

[0025] Optional features will now be set out. These are applicable singly or in any combination with any aspect.

[0026] The visual feedback means may comprise at least one light source.

[0027] To illustrate, a user may be able to provide a trigger input to initiate a preselected mode of operation, where one such mode may be a "burn down" mode, whereby the device provides a visual feedback in the form of a light source, that may mimic the behaviour of a conventionally lit (i.e. burning) cigarette or cigar. In other words, the device may be configured to receive a trigger input in order to initiate a smoking session, in which the devices operates in a "burn down" mode, in order to indicate to a user an amount of available usage remaining. One advantage is that the visual feedback to the user can be seen in dark or low lit areas, or in areas with low ambient light. Another associated advantage is that the light source is able to mimic the burning or glowing embers associated with conventional tobacco-burning products. In this way, the user of the device is advantageously provided with an e-smoking experience which more closely mimics the behaviour of a conventional cigarette or cigar. Again, this may further advantageously make the user more comfortable, or at ease with, with using an e-cigarette device.

[0028] The total available usage of the device may be defined in terms of a predetermined total number of puffs, or a predetermined total amount of smoking time.

[0029] Preferably, a predetermined total number of puffs, or a predetermined total amount of smoking time may refer to a fixed (e.g. user pre-set) value or amount, and therefore may not be dependent on other aspect/component of the device, such the amount of battery, power source, or power source capacity available, etc. For example, the user may be able to configure the device to provide a predetermined total number of puffs available for inhalation by the user, or a predetermined total amount of smoking time available to the user. This may be defined by the user via an application (or "app") installed on a user's personal device (e.g. a smartphone) which may be in wireless or wired communication with the device. For example, the application may include a graphical user interface which allows the user to input or select the total number of puffs available for inhalation by that user, and/or the total amount of smoking time

available to that user.

[0030] This advantageously allows the user to better customise the device's e-smoking experience, particularly if the user is accustomed to smoking conventional cigarettes which typically may a predetermined (e.g. a finite number) of inhalation puffs in them, or have a predetermined smoking time associated with them. In this way the user of the device is further provided with an e-smoking experience which is customisable, and therefore better mimics the behaviour of conventional cigarettes that may be familiar to that user. Again, this may further advantageously make the user more comfortable, or at ease with, with using an e-cigarette device.

[0031] In some embodiments, different user inputs may correspond to differently-defined predetermined numbers of puffs or smoking times. Specifically, in response to a first user input, the input means may be configured to output a first trigger signal to the controller, which causes the device to initiate a first preselected mode of operation, and in response to a second user input, the input means may be configured to output a second trigger signal to the controller, which causes the device to initiate a second preselected mode of operation, wherein the predetermined total available usage associated with the first preselected mode of operation is different from the predetermined available usage associated with the second preselected mode of operation. More generally, the input means may be configured to receive any of a plurality of user inputs, and to generate one of a plurality of trigger signals, corresponding to that user input, and in response to the received trigger signal, the controller may be configured to cause the device to initiate a corresponding respective preselected mode of operation. In this way, the user can change the characteristics of the smoking session which they initiate by varying the input. For example, the user may be able to choose between a "short" and a "long" smoking session, depending on what they desire at the time. The aerosol delivery device of the present invention is thus able to provide a user with more flexibility, in this respect, than a conventional cigarette. As above, each of the preselected modes of input may be configurable by a user.

[0032] The input means of the invention may be in the form of a movement detection unit, configured to detect some kind of motion of the device. Preferably, the movement detection unit includes an accelerometer which is configured to detect an acceleration, a force, or an impulse applied to the device. In preferred embodiments, the accelerometer is configured to detect a trigger input in the form of one or more taps on the device by a user. Referring to the previous section, different numbers of taps may correspond respectively to different preselected modes of operation, and thus, to different predetermined total available usages.

[0033] Alternatively, the accelerometer may be configured to detect movement of the device when the device is moved in any way, and typically when the device is either tapped, shaken, touched, or knocked by the user.

However, in preferred embodiments, the trigger input includes a complex pattern of movements which are unlikely to be effected unintentionally, e.g. if the device is located the pocket of a walking user. The trigger input may have an associated frequency or time period (i.e. the rate of, or interval between successive taps, knocks or shakes) which does not correspond to an average human walking pace. For example, a user may be able to trigger an input to activate the previously discussed "burn down" mode by tapping the device twice. It is well known in the art, that users of conventional cigarettes (at least) are often required to "tamp" or "pack" the cigarette in order to physically condense the tobacco contained within the (typically) paper cylindrical body of that cigarette. As such, many smokers are accustomed to "tamping" or "packing" each cigarette in this way before using them (e.g. lighting the tip of the cigarette, often refer to as "lighting up"). This behaviour is therefore instinctive to many smokers and often done out of habit.

[0034] In this way, by having a trigger input to the device in the form of an accelerometer, the device is able to detect a user motion typically associated with conventional smoking behaviour, namely "tamping" or "packing" (e.g. tapping, shaking, knocking, etc.) of conventional cigarettes. The device advantageously responds to a trigger input provided by a user that would otherwise only be associated with conventional cigarettes. In this way, the user of the device may further be provided with an e-smoking experience which more closely mimics the behaviour of a conventional cigarette. Again, this may further advantageously make the user more comfortable, or at ease with, with using an e-cigarette device.

[0035] The device may comprise a vibrating means, wherein the controller is configured to cause the vibrating means to vibrate in response to receiving the trigger signal, thereby generating audible or haptic feedback.

[0036] A user may wish to feel physical responses, such as vibrations, from the device additionally, or alternatively to, receiving a visual feedback from the device. The vibrating means allow the user to additionally feel responses from a device (e.g. in response to receiving a trigger signal). This is particularly advantageous for the user if the device is not directly visible to the user (e.g. if the device is in the user's pocket). The vibrating means may be in the form of a haptic motor for vibrating the device and/or producing an audible noise for the user to hear. Alternatively, or additionally, the vibrating means may be in the form of a buzzer or alarm. Advantageously, the vibrating means may also allow the user to hear responses from the device when the user is located a certain distance away from the proximity of the device, such as in the form of an audible noise. To illustrate, this may be in the form of the device vibrating on a solid surface (e.g. on a bedside table), or the device sounding a buzzer/alarm out loud.

[0037] The at least one light source may be configured to display a flashing light signal and/or display a solid light signal to the user for a predetermined time period.

[0038] Advantageously, by using solid light signals and/or flashing lights signals, the device may be able to communicate, or visibly convey, different types of alerts, notifications, and/or or messages to the user in a visual way. Furthermore, a flashing light signal may mimic the flickering and/or glowing embers typically associated with conventional tobacco-burning products. This way, the user of the device may further be provided with an e-smoking experience which more closely mimics the behaviour of a conventional cigarette. Again, this may further advantageously make the user more comfortable, or at ease with, with using an e-cigarette device.

[0039] The device, specifically the device body may include an illumination region, configured to be illuminated by the one or more light sources. For example, the one or more light sources may be located inside the device body, and the illumination region may be include a transparent or translucent material located such that the light sources are visible from outside the device.

[0040] The illumination region may include light diffusion plastic for diffusing light produced by the at least one light source. An associated advantage may be that the diffusion plastic is able to diffuse light produced by the device in such a way that it creates a visual effect which resembles the gradual light-fade associated with the burning (or burning out) or glowing embers in conventional tobacco-burning products. This is also referred to as a "feathering" effect. In other words, the diffusion plastic may advantageously be able to remove the stark glow of artificial light (e.g. as produced by light emitting diodes, hereafter referred to as LEDs), as are typically produced in known e-cigarette products on the market. In this way, any "hard" to visually "sharp" edges of the produced/emitted light are reduced by the light diffusion plastic of the device. In this way, the user of the device may further be provided with a smoking experience which more closely mimics the behaviour of a conventionally lit (i.e. burning) cigarette or cigar. Again, this may further advantageously make the user more comfortable, or at ease with, with using an e-cigarette device. Alternatively, or additionally, the above-described feathering-effect may also be enhanced by varying the radius of curvature the body of the device (also referred to as a "light pipe" or "body radius drop-off").

[0041] In one example, the diffusion plastic is formed from an electrically and thermally insulating material. In this way, the diffusion plastic may function as a protective mask in front of the LEDs in order to avoid hot spots forming on the outer surface of the device's body. This advantageously prevents the user from burning their hands, or simply avoids the device's body becoming too warm, and thereby becoming uncomfortable to hold for long periods of time, for example.

[0042] The controller may be configured to vary an amount of the illumination region which is illuminated at a given time, based on the remaining available usage, for example by controlling the one or more light sources. The controller may also be configured to vary a bright-

ness of the one or more light sources, again based on the remaining available usage.

[0043] The visual feedback means may include a plurality of light sources (e.g. an array of LEDs, bulbs) arranged along the illumination region. In embodiments in which the illumination region includes a translucent or transparent material, the light sources may be located beneath this material. Alternatively, the light sources may be located on an external surface of the device or device body. Alternatively, or additionally, the at least one light source may be a single light source (e.g. a single bulb, LED).

[0044] The illumination region may be formed along a length of the body of the device, and is preferably elongate in shape, and in preferred embodiments may have a length approximately the same as a traditional cigarette. The illumination region may be formed along either the full, or partial, longitudinal length of the device body.

[0045] The controller may be configured to control the visual feedback means such that the proportion of the illumination region which is illuminated provides an indication of the remaining available usage. For example, when the illumination region is illuminated along the full longitudinal length of the device, the illumination region may visibly resemble the length of an un-lit (i.e. un-used) conventional cigarette to the user. Similarly, when the illumination region is illuminated along the partial length of the device, the illumination region may instead visibly resemble the length of a lit cigarette (i.e. in use) to the user. In other words, this advantageously allows the illumination region to visibly resemble a conventional cigarette which is progressively "burning down" towards the opposite end (i.e. undergoing the "burn down" mode). In some embodiments, the proportion of the illumination region which is illuminated may correspond to a proportion of the plurality of the light sources which are illuminated at a given time. In other words, the controller may be configured to control the visual feedback means such that the proportion of the plurality of light sources which is illuminated corresponds to the remaining available usage.

[0046] In both scenarios, the user of the device is advantageously provided with an e-smoking experience which more closely mimics the behaviour of a conventional cigarette. Again, this may further advantageously make the user more comfortable, or at ease with, with using an e-cigarette device.

[0047] The at least one light source is configured to display a full brightness level in order to indicate:

a full number of inhalation puffs available,
or a full time duration of each inhalation puff available;

and is further configured to display a partial brightness level in order to indicate:

a partial number of inhalation puffs available,

or a partial time duration of each inhalation puff available;

and is further configured to display a zero-brightness level in order to indicate:

a zero number of inhalation puffs available,
or a zero time duration of each inhalation puff available.

[0048] In one example, the brightness level of the at least one light source (e.g. an array of LEDs) may be varied from full brightness (i.e. a 100% brightness level), through a partial brightness (e.g. a 50% brightness level), to a zero brightness (i.e. a 0% brightness level). In other words, the device may be able to vary the brightness level being displayed to the user depending on whether there is either a full, partial, or zero number of inhalation puffs available to that user. Similarly, the device may be able to vary the brightness level being displayed to the user in depending on whether there is either a full, partial, or zero time of duration of each inhalation puff available to that user. As the skilled person will appreciate, measured brightness as a percentage may be defined by a continuous spectrum or range, i.e. ranging between a full-brightness (i.e. 100%) and zero-brightness (i.e. 0%). In this way, any brightness percentage value falling between 100% and 0% brightness may be considered a "partial brightness".

[0049] Advantageously, these varying brightness levels of the device can visually indicate two different values (or device parameters) to the user at any one time. Moreover, these varying brightness levels provide the user with a visual indication of any 'on-the-fly' changes to these two different values (or device parameters) progressively over time, or during use of the device. This therefore provides the user with an easy-to-read way of monitoring the progress of their e-smoking session at any one time.

[0050] The controller may be configured to determine an amount of power remaining in a power supply, and the visual feedback means may be further configured to indicate the remaining amount of power. The controller may be configured to cause the visual feedback means to illuminate the illumination region in a different colour, depending on the amount of power remaining.

[0051] In an example, the visual feedback means may be further configured to indicate an amount of remaining amount of power left in the power supply of the device to the user by varying the colour, brightness, and/or intensity of the light emitted by the at least one light source.

[0052] Advantageously this further allows the device to visually indicate a battery power level to the user 'on-the-fly'. Again, the device therefore provides the user with an easy-to-read method of monitoring the battery power levels available to the device (e.g. via the battery), so that they may be able to time-manage their e-smoking sessions more effectively. To illustrate an example sce-

nario; a user may determine to not spend a lot of time using the device for an e-smoking session if the power supply is indicated to be low, whereas they may determine to spend more time using the device if the opposite is true (i.e. the power supply is indicated to be ample).

[0053] The controller may be configured to compare the determined amount of power remaining in the power supply with a predetermined threshold, and if the amount of power remaining is greater than or equal to the threshold, the controller is configured to cause the visual feedback means to generate the illumination region in a first colour, and if the amount of power remaining is less than the threshold, the controller is configured to cause the visual feedback means to generate the illumination region in a second colour.

[0054] The choice of colour generated in the illumination region of the device may advantageously indicate the criticality (or severity) of the current power level to the user. For example, a first colour may be amber to indicate to the user that the current power level is at a non-critical level, whereas the second colour may be red, indicating to the user that the current power level is at a critically low level.

[0055] In a preferred embodiment of the device 102, if the controller determines that the amount of power remaining is greater than or equal to a threshold value of 20% of the total power supply capacity available (i.e. the threshold is $\geq 20\%$), then the controller is configured to cause the visual feedback means (e.g. an array of LEDs) to illuminate the illumination region in amber coloured light. In contrast, if the controller determines that the amount of power remaining is less than or equal to a threshold value of 20% of the total power supply capacity available (i.e. the threshold is $\leq 20\%$), then the controller is configured to cause the visual feedback means to illuminate the illumination region in red coloured light. As the skilled person will appreciate, the specific threshold value is not limited to being either above or below a 20% value of the total power capacity available, and may instead be any pre-set percentage value of the total power capacity available. As the skilled person will further appreciate, the visual feedback means may be illuminated in any coloured light (e.g. white, blue, or green, etc.) and are not limited to the specific colours mentioned or illustrated in this application.

[0056] According to a second aspect of the invention there a method of delivering an aerosol precursor from the aerosol delivery device (as previously described); wherein the method comprises the following steps:

detecting a trigger input from the user,
outputting the trigger signal to the controller;
in response to receiving the trigger signal, causing the device to enter a preselected mode of operation, associated with a predetermined total available usage;
and when the device is operating in the preselected mode, providing a visual feedback means to indicate

a remaining available usage of the device to the user.

[0057] The device comprises a power supply which may be a battery. The source of power may be a capacitor.

[0058] The device may comprise the device body for housing the power source and/or other electrical components. 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.

[0059] The device body may have a length of between 5 and 30 cm e.g. between 10 and 20 cm such as between 10 and 13 cm. The maximum depth of the device body may be between 5 and 30 mm e.g. between 10 and 20 mm.

[0060] 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.

[0061] The radius of curvature of the front surface may be between 10 and 50 mm, preferably between 10 and 40 mm, preferably between 10 and 30 mm, preferably between 10 and 20 mm, more preferably between 10 and 15 mm, more preferably substantially 13.5 mm.

[0062] The front and rear surfaces may meet at opposing transverse edges of the device body. This leads to a mandorla-/lemon-/eye-shaped cross sectional shape of the device body.

[0063] The transverse edges may have a radius of curvature that is significantly smaller than the radius of curvature of either the front or rear surface. This leads to the transverse edges being substantially "pointed" or "sharp". The transverse edges may have a radius of curvature in the transverse dimension of less than 10 mm, preferably less than 5 mm, preferably less than 2 mm, preferably less than 1 mm.

[0064] The transverse edges may extend substantially the full longitudinal length of the device body. However, in some embodiments, the transverse edges may only extend along a longitudinal portion of the device body.

[0065] The device body may have a curved longitudinal axis i.e. curved in a direction between the front and rear faces.

[0066] The front and/or rear surface of the device body may include the visual user feedback means, for example one or more lights e.g. one or more LEDs.

[0067] In some embodiments, the device body may include an illumination region configured to allow light provided by a light source (e.g. one or more LEDs) within the device body to shine through.

[0068] As discussed, the device may comprise a movement detection unit (e.g. an accelerometer) for detecting a movement of the device, and a haptic feedback generation unit (e.g. an electric motor and a weight mounted

eccentrically on a shaft of the electric motor).

[0069] As discussed, the device may include a controller in the form of the processor.

[0070] The controller may be configured to wherein the processor is configured to identify an operation of the smoking substitute device; and control the source of light contained within the device body, to illuminate the illumination region based on the operation of the smoking substitute device identified.

[0071] The controller may be configured to control the haptic feedback generation unit to generate the haptic feedback in response to the detection of movement of the system.

[0072] A memory may be provided and may be operatively connected to the controller. The memory may include non-volatile memory. The memory may include instructions which, when implemented, cause the controller to perform certain tasks or steps of a method. The device may comprise a wireless interface, which may be configured to communicate wirelessly with another device, for example a mobile device, e.g. via Bluetooth®. To this end, the wireless interface could include a Bluetooth® antenna. Other wireless communication interfaces, e.g. WiFi®, are also possible. The wireless interface may also be configured to communicate wirelessly with a remote server.

[0073] An airflow (i.e. puff) sensor may be provided that is configured to detect a puff (i.e. inhalation from a user). The airflow sensor may be operatively connected to the controller so as to be able to provide a signal to the controller that is indicative of a puff state (i.e. puffing or not puffing). The airflow sensor may, for example, be in the form of a pressure sensor or an acoustic sensor. The controller may control power supply to a heating element in response to airflow detection by the sensor. The control may be in the form of activation of the heating element in response to a detected airflow. The airflow sensor may form part of the device. The heating element may be used in a vaporiser to vaporise an aerosol precursor. The vaporiser may be housed in a vaporising chamber.

[0074] In a second aspect, there is provided an aerosol delivery system comprising a device according to the first aspect and a component for containing an aerosol precursor.

[0075] The component may be an aerosol-delivery (e.g. a smoking substitute) consumable i.e. in some embodiments the component may be a consumable component for engagement with the aerosol-delivery (e.g. a smoking substitute) device to form the aerosol-delivery (e.g. s smoking substitute) system.

[0076] 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, such that there is snap engagement between the device and the consumable component. Alternatively, the de-

vice and the consumable component may be physically coupled together by screwing one onto the other, or through a bayonet fitting.

[0077] Thus, the consumable component may comprise one or more engagement portions for engaging with the device.

[0078] 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 (which may extend through the transverse plate of the lower portion of the insert). Thus, when the device is engaged with the consumable component, the electrical interface may be configured to transfer electrical power from the power source to a heating element of the consumable component. The electrical interface may also be used to identify the consumable component from a list of known types. The electrical interface may additionally or alternatively be used to identify when the consumable component is connected to the device.

[0079] 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.

[0080] In other embodiments, the component may be integrally formed with the aerosol-delivery (e.g. a smoking substitute) device to form the aerosol-delivery (e.g. s smoking substitute) system.

[0081] 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).

[0082] The smoking substitute system may comprise an airflow path therethrough, the airflow path extending from an air inlet to an outlet. 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).

[0083] The airflow path passes the vaporiser between the air inlet to the air outlet.

[0084] The airflow path may comprise a first portion extending from the air inlet towards the vaporiser. The second portion of the airflow path passes through the vaporising chamber to a conduit that extends to the air outlet. The conduit may extend along the axial centre of the component.

[0085] References to "downstream" in relation to the airflow path are intended to refer to the direction towards the air outlet/outlet portion. Thus the second and third portions of the airflow path are downstream of the first portion of the airflow path. Conversely, references to "up-

stream" 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/third portions of the airflow path (and the air outlet/outlet portion).

[0086] 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.

[0087] The component 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.

[0088] At least a portion of one of the walls defining the tank may be translucent or transparent.

[0089] The conduit 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.

[0090] As discussed above, the air flow path passes the vaporiser between the air inlet to the air outlet. The vaporiser may comprise a wick e.g. an elongate wick which may have a cylindrical shape.

[0091] The wick may be oriented so as to extend in the direction of the width dimension of the component (perpendicular to the longitudinal axis of the component). Thus the wick may extend in a direction perpendicular to the direction of airflow in the airflow path.

[0092] The vaporiser may be disposed in the vaporising chamber. The vaporising chamber may form part of the airflow path.

[0093] The wick may comprise a porous material. A portion of the wick may be exposed to airflow in the airflow path. The wick may also comprise one or more portions in contact with liquid aerosol precursor stored in the tank. For example, opposing ends of the wick may protrude into the tank and a central portion (between the ends) may extend across the airflow path so as to be exposed to airflow. Thus, fluid may be drawn (e.g. by capillary action) along the wick, from the tank to the exposed portion of the wick.

[0094] The heating element may be in the form of a filament wound about the wick (e.g. the filament may extend helically about the wick). The filament may be wound about the exposed portion of the wick. The heating element is electrically connected (or connectable) to the 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 airflow along the airflow path. This vapour may subsequently cool to form an aerosol e.g. in the conduit.

[0095] In a third aspect there is provided a method of using the aerosol-delivery (e.g. smoking substitute) system according to the second aspect, the method com-

prising engaging the consumable component with an aerosol-delivery (e.g. smoking substitute) device (as described above) having a power source so as to electrically connect the power source to the consumable component (i.e. to the vaporiser of the consumable component).

[0096] 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

[0097] 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 components of the device;
- Fig. 2B is a schematic of the components of the component;
- Fig. 3 is a section view of the component;
- Fig. 4 a perspective view of an embodiment of the device of the system;
- Fig. 5 is an end view of the device of the system;
- Fig. 6 is a schematic of the components of the device according to another embodiment;
- Fig. 7 is flow diagram illustrating the operation of the device shown in Fig. 6;
- Fig. 8 is a perspective view of the device shown in Fig. 6 ;
- Fig 9. a perspective view of the device according to another embodiment;
- Fig. 10A is a front view of the device showing full illumination level;
- Fig. 10B is a front view of the device showing a partial illumination level;
- Fig. 10C is a front view of the device showing a zero

illumination level.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0098] 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.

[0099] Fig. 1A shows a first embodiment of a smoking substitute system 100. 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.

[0100] 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 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.

[0101] 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.

[0102] The component 104 includes a mouthpiece (not shown in Fig. 1A, 1B or 1C) at an upper end 109 of the component 104, and one or more air inlets (not shown) in fluid communication with the mouthpiece such that air can be drawn into and through the component 104 when a user inhales through the mouthpiece. The tank 106 containing e-liquid is located at the lower end 111 of the component 104.

[0103] The tank 106 includes a window 112, which allows the amount of e-liquid in the tank 106 to be visually assessed. The device 102 includes a slot 114 so that the window 112 of the component 104 can be seen whilst the rest of the tank 106 is obscured from view when the component 104 is inserted into the cavity at the upper end 108 of the device 102.

[0104] 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. Whilst not shown, the component 104 may identify itself to the device 102, via an electrical interface, RFID chip, or barcode.

[0105] 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.

[0106] 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 power source 118, a controller (or a processor) 120, a memory 122, a wireless interface 124, an electrical interface 126, and, optionally, one or more additional components 128.

[0107] The power source 118 is preferably a battery, more preferably a rechargeable battery. The processor 120 may include a microprocessor, for example. The memory 122 preferably includes non-volatile memory. The memory may include instructions which, when implemented, cause the processor 120 to perform certain tasks or steps of a method.

[0108] 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.

[0109] 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 source 118 to the component 104 (i.e. upon activation of the smoking substitute system 100).

[0110] 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 processor 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.

[0111] The additional components 128 of the device 102 may comprise the light 116 discussed above.

[0112] The additional components 128 of the device 102 also comprises the charging connection 115 configured to receive power from the charging station (i.e. when the power source 118 is a rechargeable battery). This may be located at the lower end 110 of the device 102.

[0113] The additional components 128 of the device 102 may, if the power source 118 is a rechargeable battery, include a battery charging control circuit, for controlling the charging of the rechargeable battery. However,

er, a battery charging control circuit could equally be located in the charging station (if present).

[0114] The additional components 128 of the device 102 may include a sensor, such as an airflow (i.e. puff) sensor for detecting airflow in the smoking substitute system 100, e.g. caused by a user inhaling through a mouthpiece 136 of the component 104. The smoking substitute system 100 may be configured to be activated when airflow is detected by the airflow sensor. This sensor could alternatively be included in the 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.

[0115] The additional components 128 of the device 102 may include a user input, e.g. a button. The smoking substitute system 100 may be configured to be activated when a user interacts with the user input (e.g. presses the button). This provides an alternative to the airflow sensor as a mechanism for activating the smoking substitute system 100.

[0116] As shown in Fig. 2B, the component 104 includes the tank 106, an electrical interface 130, a vaporiser 132, one or more air inlets 134, a mouthpiece 136, and one or more additional components 138.

[0117] 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 source 118 in the device 102 to the vaporiser 132 in the component 104.

[0118] The vaporiser 132 is configured to heat and vaporise e-liquid contained in the tank 106 using electrical energy supplied from the power source 118. As will be described further below, the vaporiser 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.

[0119] 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 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.

[0120] In operation, a user activates the smoking substitute system 100, e.g. through interaction with a user input forming part of the device 102 or by inhaling through the mouthpiece 136 as described above. Upon activation, the processor 120 may supply electrical energy from the power source 118 to the vaporiser 132 (via electrical interfaces 126, 130), which may cause the vaporiser 132 to heat e-liquid drawn from the tank 106 to produce a

vapour which is inhaled by a user through the mouthpiece 136.

[0121] 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 electronic 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.

[0122] It should be appreciated that the smoking substitute system 100 shown in figures 1A to 2B is just one exemplary implementation of a smoking substitute system. 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).

[0123] Fig. 3 is a section view of the component 104 described above. The component 104 comprises a tank 106 for storing e-liquid, a mouthpiece 136 and a conduit 140 extending along a longitudinal axis of the component 104. In the illustrated embodiment the conduit 140 is in the form of a tube having a substantially circular transverse cross-section (i.e. transverse to the longitudinal axis). The tank 106 surrounds the conduit 140, such that the conduit 140 extends centrally through the tank 106.

[0124] A tank housing 142 of the tank 106 defines an outer casing of the component 104, whilst a conduit wall 144 defines the conduit 140. The tank housing 142 extends from the lower end 111 of the component 104 to the mouthpiece 136 at the upper end 109 of the component 104. At the junction between the mouthpiece 136 and the tank housing 142, the mouthpiece 136 is wider than the tank housing 142, so as to define a lip 146 that overhangs the tank housing 142. This lip 146 acts as a stop feature when the component 104 is inserted into the device 102 (i.e. by contact with an upper edge of the device 102).

[0125] The tank 106, the conduit 140 and the mouthpiece 136 are integrally formed with each other so as to form a single unitary component and may e.g. be formed by way of an injection moulding process. Such a component may be formed of a thermoplastic material such as polypropylene.

[0126] The mouthpiece 136 comprises a mouthpiece aperture 148 defining an outlet of the conduit 140. The vaporiser 132 is fluidly connected to the mouthpiece aperture 148 and is located in a vaporising chamber 156 of the component 104. The vaporising chamber 156 is downstream of the inlet 134 of the component 104 and is fluidly connected to the mouthpiece aperture 148 (i.e. outlet) by the conduit 140.

[0127] The vaporiser 132 comprises a porous wick 150 and a heater filament 152 coiled around the porous wick 150. The wick 150 extends transversely across the chamber vaporising 156 between sidewalls of the chamber

156 which form part of an inner sleeve 154 of an insert 158 that defines the lower end 111 of the component 104 that connects with the device 102. The insert 158 is inserted into an open lower end of the tank 106 so as to seal against the tank housing 142.

[0128] In this way, the inner sleeve 154 projects into the tank 106 and seals with the conduit 140 (around the conduit wall 144) so as to separate the vaporising chamber 156 from the e-liquid in the tank 106. Ends of the wick 150 project through apertures in the inner sleeve 154 and into the tank 106 so as to be in contact with the e-liquid in the tank 106. In this way, e-liquid is transported along the wick 150 (e.g. by capillary action) to a central portion of the wick 150 that is exposed to airflow through the vaporising chamber 156. The transported e-liquid is heated by the heater filament 152 (when activated e.g. by detection of inhalation), which causes the e-liquid to be vaporised and to be entrained in air flowing past the wick 150. This vaporised liquid may cool to form an aerosol in the conduit 140, which may then be inhaled by a user.

[0129] Fig. 4 shows a perspective view of an embodiment of the device 102 engaged with the component 104 at the upper end 108. The device 102 includes a charging connection 115 at the lower end 110.

[0130] The front surface 201 of the device body 200 is curved in the transverse dimension. The rear surface 202 of the device body 200 is curved in the transverse dimension. The curvatures of the front surface 201 and rear surface 202 are of the opposite sense to one another. Both front and rear surfaces 201, 202 are convex in the transverse dimension. This leads to a mandorla-/lemon-/eye-shaped cross sectional shape of the device body 200.

[0131] The front surface 201 and rear surface 202 meet at two transverse edges 205. The transverse edges 205 have a radius of curvature that is significantly smaller than the radius of curvature of either the front 201 or rear surface 202. This leads to the transverse edges being substantially "pointed" or "sharp". The transverse edges may have a radius of curvature in the transverse dimension of less than 1 millimetre.

[0132] As illustrated in Fig. 4, the transverse edges 205 extend substantially the full longitudinal length of the device body 200.

[0133] The front surface 201 of the device body 200 may include visual user feedback means.

[0134] Fig. 5 illustrates a schematic transverse cross section through the device 102 of Fig. 4, in accordance with an embodiment. The front surface 201 and rear surface 202 are shown meeting at the transverse edges 205 on either side of the device body 200. The radius of curvature in the transverse dimension of the front surface 201 is equal to the radius of curvature in the transverse dimension of the rear surface 202.

[0135] The radius of curvature of the front surface 201 may be between 10 and 15 mm.

[0136] Fig. 6 is a schematic drawing of the device 102 according to another embodiment of the invention. As is

apparent from Fig. 6, this embodiment of the device 102 includes a power source 118, a processor 120, a memory 122, a wireless interface 124, an electrical interface 126, a movement detection unit 117, and a visual feedback means 103. In this way, the embodiment of the device 102 shown in Fig. 6 is otherwise similar to the embodiment shown in Fig. 2A, with the exception of the movement detection unit 117 and the visual feedback means 103. The device 102 shown in Fig. 6 is configured to connect to the component 104, as shown in Fig. 1C, Fig. 2B, Fig. 3, and Fig. 4 in the same way as previously described.

[0137] Fig. 7 is a flow diagram illustrating the operating steps associated with the device 102, as illustrated in Fig. 6. Referring to Fig. 7, the movement detection unit 117 is configured to detect a trigger input 105 from a user. In one embodiment, the trigger input 105 is in the form of the user tapping on the body 200 of the device 102. The movement detection unit 117 is then configured to output a trigger signal 107 to the processor 120. In response to receiving the trigger signal 107, the processor 120 is configured to cause the device 102 to enter a preselected mode of operation 113. Once the device 102 is operating in the preselected mode 113, the visual feedback means 103 is then configured to indicate an available usage of the device to the user.

[0138] An associated advantage of this is that the visual feedback means 103 is able to indicate an available usage of the device 102 to the user. This allows the user to visually keep track of their usage, and/or visually determine a usage time in a way they may be already accustomed to when using conventional tobacco-burning products. As such, many potential users may feel more comfortable using (or switching to) the device 102 from conventional tobacco-burning products. Furthermore, the device 102 also provides an easy way for the user to determine the available usage in a readily accessible way (i.e. by a visual feedback 103), which is further advantageous over known e-cigarette (or "vaping") devices. In other words, the device 102 advantageously provides a "temporal feel" for the user, typically only associated with conventional tobacco-burning products. In this way, the user of the device 102 is advantageously provided with an e-smoking experience which more closely mimics the behaviour of a conventional cigarette or cigar. As a result, this may further advantageously make the user more comfortable, or at ease with, with using the device 102.

[0139] Fig. 8 shows a more detailed perspective view of an embodiment of the same device 102 illustrated in Fig. 6 and in Fig. 7.

[0140] Analogous to the embodiment of the device 102 shown in both Fig. 1A and in Fig. 4, the device 102 shown in Fig. 8 is configured to be engaged with the component 104 at the upper end 108, in the same way as previously described. Similarly, the device 102 also includes a charging connection 115 at the lower end 110. Referring to Figure 8, the front surface 201 of the device body 200 is curved in the transverse dimension. The rear surface

202 of the device body 200 is curved in the transverse dimension. The curvatures of the front surface 201 and rear surface 202 are of the opposite sense to one another. Both front and rear surfaces 201, 202 are convex in the transverse dimension. This leads to a mandorla-/lem-on-/eye-shaped cross sectional shape of the device body 200. The front surface 201 and rear surface 202 meet at two transverse edges 205. The transverse edges 205 have a radius of curvature that is significantly smaller than the radius of curvature of either the front 201 or rear surface 202. This leads to the transverse edges being substantially "pointed" or "sharp". The transverse edges may have a radius of curvature in the transverse dimension of less than 1 millimetre. As also illustrated in Fig. 8, the transverse edges 205 extend substantially the full longitudinal length of the device body 200. The front surface 201 of the device body 200 may include visual user feedback means 206.

[0141] In one embodiment of the device 102, the visual feedback means 206 comprises at least one light source 206. The at least one light source 206 may be a plurality of light sources, such as an array of LEDs or light bulbs arranged along the body of the device in order to form an illumination region. Alternatively, or additionally, the at least one light source 206 may be a single light source, such as a single bulb, or a single LED strip.

[0142] To illustrate when the device 102 is in use, the user is be able to provide a trigger input 105 to cause the device 102 to enter a preselected mode of operation 113, as is illustrated in Fig. 7. In one embodiment, one such preselected mode of operation 113 is a "burn down" mode, whereby the device 102 provides a visual feedback, via the visual feedback means 206, in the form of a light source. The light source 206 mimics the behaviour of a conventionally lit (i.e. ignited or burning) cigarette or cigar. One advantage is that the light source 206 can be easily seen in dark, or seen low lit areas, or in areas with low ambient light. Another associated advantage is that to the light source 206 is able to mimic the burning or glowing embers associated with conventional tobacco-burning products. In this way, the user of the device 102 is advantageously provided with an e-smoking experience which more closely mimics the behaviour of a conventional cigarette or cigar. Again, this may further advantageously make the user more comfortable, or at ease with, with using an e-cigarette device. As the skilled person will appreciate, the preselected mode of operation 113 is not limited to the previously described "burn down" mode 113, and may refer to any mode of operation 113 of the device 102.

[0143] The light source 206 is shown Fig.8 in the form a faded out "light pipe" 207 being emitted the at least one light source 206, through the front surface 201 of the device 102. The light pipe 207 also extends along the longitudinal length of the body 200, and along the front surface 201, of the device 102. In one embodiment, the light pipe 207 is brighter at one end, and becomes progressively less bright (or more faded) when moving along

the longitudinal axis of the device 102, along the front surface 201, towards the opposite end of the light pipe 207.

[0144] In the embodiment shown in Fig. 8, the light pipe 207 is brightest at an end nearest to the lower end 110 of the device 102 (near to the charging connection 115), and becomes progressively more faded at an opposite end, nearest to the component 104. The light pipe 207 is not limited to the specific configuration shown in Fig. 8 and, as the skilled person will appreciate, the light pipe 207 may instead be orientated in a plurality of different ways (not shown in the figures). Furthermore, as the skilled person will further appreciate, the light source 206 is not limited to the specific form of the light pipe 207 (as shown in Fig. 8), and may take any other two-dimensional shape or form, such as incremented or segmented bar, or a dashed line, to give just a few examples.

[0145] Fig. 9 shows a perspective view of the device according to another embodiment of the device 102 shown in Fig. 8, whereby the colours of the emitted light from the light source 206 are different. Referring to the embodiments shown in Figs 8 and 9, the body 200 of the device 102 comprises a light diffusion plastic for diffusing light produced by the at least one light source 206. In the embodiments shown the material covering at least the illuminated light pipe 207 is formed of a light diffusion plastic. In other embodiments, the area covering the entire longitudinal length of the body 200, and along the entire front surface 201 of the device 102, is formed from a light diffusion plastic

[0146] sAn associated advantage of using light diffusion plastic is that it is able to diffuse light produced by the at least one light source 206. As a result, the diffusion of light creates a visual effect which resembles the gradual light-fade associated with the burning (or burning out) or glowing embers in conventional tobacco-burning products. This is also referred to as a "feathering" effect. In other words, the diffusion plastic may advantageously be able to remove the stark glow of artificial light produced by the light source 206, as is typically produced in known e-cigarette products on the market. In this way, any "hard" to visually "sharp" edges of the produced/emitted light from the light source 206 are reduced by the light diffusion plastic. Alternatively, or additionally, the above-described feathering-effect may also be enhanced by varying the radius of curvature the body 200 of the device 102 (also referred to as a "body radius drop-off").

[0147] In one example, the diffusion plastic is formed from an electrically and thermally insulating material. In this way, the diffusion plastic may function as a protective mask in front of the at least one light source 206 in order to avoid hot spots forming on the outer surface of the device's body 200. This advantageously prevents the user from burning their hands, or simply avoids the device's body becoming too warm, and thereby becoming uncomfortable to hold for long periods of time, for example.

[0148] In one embodiment of the device 102, the movement detection unit 117 of the device 102 includes an

accelerometer 117, and the trigger input 105 is in the form of one or more taps on the device 102 by a user. The accelerometer 117 may be configured to detect movement or motion of the device 102 when the device 102 is moved in any way, and typically when the device 102 is either tapped, shaken, touched, or knocked by the user in any combination. For example, the user may tap anywhere on the surface of the body 200 of the device 102, such as the top surface 201 and/or the rear surface 202 in any combination. In one example embodiment, the user is able to trigger an input 105, in order to activate the previously discussed "burn down" mode 113, by tapping any surface of the body 200 of the device 102 twice. As the skilled person will appreciate, the device 102 may alternatively be tapped any number of times in order to trigger an input 105. Alternatively or additionally, the device 102 may be knocked or tapped at, or near to, the lower end 110 of the device 102 in order to trigger an input 105, such as gently tapping or knocking the lower end 110 against a flattened surface, for example.

[0149] It is well known that users of conventional cigarettes (at least) are often required to "tamp" or "pack" the cigarette in order to physically condense the tobacco contained within the (typically) paper cylindrical body of that cigarette. As such, many smokers are accustomed to "tamping" or "packing" each cigarette in this way before using them (e.g. lighting the tip of the cigarette, often refer to as "lighting up"). This behaviour is therefore instinctive to many smokers and often done out of habit. In this way, by having a trigger input 105 to the device 102 in the form of an accelerometer 117, the device 102 is able to detect user-related motion typically associated with conventional smoking behaviour, namely "tamping" or "packing" (e.g. tapping, shaking, knocking, etc.) of conventional cigarettes. The device 102 therefore advantageously responds to a trigger input 105 provided by a user that would otherwise only be associated with conventional cigarettes.

[0150] In another embodiment, the device 102 comprises a vibrating means (not shown in the figures) wherein the processor 120 is configured to cause the vibrating means to vibrate in response to receiving the trigger signal 105, thereby generating audible or haptic feedback. In one embodiment, the vibrating means is in the form of a haptic motor for vibrating the device 102 and/or producing an audible noise for the user to hear. In an example embodiment, the haptic motor (also known as a haptic feedback generation unit) is in the form of an electric motor and a weight mounted eccentrically on a shaft of the electric motor (also not shown in the figures).

[0151] Alternatively, or additionally, the vibrating means may be in the form of a buzzer or alarm (not shown in the figures). Advantageously, the vibrating means allows the user to hear responses from the device when the user is located a certain distance away from the proximity of the device 102, such as in the form of an audible noise. To illustrate examples, the audible noise may be formed when the device 102 vibrates against a solid sur-

face (e.g. on a bedside table), or the device 102 sounds a buzzer/alarm out loud. A prospective user may wish to feel physical responses, such as vibrations, from the device 102 additionally, or alternatively to, receiving a visual feedback from the device 102. Advantageously, the vibrating means therefore provides a means for the user to feel responses from the device 102 (e.g. in response to receiving a trigger signal 107). This is particularly advantageous for the user if the device 102 is not directly visible to the user (e.g. if the device is in the user's pocket).

[0152] In another embodiment of the device 102, the at least one light source 206 is configured to display a flashing light signal and/or display a solid light signal to the user for a predetermined time period. If the at least one light source 206 is a plurality of light sources, such as an array of LEDs, or an array of light bulbs, then the entire array is configured to display a flashing light signal and/or display a solid light signal for a predetermined time period. In this way, the array of LEDs or light bulbs may be arranged along the body 200 of the device 102 in order to collectively form an "illumination region". Alternatively, if the at least one light source 206 is a single light source 206, such as a single bulb or LED strip, then single light source similarly forms the "illumination region". In this way, the illumination region is perceived by the user to homogeneously illuminated region of the device 102. The appearance of the illuminated region may be further enhanced by the incorporation of the light diffusion plastic (as previously discussed), which may further act to diffuse the light in a homogenous manner. The illumination regions of the device 102 are in the form of the illuminated light pipes 207 shown in both Fig. 8 and Fig. 9.

[0153] Advantageously, by using solid light signals and/or flashing lights signals, the device may be able to communicate, or visibly convey, different types of alerts, notifications, and/or messages to the user in a visual way. Furthermore, a flashing light signal may mimic the flickering and/or glowing embers typically associated with conventional tobacco-burning products. This way, the user of the device may further be provided with an e-smoking experience which more closely mimics the behaviour of a conventional cigarette.

[0154] In another embodiment of the device 102, the at least one light source 206 is further configured to vary an amount of an illumination region 207 which is illuminated, or a brightness level, based on the available usage of the device 102. As previously discussed, the illumination region 207 may be formed along a length of the body 200 of the device 102.

[0155] Fig. 10 illustrates three separate side-on views of the device 102 according to the same embodiment of the device 102 in the present application. Similarly to the embodiments shown in Fig 8 and Fig.9, Fig. 10A shows that the illumination region 207 located along a full longitudinal length of the device 102. Fig. 10B further shows the illumination region 207 located along the partial lon-

gitudinal length of the device 102. In contrast to the other figures, Fig. 10C further shows a total absence of an illumination region 207 on the device 102.

[0156] When the illumination region 207 is illuminated along the full longitudinal length of the device 102 (e.g. as shown in Fig 10A), it visibly resembles the length of an un-lit (i.e. un-used) conventional cigarette to the user. Similarly, when the illumination region 207 is illuminated along the partial length of the device 102 (e.g. as shown in Fig 10B), it instead visibly resembles the length of a lit cigarette (e.g. a cigarette currently being smoked) to the user. When there is a total absence of an illumination region 207 being shown by the device 102 (e.g. as shown in Fig 10C), the user is informed that the device 102 is currently not in use (e.g. the device 102 may be turned off), or at least not triggered to perform the "burn down" mode 113 operation. In other words, device 102 is advantageously configured to allow the illumination region 207 to visibly resemble a conventional cigarette which is progressively "burning down" towards the opposite end (i.e. undergoing the "burn down" mode 113 operation).

[0157] In one embodiment of the device 102, the available usage of the device is defined in terms of a predetermined remaining number of puffs, or a predetermined remaining amount of smoking time. Preferably, a predetermined remaining number of puffs, or a predetermined remaining amount of smoking time may refer to a fixed (e.g. user pre-set) value or amount, and therefore may not be dependent on any other operating component of the device 102, such as the amount of battery, power source, or power source capacity available, etc. In one embodiment, the user may be able to configure the device 102 to provide a predetermined remaining number of puffs available for inhalation by the user, or a predetermined remaining amount of smoking time available to the user.

[0158] In yet another example embodiment, the user is able to define these predetermined values by adjusting the operational settings of the device 102. This may be done via an application (or "app"), that may be installed on a user's personal device (e.g. a smartphone). The personal device may be configured to connect with device 102 via a wireless connection (e.g. via Bluetooth, Wi-Fi, etc.) or via a wired connection (e.g. via a direct connection-cable, a USB port connection etc.). In one embodiment, the application may include a graphical user interface (or GUI) which allows the user to input or select the remaining number of puffs available for inhalation by that user, and/or the remaining amount of smoking time available to that user. This advantageously allows the user to better customise the device's e-smoking experience, particularly if the user is accustomed to smoking conventional cigarettes which typically may have a predetermined (e.g. a finite number) of inhalation puffs in them, or have a predetermined smoking time associated with them.

[0159] In a further embodiment of the device 102, the at least one light source 206 is configured to display a

full brightness level in order to indicate: i) a full number of inhalation puffs available, or a full time duration of each inhalation puff available. The at least one light source 206 is further configured to display a partial brightness level in order to indicate: ii) a partial number of inhalation puffs available, or a partial time duration of each inhalation puff available. The at least one light source 206 is then further configured to display a zero-brightness level in order to indicate: iii) a zero number of inhalation puffs available, or a zero time duration of each inhalation puff available. To illustrate the operation of the device 102 by way of an example, the brightness level of the at least one light source (e.g. an array of LEDs) may be varied from full brightness (i.e. a 100% brightness level), through a partial brightness (e.g. a 50% brightness level), to a zero brightness (i.e. a 0% brightness level). In other words, the device 102 may be able to vary the brightness level being displayed to the user depending on whether there is either a full, partial, or zero number of inhalation puffs available to that user. Similarly, the device 102 may be able to vary the brightness level being displayed to the user in depending on whether there is either a full, partial, or zero time of duration of each inhalation puff available to that user.

[0160] In another example embodiment, the at least one light source 206 may take the form of the previously discussed light pipe 207. As shown in Fig 10, the light pipe 207 may be incremented (e.g. moved up or down) in accordance with the number of inhalation puffs available, or a full time duration of each inhalation puff available. To illustrate the operation of the device 102 by way of an example, the longitudinal length of light pipe 207 may be varied from full length (i.e. as shown in Fig. 10A), through a partial length (e.g. as shown in Fig. 10B), to an absence of any length being shown at all (i.e. as shown in Fig 10C). In other words, the device 102 may be able to increment or vary the overall length of the light pipe 207 being displayed to the user depending on whether there is either a full, partial, or zero number of inhalation puffs available to that user.

[0161] Advantageously, varying either the brightness and/or the longitudinal length of the light pipe 207 can visually indicate two different values (or device 102 "parameters") to the user at any one time and provide the user with a visual indication of any 'on-the-fly' changes to these two different values (or "parameters") progressively over time, or during use of the device 102. This therefore provides the user with an easy-to-read way of monitoring the progress of their e-smoking session.

[0162] In one embodiment, the processor 120 is configured to determine an amount of power remaining in the power supply, and the visual feedback means is further configured to indicate the remaining amount of power.

[0163] In one embodiment, the visual feedback means is configured to vary a colour of the illumination region based on the amount of power remaining in the power supply.

[0164] In an example, the visual feedback means may be further configured to indicate an amount of remaining amount of power left in the power supply of the device 102 to the user by varying the colour, brightness, and/or intensity of the light emitted by the at least one light source 206. Advantageously this further allows the device to visually indicate a battery power level to the user 'on-the-fly'. Again, the device 102 therefore provides the user with an easy-to-read method of monitoring the battery power levels available to the device (e.g. via the battery), so that they may be able to time-manage their e-smoking sessions more effectively. To illustrate an example scenario; a user may determine to not spend a lot of time using the device 102 for an e-smoking session if the power supply is indicated to be low, whereas they may determine to spend more time using the device if the opposite is true (i.e. the power supply is indicated to be ample for use of the device 102).

[0165] In one embodiment the processor 120 is configured to compare the determined amount of power remaining in the power supply with a predetermined threshold, and if the amount of power remaining is greater than or equal to the threshold, the processor is configured to cause the visual feedback means to generate the illumination region in a first colour, and if the amount of power remaining is less than the threshold, the processor is configured to cause the visual feedback means to generate the illumination region in a second colour.

[0166] In one example, the predetermined thresholds may be pre-set percentage (%) values of the total power capacity available within the power supply (e.g. the battery). As the skilled person will appreciate, the threshold value is not limited to being a pre-set percentage (%) value of the total power capacity available, and may instead be any one of a pre-set voltage (V), current (I), or capacitance (C) value associated with the power supply or battery of the device 102, for example.

[0167] The choice of colour generated in the illumination region of the device may advantageously indicate the criticality (or severity) of the current power level to the user. For example, a first colour may be amber to indicate to the user that the current power level is at a non-critical level, whereas the second colour may be red, indicating to the user that the current power level is a critically low level. As the skilled person will further appreciate, the visual feedback means may be illuminated in any coloured light (e.g. white, blue, or green, etc.) and are not limited to the specific colours mentioned or illustrated in this application

In a preferred embodiment of the device 102, if the processor determines that the amount of power remaining is greater than or equal to a threshold value of 20% of the total power supply capacity available (i.e. the threshold is $\geq 20\%$), then the processor is configured to cause the visual feedback means 103 (e.g. an array of LEDs) to illuminate the illumination region in amber coloured light. In contrast, if the processor determines that the amount of power remaining is less than or equal to a threshold

value of 20% of the total power supply capacity available (i.e. the threshold is $\leq 20\%$), then the processor is configured to cause the visual feedback means to illuminate the illumination region in red coloured light. As the skilled person will appreciate, the specific threshold value is not limited to being either above or below a 20% value of the total power capacity available (as given in the preferred embodiment), and may instead be any pre-set percentage value of the total power capacity available.

[0168] In a further embodiment of the device 102, the processor 120 is configured to operate the haptic motor or buzzer in response to a determination that either: some (e.g. 50%) or all (i.e. 100%) of the total battery level has been used up. Preferably the haptic motor is configured to vibrate the device with one vibration at the 50% mark, in order to indicate a progression of the battery usage to the user. Additionally, the visual feedback means 103 may also flash any number of times.

[0169] In another preferred embodiment of the device 102, a user is able to enable to ensure that device 102 enters a preselected mode of operation 113, such as the burn down mode of operation 113 (as previously described). The burn down mode of operation 113 enables the user to activate and/or a select a predetermined e-smoking session (sometimes referred to as a "sessioning" the device 102). For example, the predetermined e-smoking session may be a customisable session, as defined by the specific mode of operation 113. The user customises the session so that the device 102 is configured to provide a predetermined remaining number of puffs available for inhalation, and/or a predetermined remaining amount of smoking time available to the user. Activation of the burn down mode of operation 113 is triggered by a trigger input 105 in the form of a user tapping 105 anywhere on the body 200 of the device 102. The movement detection unit 117, in the form of an accelerometer 117 detects the tapping 105 and is then configured to output a trigger signal 107 to the processor 120. In response to receiving the trigger signal 107, the processor 120 is configured to cause the device 102 to enter the customised burn down mode 113.

[0170] Once the device 102 is operating in burn down mode 113, the visual feedback means 103, in the form of an amber coloured light pipe 207 is illuminated at a full longitudinal length (as shown in Fig. 10A), indicating a full (i.e. 100%) amount of puffs available to the user.

[0171] An e-smoking session may comprise a total of 10 puffs for inhalation by the user. In an example use of the device 102, once the user begins to smoke the device 102 (e.g. inhales any number of puffs), in response to any number of puffs taken by the user, the processor 120 determines how many puffs are left and decrements the amber coloured light pipe 207 accordingly. For example, if the user takes 5 puffs out of a total of available 10 puffs, the processor 120 determines that there are 5 puffs left. The processor 120 subsequently adjusts (or decrements) the illumination of the amber coloured light pipe 207 accordingly, so that it reduces in length and is only

illuminated along a partial longitudinal length (as shown in Fig 10.B), indicating that 50% (i.e. half) of the (initial) total number of puffs have been used up, and that 50% of the (initial) total puffs are still available for inhalation by the user. Decrementing of the light pipe 207 may be adjusted in a discrete way (e.g. decrementing a set amount of length at a time), or instead adjusted in a continuous way. After the user continues to smoke the remaining 5 puffs available, the processor 120 subsequently determines that there are no puffs available (i.e. all the available puffs have been used up). At this point, the processor 120 adjusts the illumination of the amber coloured light pipe 207 accordingly, so that the light pipe 207 reduces in length to zero, and stops all illumination along the longitudinal length (as shown in Fig 10.C), indicating that all (i.e. 100%) of the (initial) total number of puffs have been used up, and that zero (i.e. 0%) of the (initial) total puffs are now available for inhalation by the user.

[0172] Alternatively, or additionally, when the amber coloured light pipe 207 is illuminated at a full longitudinal length (as also shown in Fig. 10A), it indicates a full (i.e. 100%) remaining amount of smoking time available to the user.

[0173] An e-smoking session may be allocated to last 10 minutes in total. In an example use of the device 102, once the user begins to smoke the device 102 (e.g. uses the device 102 for some time). In response to the amount of smoking time already taken up or used by the user, the processor 120 subsequently determines how much allocated smoking is left and decrements the amber coloured light pipe 207 accordingly. For example, if the user smokes for 5 minutes as part of an e-smoking session that is allocated to last 10 minutes in total, the processor 120 determines that there are 5 minutes of allocated smoking time left. The processor 120 subsequently adjusts (or decrements) the illumination of the amber coloured light pipe 207 accordingly, so that it reduces in length and is only illuminated along a partial longitudinal length (as shown in Fig 10.B), indicating that 50% (i.e. half) of the (initial) allocated smoking time has already been used up, and that 50% of the (initial) allocated smoking time is still available to the user. In the same way as previously discussed, decrementing of the light pipe 207 may be adjusted in a discrete way, or adjusted in a continuous way. After the user continues to smoke for the remaining 5 minutes, the processor 120 subsequently determines that there is no allocated smoking time available (i.e. the total allocated smoking time has been fully used up). At this point, the processor 120 adjusts the illumination of the amber coloured light pipe 207 accordingly, so that the light pipe 207 reduces in length to zero. After which, the processor 120 stops all illumination along the longitudinal length (as shown in Fig 10.C), indicating that all (i.e. 100%) of the allocated smoking time has been used up, and that zero (i.e. 0%) of the allocated smoking time are now available for inhalation by the user.

[0174] In a further embodiment of the device 102, the

processor 120 is configured to operate the haptic motor or buzzer in response to a determination that either: i) some (e.g. 50%) or all (i.e. 100%) of the total number of puffs have been used up, or that ii) some (e.g. 50%) or all (i.e. 100%) of the allocated smoking time has been used up. Preferably the haptic motor is configured to vibrate the device with two vibrations at the 50% mark, in order to indicate a progression of usage to the user.

[0175] According to a second aspect of the invention there is a method of delivering an aerosol precursor from the aerosol delivery device (as previously described); wherein the method comprises the following steps:

- i) detecting a trigger input from the user,
- ii) outputting the trigger signal to the processor; and
- iii) in response to receiving the trigger signal, causing the device to enter a preselected mode of operation; and when the device is operating in the preselected mode,
- iv) providing a visual feedback means to indicate an available usage of the device to the user.

[0176] 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.

[0177] 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.

[0178] 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, $\pm 10\%$.

[0179] The words "preferred" and "preferably" are used herein to 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 for use with a consumable component containing an aerosol precursor, the aerosol delivery device comprising:

a controller;
an input means;
a visual feedback means;

wherein:

the input means is configured to detect a trigger input from a user, and to output a trigger signal to the processor;
in response to receiving the trigger signal, the controller is configured to initiate a preselected mode of operation, associated with a total available usage;
when the device is operating in the preselected mode, the visual feedback means is configured to indicate a remaining available usage of the device to the user.

2. The aerosol delivery device of claim 1; wherein the visual feedback means comprises one or more light sources.

3. The aerosol delivery device of any preceding claim, wherein the total available usage of the device is defined in terms of a predetermined total number of puffs, or a predetermined total amount of smoking time, and wherein the predetermined total number of puffs or the predetermined total smoking time is configurable by a user.

4. The aerosol delivery device of claim 3, wherein:

in response to a first user input, the input means may be configured to output a first trigger signal to the controller, which causes the device to initiate a first preselected mode of operation, and in response to a second user input, the input means may be configured to output a second trigger signal to the controller, which causes the device to initiate a second preselected mode of operation, and
the predetermined total available usage associated with the first preselected mode of operation is different from the predetermined available usage associated with the second preselected mode of operation.

5. The aerosol delivery device of any one of claims 1 to 4, wherein the input means includes a movement

detection unit.

6. The aerosol delivery device of claim 5, wherein the movement detection unit includes an accelerometer configured to detect a trigger input in the form of an acceleration, a force, or an impulse applied to the device; and wherein the accelerometer is configured to detect a trigger input in the form of one or more taps on the device by a user.

7. The aerosol delivery device of any one of claims 1 to 6, further comprising a vibrating means, wherein the controller is configured to cause the vibrating means to vibrate in response to receiving the trigger signal, thereby generating audible or haptic feedback.

8. The aerosol delivery device of any one of claims 2 to 7, wherein the body of the device includes an illumination region, configured to be illuminated by the one or more light sources, and wherein the controller is configured to vary an amount of the illumination which is illuminated at a given time, based on the remaining available usage.

9. The aerosol delivery device of claim 8, wherein the visual feedback means includes a plurality of light sources, and the controller is configured to control the visual feedback means such that the proportion of the plurality of light sources which is illuminated corresponds to the remaining available usage.

10. The aerosol delivery device of any one of claims 2 to 9, wherein the controller is configured to vary a brightness of the one or more light sources, based on the remaining available usage.

11. The aerosol delivery device of claim 10, wherein:

the one or more light sources is/are configured to display a full brightness level in order to indicate:

a full number of inhalation puffs available, or
a full time duration of each inhalation puff available;

the one or more light sources is/are configured to display a partial brightness level in order to indicate:

a partial number of inhalation puffs available, or
a partial time duration of each inhalation puff available; and

the one or more light sources is/are configured to display a zero-brightness level in order to in-

dicating:

a zero number of inhalation puffs available,
or
a zero time duration of each inhalation puff
available. 5

12. An aerosol delivery device according to any one of claims 1 to 11, wherein the controller is configured to determine an amount of power remaining in a power supply, and the visual feedback means is configured to indicate the remaining amount of power. 10

13. An aerosol delivery device according to claim 12, dependent on any of claims 8 to 11, wherein the controller is configured to cause the visual feedback means to illuminate the illumination region in a different colour, depending on the amount of power remaining. 15

14. An aerosol delivery system comprising an aerosol delivery device according to any one of claims 1 to 13, and a component for containing an aerosol precursor. 20

15. A method of operation of an aerosol delivery device according to any one of claims 1 to 13, or an aerosol delivery system according to claim 14, including the steps of: 25

detecting a trigger input from the user,
outputting the trigger signal to the controller;
in response to receiving the trigger signal, causing the device to enter a preselected mode of operation, associated with a predetermined total available usage; 30
and when the device is operating in the preselected mode, providing a visual feedback means to indicate a remaining available usage of the device to the user. 35 40

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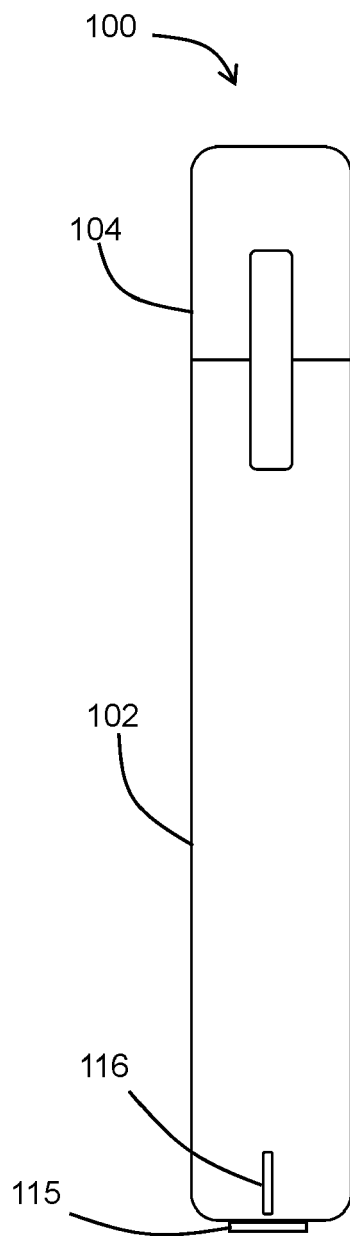


FIG 1A

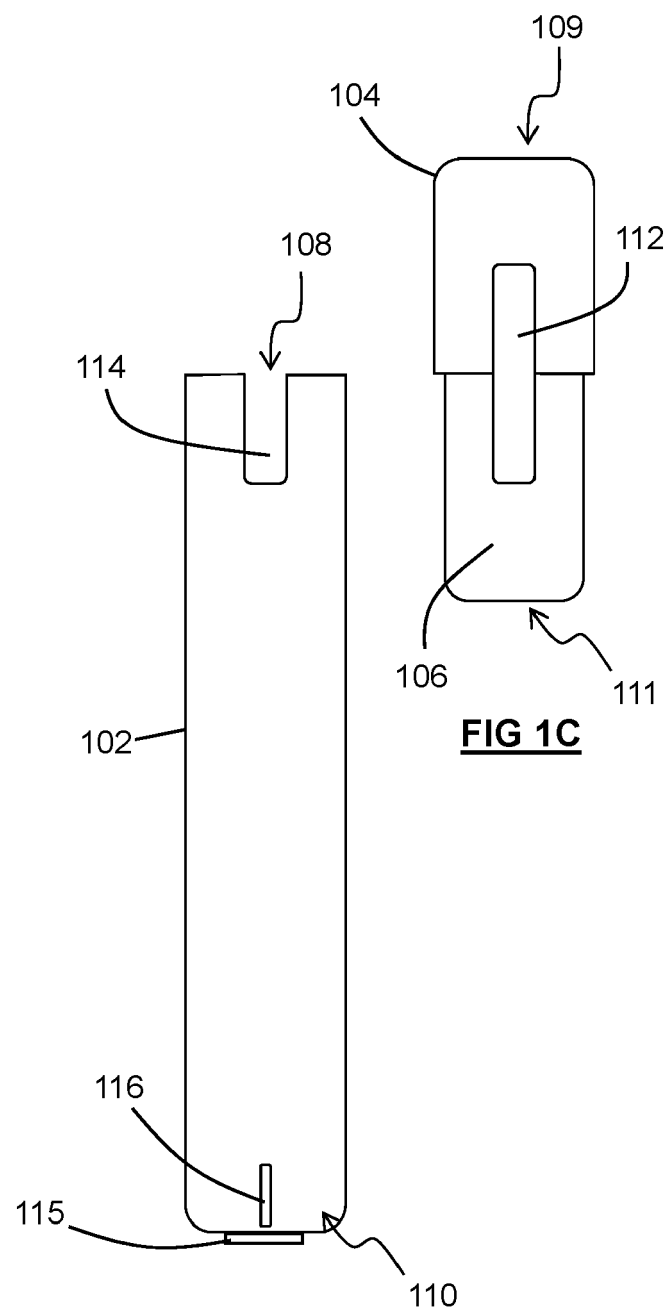


FIG 1C

FIG 1B

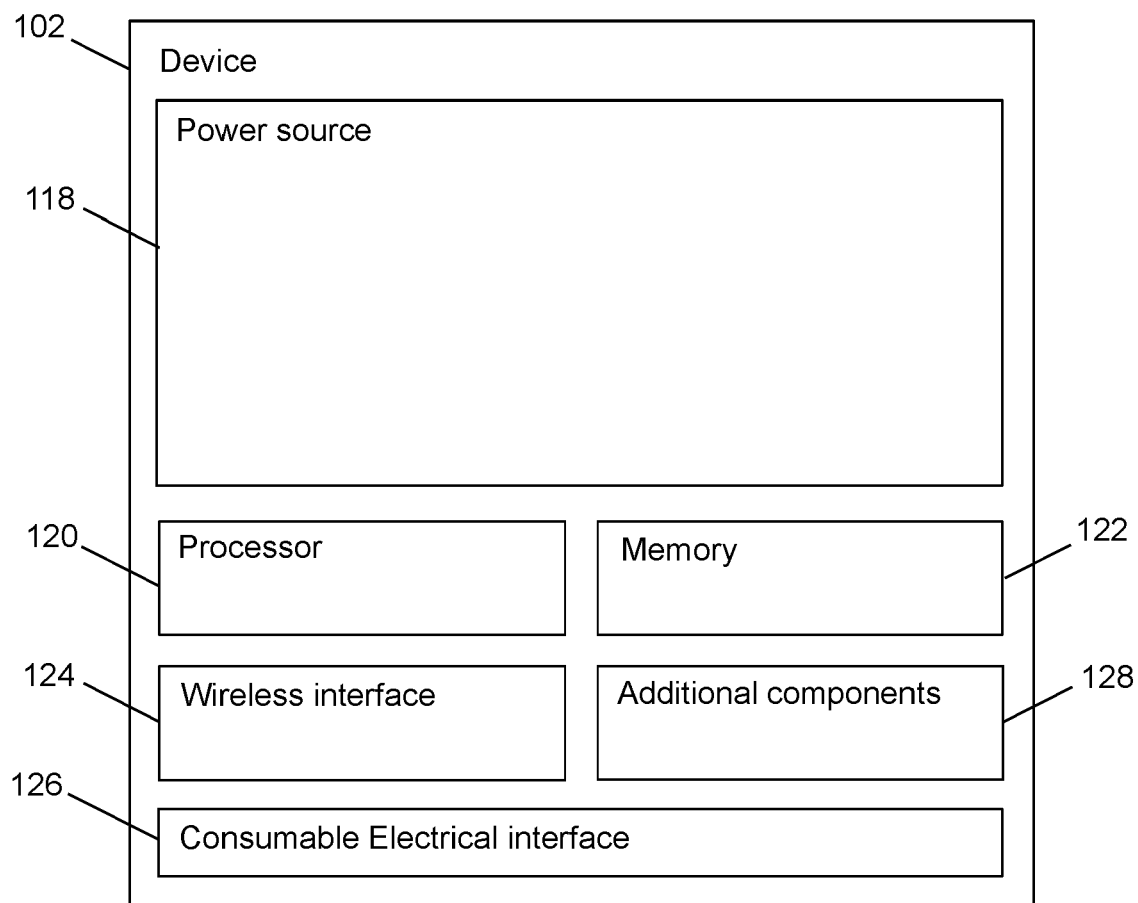


FIG 2A

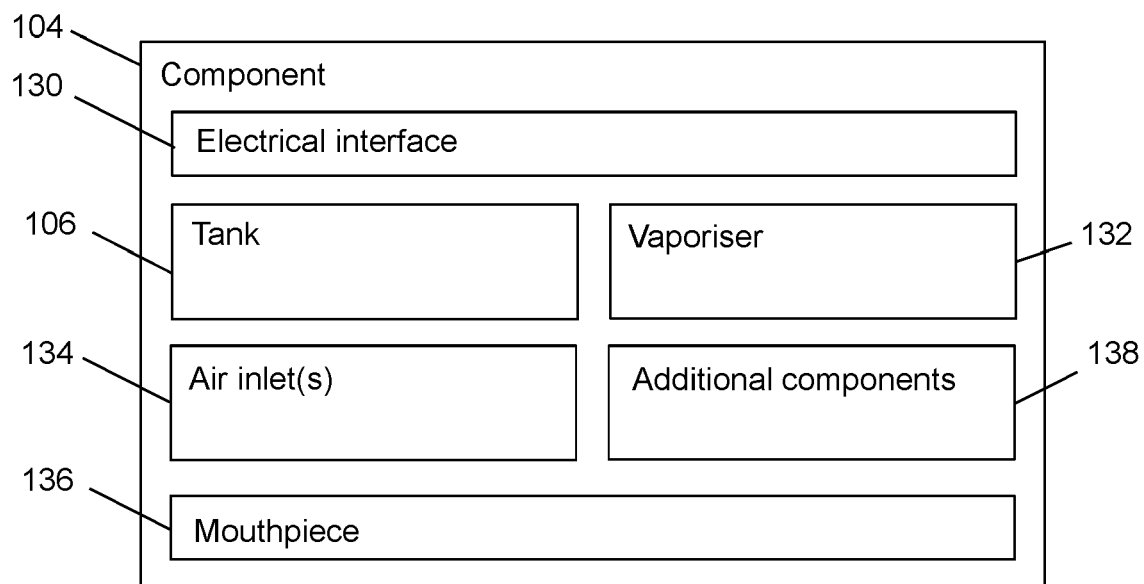


FIG 2B

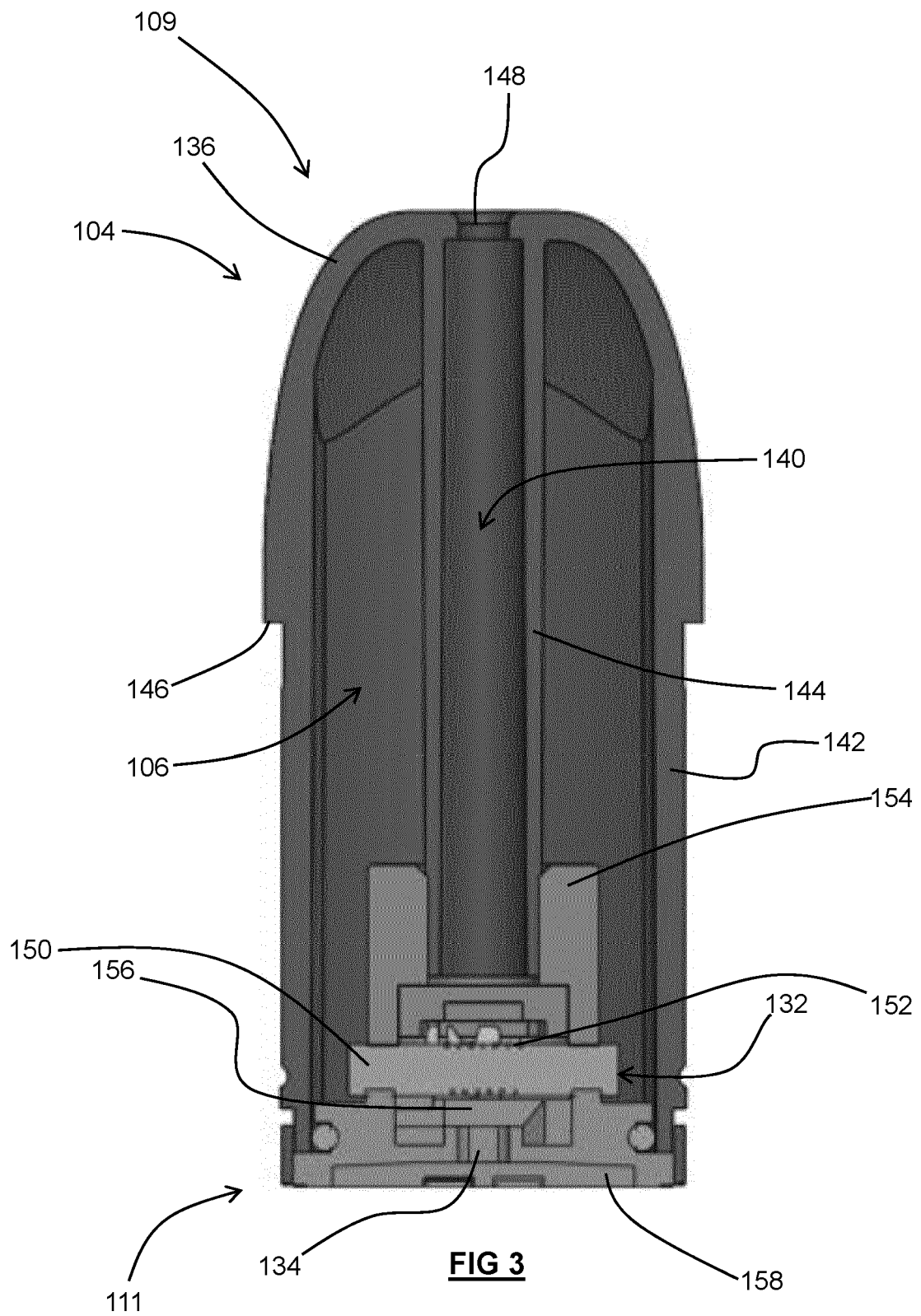
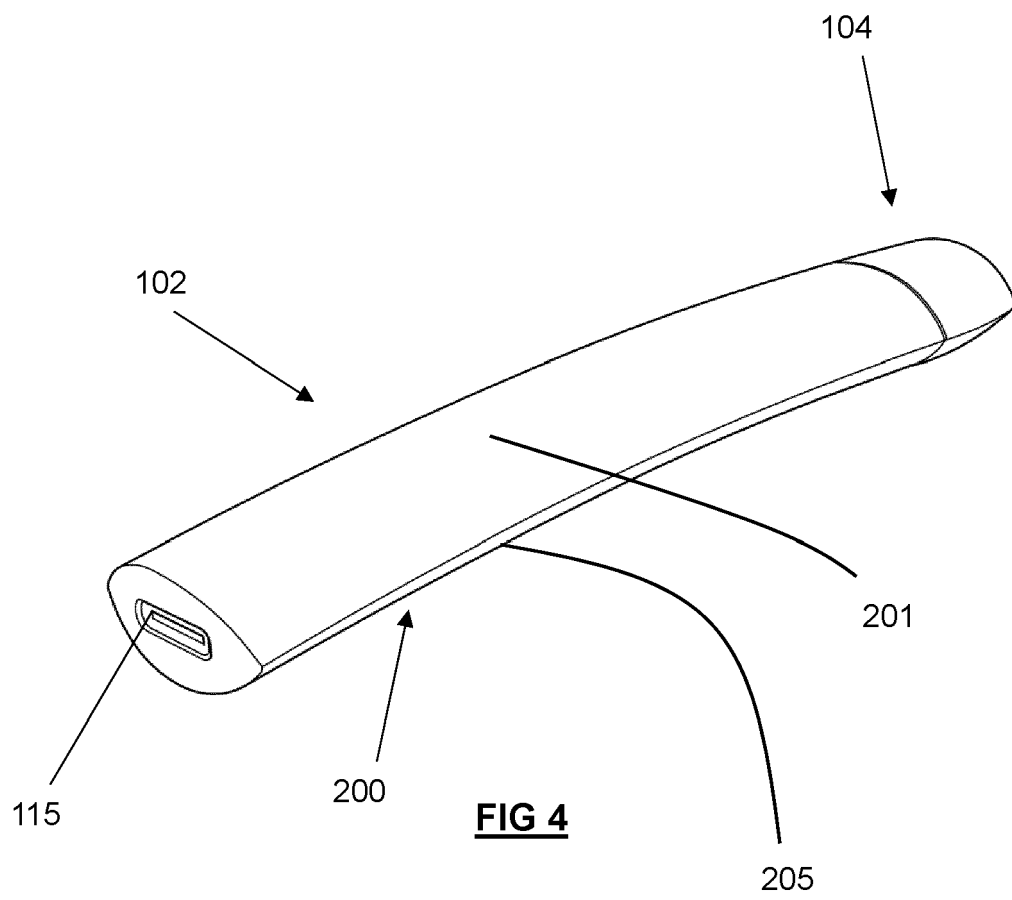


FIG 3



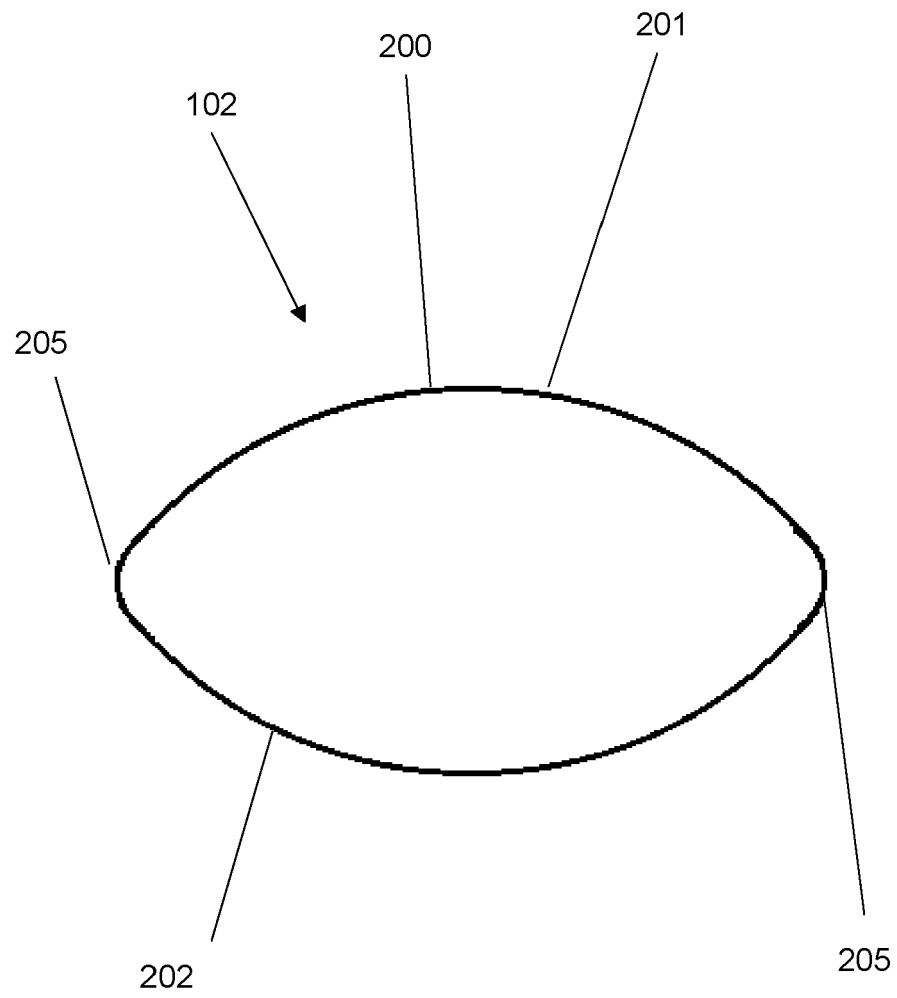


FIG 5

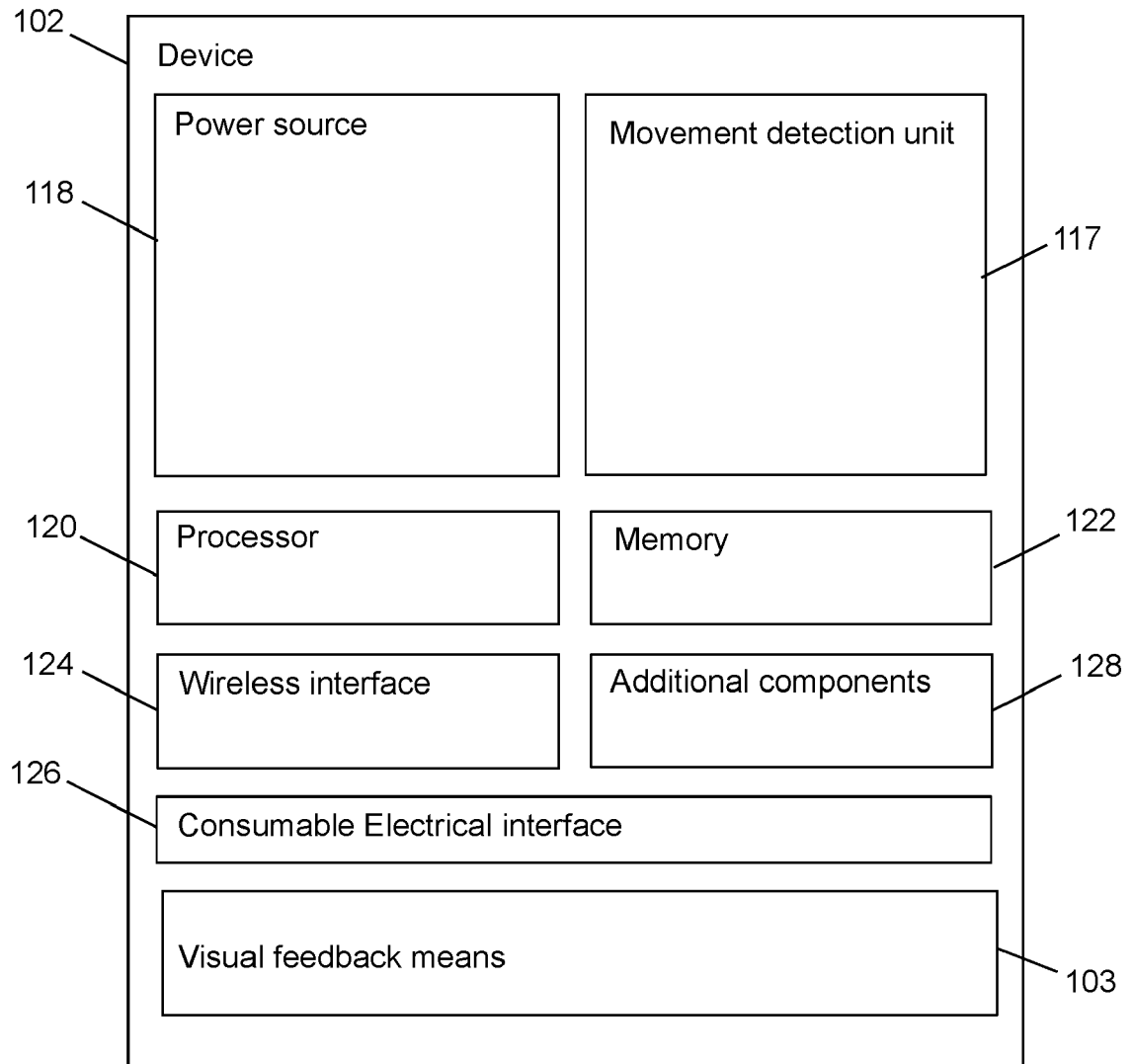


FIG 6

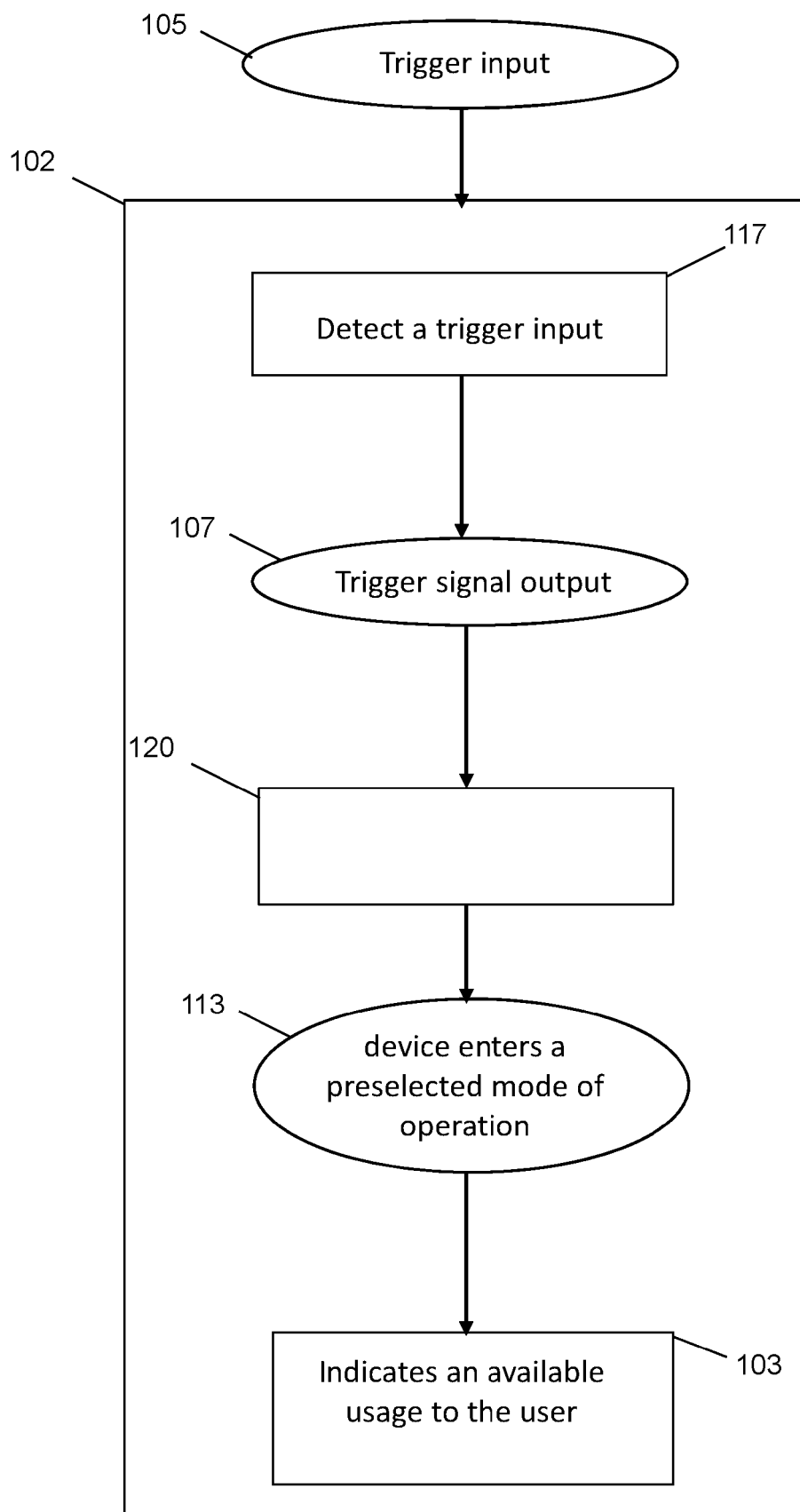


FIG 7

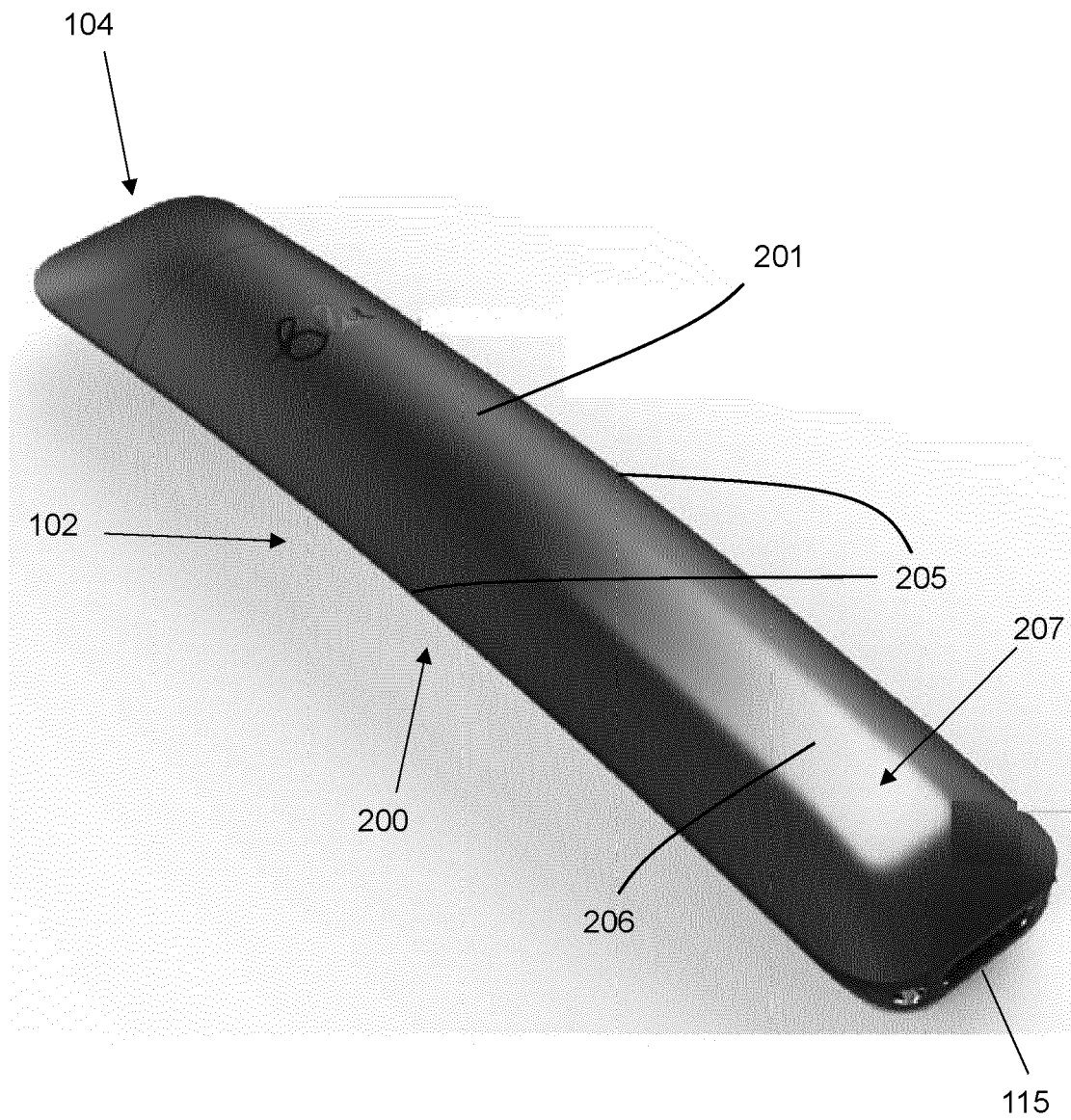


FIG 8

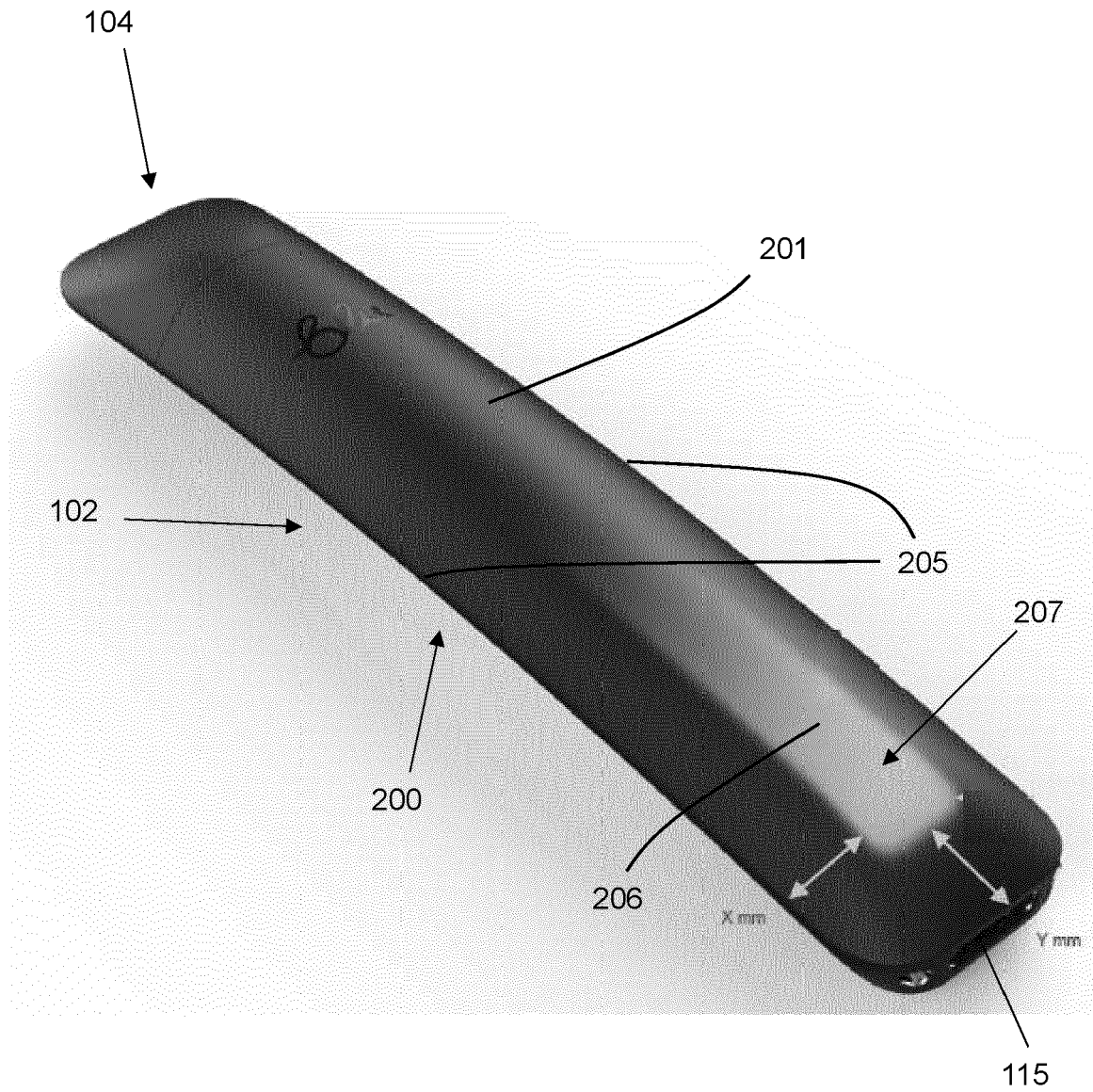


FIG 9





EUROPEAN SEARCH REPORT

Application Number
EP 19 21 8885

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EPO FORM 1503 03.82 (P04C01)

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	EP 0 703 734 A1 (PHILIP MORRIS PROD [US]) 3 April 1996 (1996-04-03)	1-5,8,9, 14,15	INV. A24F40/50
Y	* paragraphs [0030] - [0032]; figure 1 *	6,7, 10-13	A24F40/65 A24F40/60 A61M15/06 H04M1/00
Y	----- WO 2016/009202 A1 (CAMBRIDGE DESIGN PARTNERSHIP LLP [GB]) 21 January 2016 (2016-01-21) * page 44 - page 46 * * page 24, line 17 - line 23 *	6,7, 10-13	
Y	----- US 2018/020731 A1 (RASMUSSEN DENNIS [US] ET AL) 25 January 2018 (2018-01-25) * paragraph [0042] *	10,11	
Y	----- US 2019/029319 A1 (MOORMAN WALLACE DRAY [US]) 31 January 2019 (2019-01-31) * paragraph [0022]; figures 1,2 *	12,13	

			TECHNICAL FIELDS SEARCHED (IPC)
			A24F A61M H04M
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 22 June 2020	Examiner Schwertfeger, C
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			

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

EP 19 21 8885

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
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