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(54) METHOD OF OPERATING AN AEROSOL-GENERATING DEVICE

(57) The present invention relates to a method of operating an aerosol-generating device. The method comprises determining a positional orientation of the device when in use; monitoring usage of the device; activating a first mode of operation when the device is determined to be in a first orientation, wherein in the first mode providing a first indication to a user when the usage of the device reaches a first threshold; and activating a second mode of operation when the device is determined to be in a second orientation, wherein in the second mode providing no indication to the user.

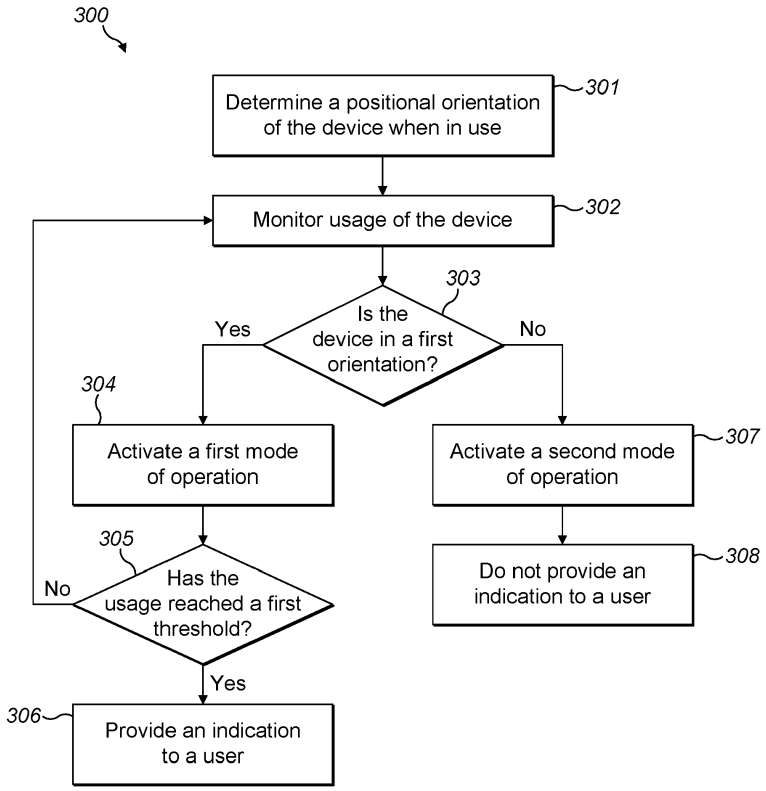

FIG. 3

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Description

Field of Invention

[0001] The present invention relates to a method of operating an aerosol generating device for enhanced user experience. More specifically, it relates to an aerosol generating device such as e-cigarettes, heat-not-burn devices, and the like which is capable of indicating aerosol intake to a user based on the position of the device.

Background

[0002] Inhalers or aerosol generating devices such as e-cigarettes or vaping devices are becoming increasingly popular. They generally heat or warm an aerosolisable substance to generate an aerosol for inhalation, as opposed to burning tobacco as in conventional tobacco products. The generated aerosol may contain a flavour and/or a stimulant (e.g., nicotine or other active component). Users of such inhalers may wish to monitor the amount of flavour or stimulant taken during use at times.

[0003] Most aerosol generating devices incorporate some form of electronic control circuit, typically including a simple computer processor, allowing a user to control operation of the aerosol generation device. However, these devices can be quite restrictive in their settings and may not offer much flexibility to the user. Even in devices that allow a user to customise settings, it requires some effort from the user and may not be intuitive.

[0004] Therefore, there exists a need for a device that can be operated and controlled in accordance with the user's preference for aerosol monitoring without requiring much effort.

Summary of the Invention

[0005] According to an aspect of the present invention, there is provided a method of operating an aerosol-generating device comprising determining a positional orientation of the device when in use; monitoring usage of the device; activating a first mode of operation when the device is determined to be in a first orientation, wherein in the first mode providing a first indication to a user when the usage of the device reaches a first threshold; and activating a second mode of operation when the device is determined to be in a second orientation, wherein in the second mode providing no indication to the user.

[0006] Advantageously, the user can choose to operate in two different modes by simply flipping the vaping device in a different orientation. It is possible to monitor the vaping usage in both modes but the user is provided an indication on reaching a usage threshold when operating in the first mode. In this way the user can have more control over his or her vaping habits.

[0007] Preferably, the first indication is provided only when the usage of the device in the first orientation reaches the first threshold.

[0008] Preferably, in the said method, the first mode is retained if the device is determined to be in the second orientation for less than a preset period of time and is returned to the first orientation within the preset period.

[0009] Preferably, the first mode is retained if the usage of the device, when in the second orientation, is less than a preset number of puffs before the device is returned to the first orientation.

[0010] Preferably, in the said method, it is determined whether the device is in the first orientation at least once during a predetermined period of use and if so, a second indication is provided to the user at the end of the predetermined period of use.

[0011] Preferably, the second indication is provided to the user when the usage of the device during the predetermined period of use reaches a second threshold.

[0012] Preferably, in the said method, an aerosol source is identified to automatically set the second threshold based on the aerosol source.

[0013] Preferably, in the said method, an input is received from the user to set the second threshold.

[0014] Preferably, in the said method, the second indication is provided to the userwhen the usage of the device reaches the second threshold after the predetermined period of use irrespective of active mode of operation.

[0015] Preferably, in the said method, a number of puffs is counted to determine the usage of the device, wherein each puff is associated with a time stamp to analyse the usage overtime.

[0016] Preferably, the said method further includes receiving an input from the user setting a number of puffs in a session as the first threshold for the first mode and if during the session the setting is changed by the user then resetting the puff count to zero.

[0017] Preferably, in the said method, the difference between the first orientation and the second orientation is 180 degrees along the longitudinal axis of the device.

[0018] According to another aspect of the invention, there is provided a control circuitry for use in an aerosol-generating device, the control circuitry configured to actuate the method described above.

[0019] According to another aspect of the invention, there is provided an aerosol-generating device comprising a body having an inlet and an outlet with an air channel defined between the inlet and the outlet; an orientation sensor configured to detect a positional orientation of the device when in use; a controller configured to: monitor usage of the device; activate a first mode of operation when the device is detected to be in a first orientation, wherein in the first mode an indication is provided to a user when the usage of the device reaches a first threshold; and activate a second mode of operation when the device is detected to be in a second orientation, wherein in the second mode no indication is provided to the user.

[0020] According to yet another aspect of the invention, there is provided a computer-readable storage medium comprising instructions which, when executed by a com-

puter, cause the computer to carry out the steps of the method described above.

Brief Description of the Drawings

[0021] Embodiments of the invention are now described, by way of example, with reference to the drawings, in which:

Fig. 1 shows an aerosol generating device according to an aspect of the invention;

Fig. 2 shows a block diagram of various components of the device of Fig. 1;

Fig. 3 shows a flow diagram of a method of operating the device of Fig. 1; and

Figs. 4 and 5 show graphs illustrating a control operation of the device of Fig. 1.

Fig. 6 shows a vaping profile of a user displayed on a personal computing device linked with the aerosol generating device of Fig. 1.

Detailed Description

[0022] Next, various aspects of the invention will be described. Note that the same or similar portions are denoted with the same or similar reference signs in the descriptions of the drawings below. Note that the drawings are schematic and a ratio of each size is different from a real one. Therefore, specific sizes and the like should be judged in consideration of the following descriptions.

[0023] Fig. 1 shows a non-combustion-type aerosol generating device 100, which is a device for inhaling an aerosol by heating or vaporisation without combustion. The device 100 has a rod-like shape with a main body 101 extending from a non-mouthpiece end 102 to a mouthpiece end 103. An air channel or path is defined in the main body 100 between the opposite ends 102, 103. The aerosol-generating device 100 in the present example is an electronic cigarette or a vaping device, and is referred to as e-cig 100 hereinafter. The e-cig 100 works by vaporizing or heating an aerosol source inserted into the e-cig 100 to release a flavour and/or a stimulant for a user to inhale through the mouthpiece end 103. The construction and operation of such a device to generate aerosol is well-known in the art and it will be understood by a skilled person that the invention disclosed herein can be applicable to aerosol generation devices in any shapes, configured with any aerosol generating techniques, not limited to the example.

[0024] The e-cig 100 may include an activation switch 104 that may be configured to perform at least one of a turn-on and a turn-off of a power source of the e-cig 100. The activation switch 104 may be a push button or a touch button disposed at any convenient location on the surface of the main body 101 of the e-cig 100. Alternatively, the e-cig 100 does not rely on a switch button to activate power supply to heater, but rely on a puff sensor to detect air flow and trigger the device to start generating aerosol.

[0025] Fig. 2 is a block diagram showing various components or modules of the e-cig 100. In one example, the e-cig 100 comprises a consumables module 201a and a heating element 202 that vaporizes a consumable item 201b received by the consumables module 201a to release aerosol containing the flavour and/or stimulant for the user to inhale. In the present example, the consumable item 201b is a substance containing nicotine. Presence of the consumable item 201b in the consumables module 201a may be detected by a detector 201c. The consumable item 201b may be in the form of solid or liquid and is heated by the heating element 202 to release the aerosol without combustion. In case the consumable item 201b is a liquid store, more than one consumable items can be received at the consumable module 201a. The heating element 202 may be powered by a power source 203.

[0026] The power source 203 is, for example, a lithium ion battery. The power source 203 supplies an electric power necessary for an action of the e-cig 100. For example, the power source 203 supplies the electric power to all other components or modules included in the e-cig 100.

[0027] For the purposes of the present description, it will be understood that the terms vapour and aerosol are interchangeable. In some examples, the heating element is arranged within a capsule or cigarette-like aerosol generating material and connectable to the aerosol generation device, rather than being a component of the aerosol generation device itself.

[0028] In one embodiment, a flavouring is present in the consumable item 201b. The flavouring may include Ethylvanillin (vanilla), menthol, Isoamyl acetate (banana oil) or similar. In another embodiment, the consumable item 201b may include an additional flavour source (not shown) provided on the side of the mouthpiece end 103 beyond the consumables module 201a the consumable item 201b, and generates a flavour to be inhaled by the user together with the aerosol generated from the consumable item 201b. In yet another embodiment, the e-cig 100 comprises more than one consumable item each comprising a flavouring and/or a certain level of active component (nicotine). In this case, each consumable item can be independently heated to generate aerosol.

[0029] The e-cig 100 also includes a controller 204 that is configured to control various components in the e-cig. For example, the controller 204 may control a timing unit 205 (comprising a timer), a communications unit 206, a memory 207, an orientation sensor 208, and a puff sensor 209 included in the e-cig 100. The timing unit 205 is configured to provide time information (e.g., time of the day) and generate timestamp for puff data or event data, which is helpful to analyse user's vaping preference. The timing

unit 205 is further configured to monitor timing of each puff and breaks in between and provide this information to the controller 204 to monitor and potentially restrict the user's usage of the e-cig 100. For example, the timing unit 205 may determine when to indicate the user on reaching a puff threshold. It is to be noted that the functions of the timing unit 205 can be consolidated into the controller 204.

[0030] The communications unit 206 is configured to manage communication with any personal computing device, a server, a tracking device, or other e-cigs in the vicinity of the e-cig 100. The memory 207 is configured to store vaping usage history and information such as user settings and preferences.

[0031] The e-cig 100 may also include various sensors such as the orientation sensor 208 and the puff sensor 209. The orientation sensor 208, such as a gyroscope, is configured to determine a positional orientation of the e-cig 100, for example, determining if the e-cig 100 is held face up or face down when in use. When the e-cig 100 is used with front face up (such that the activation button 104 and/or an LED and/or a logo is facing upwards), a first mode of operation is activated in which the user is provided an indication on reaching a puff threshold. This mode is also referred to as the session mode.

[0032] When the e-cig is used with front face down (such that the activation button 104 and/or an LED is facing downwards), a second mode of operation is activated in which the user is provided with no indication on reaching the puff threshold. This mode is also referred to as the free mode. In other words, the e-cig 100 is rotated or turned by 180 degrees along its longitudinal axis to switch between the session mode and the free mode. In the session mode, with the LED facing upwards, the user is indicated of the puff threshold by the means of the LED which is easily visible to the user. In the free mode, with the LED facing downwards, the puff threshold is not indicated to the user.

[0033] It is to be noted that the e-cig 100 facing up or down may also be defined with respect to any visual pattern, such as a logo or a surface design, to act as a reference for the user. Activation button and LED may not be necessary to provide such reference. In any case, sensors on the device may not be reliant on these physical or visual elements.

[0034] The puff sensor 209 is configured to determine the number of puff actions of inhaling the aerosol. The puff sensor 209 can also determine a time period required for one puff action of inhaling the aerosol. The recorded usage data can comprise puff duration (i.e., length of a puff), a puff interval (i.e., the time between consecutive puffs), and a fluid and/or nicotine consumption amount.

[0035] The e-cig 100 may also include a consumable recognition sensor (now shown) configured to identify the consumable item 201b inserted in the e-cig 100. The recognition sensor may be included in the consumables module 201a or the detector 201c. The recognition sensor may use NFC, RFID or any other known technique to recognise the strength of the stimulant contained in the consumable item 201b from an NFC/RFID tag disposed on the consumable 201b.

[0036] The e-cig 100 may also include an Input-Output (I/O) or user interface 210 configured to provide indications to the user and to receive inputs from the user. The I/O interface 210 preferably comprises an indication device and an input device. The indication device may comprise a visual light emitting element including one or more Light Emitting Diodes (LEDs), a screen display, or a sound emitter, or other appropriate means to provide indication to users. The visual light-emitting element such as an LED may be disposed at the tip of the non-mouthpiece end 102, or on a side surface of the e-cig 100. Such an LED may exhibit various light-emitting mode to provide to user within indication of a puff state where the aerosol is being inhaled, a non-puff state where the aerosol is not being inhaled, a pre-heating state when the heater is heating up, a ready-to vape state when the heater operates at target temperature to generate aerosol, a depletion state where LED bar shows depletion level of the aerosol source, and any other information related to the operation status of the e-cig. The input device can be one or more user operable buttons or sensible touch panel, responsible to depression, toggling, or touch.

[0037] All the elements described above transmit and/or receive command and/or data via communication bus 211.

[0038] In one embodiment, the e-cig 100 is also configured to communicate with a personal computing device (now shown) owned by the user. The personal computing device may be a smartphone, tablet, or, a laptop. For the sake of simplicity, the personal computing device is referred to as smartphone hereinafter. Preferably, the e-cig 100 is configured to communicably connect or pair with the smartphone wirelessly using Wi-Fi, Bluetooth, or other wireless communication standards. The smartphone preferably runs a mobile application (commonly referred to as App) that allows the user to interact with the e-cig 100 through a user-friendly interface. The App may be hosted by the manufacturer of the e-cig 100 and compatible with different mobile platforms such as iOS™ and Android™.

[0039] Fig. 3 shows a flow diagram for a process 300 of operating the e-cig 100. It is to be noted that steps in the process 300 may not necessarily be performed in the same sequence. Also, not all steps are shown and some of the steps may be optional and can be omitted.

[0040] At step 301, a positional orientation of the device is determined when in use. In the present example, when the user starts to use the e-cig 100, the orientation sensor 208 in the e-cig 100 determines if the e-cig 100 is held in a position facing up or facing down. Optionally, the orientation sensor 208 may be activated when the user pushes the activation switch 104. In addition, there may be a motion sensor which detects a movement of the e-cig 100 in addition to the activation of the activation switch 104. Signals from the orientation sensor 208, the

activation switch 104, and the motion sensor may all be processed by the controller 204 to determine if one of the two modes of operation is to be activated.

[0041] At step 302, usage of the device is monitored. In the present example, when it is determined that the device is in use, irrespective of the orientation, the controller 204 starts monitoring the usage of the e-cig 100 with the aid of the puff sensor 209 and the timing unit 205. The puff sensor 209 detects each puff inhaled by the user and the timing unit 205 time stamps each puff as well as monitors the start and end of each puff. In the session mode, the timing unit 205 starts and stops a timer between two consecutive puffs and monitors a break in a puff session. This is explained later in detail with reference to Figs. 4 and 5. Nonetheless, in both the session mode and the free mode, the number of puffs inhaled by the user is counted and recorded to analyse the user's vaping pattern over time.

[0042] At step 303, it is determined if the device is in a first orientation. In the present example, if the controller 204 determines from the signal received from the orientation session 208 that the e-cig 100 is being held facing up, the process moves to step 304 or else it moves to step 307.

[0043] At step 304, a first mode of operation is activated. In the present example, upon determining that the e-cig 100 is held in a position facing up, the controller 204 activates the session mode of operation. In the session mode, the timing unit 205 actively monitors the timing and the count of each puff and communicates with the controller 204 to take necessary action as needed. In one embodiment, the user can set up the number of puffs in a session in the session mode based on the user preferences. For example, none, 5, 10, 15, or 20 puffs in one session and user is notified when the set number of puffs in a session are reached. When "none" is selected, no minimum number of puffs are set for a session. Moreover, when the user in the middle of a session and a new parameter or criteria is set, the number of puffs and vaped amount is reset to zero.

[0044] At step 305, it is determined if the usage has reached a first threshold. In the present example, in the session mode, the timing unit continuously monitors the number of puffs taken by the user and compares the count with a predetermined threshold value (also referred to as the puff threshold). When the count reaches the puff threshold, the timing unit 205 informs the controller 204 and the process moves to step 306, else it goes back to step 302 where the controller 204 continues to monitor the usage of the e-cig 100.

[0045] At step 306, an indication is provided to the user. In the present example, upon determining that the count of number of puffs has reached the puff threshold, the controller 204 activates one or more indicators on the I/O interface 210. For instance, after reaching the 15th puff (e.g., 1 second after finishing the inhale), an upward facing LED on the I/O interface 210 is lit up with soft glow as well as the e-cig 100 is vibrated (such as two short vibrations) to provide both visual and haptic indication to the user to remind him or her of sustained continuous vaping. In addition, the user may also receive a notification on the app provided on the linked smartphone. If the user continues to vape after this, further indications may be provided to the user after further threshold or Nth puff, say after 30th puff, 45th puff, etc. is reached.

[0046] On the other hand, at step 307, a second mode of operation is activated. In the present example, upon determined that the e-cig 100 is used while facing down, the controller 204 activates the free mode. While in the free mode, the controller 204 continues to monitor the number of counts and a change in the positional orientation of the e-cig 100, but no activate control is done. Therefore, no indication is provided to the user while operating in the free mode, as shown by step 308. However, if during a predefined time period (e.g. during one day), the session mode is activated even once, the e-cig 100 enters a safety mode to provide an indication to the user when a safe threshold is reached in that predefined time period, irrespective of the current active mode of operation. For example, if the user is currently vaping in the free mode and has reached 50 puffs in that day and had at least once vaped with active session mode during that day, the controller 204 provides an indication to the user through the I/O interface 210 on reaching the 50th puff.

[0047] In one embodiment, the safe threshold may be based on the strength of the consumable item 201b as identified by the recognition sensor. For example, if the nicotine strength of the consumable item 201b is 12 mg/ml, then the safe threshold may be automatically set to 50 puffs per day and if the strength is 18 mg/ml, then the safe threshold is set to 40 puffs per day. In another embodiment, the safe threshold may be set based on a user input.

[0048] Fig. 4 shows a graph 400 illustrating related responses of the timing unit 205 and the puff sensor 209 in the e-cig 100. The response of the timing unit 205 is plotted on the X-axis against the response of the puff sensor 209 on the Y-axis. The puff sensor 209 detects a first puff 400-1 taken by the user. As soon as the first puff 400-1 is ended, the timing unit 205 starts a timer, i.e. at the trailing edge of the puff wave. The timing unit 205 keeps monitoring the time and the timer is ON until a next puff is detected. As soon as the next puff is detected, i.e. at the leading edge of the next puff wave, the timer is turned OFF. The timer is turned ON again at the trailing edge of this puff wave.

[0049] In the session mode, the controller 204 uses this information from the timing unit 205 to monitor breaks taken by the user between the puffs. If the period of break taken between two consecutive puffs, as determined by the timer being turned ON and OFF, is within a preset time period the controller 204 keeps counting the puffs in succession in the same session. When the number of puffs in that session reaches the puff threshold, the controller 204 triggers the I/O interface 210 to provide an indication to the user. On the other hand, when the period

of break exceeds the preset time period, e.g. 7 minutes, the controller 204 restarts counting the puffs in a new session. As shown in Fig. 4, after the third puff 400-3 the user takes a long break and then takes the next puff 400-4. If this long break is shorter than 7 minutes, then the timing unit 205 counts this as fourth puff in the same session. However, if this long break is longer than 7 minutes, the timing unit 205 resets the counter and counts the puff 400-4 is the first puff in a new session. In this way, no unnecessary indication is provided to the user when he or she is taking long breaks in between and therefore not engaging in sustained continuous vaping at a time.

[0050] Fig. 5 shows a graph 500 illustrating a puff counting correction methodology employed by the controller 204. The parameters of the graph 500 are same as those of the graph 400. In the present example, the controller 204 monitors a situation in which the user accidently holds the e-cig 100 with face down (hence operate in the free mode) when the user actually intended to continue holding the e-cig 100 with face up (hence operate in the session mode). The controller 204 determines that the e-cig 100 is accidently held in the face down orientation if the user turns it back to the face up orientation within a correction threshold. The controller 204 therefore continues counting the puffs in the session mode and triggers an indication when the puff count exceeds the puff threshold.

[0051] In a first scenario, consider the user holding the e-cig 100 with face up (activating the first/session mode) and taking ten puffs in one session up to the tenth puff 500-10 as shown in Fig. 5. Then, following a 2 minutes break period, the user accidently takes the next two puffs with the e-cig 100 facing down (activating the second/free mode). The user soon realises the mistake and turns the e-cig 100 facing up (within the correction threshold, e.g. three puffs) and takes three further puffs. In this scenario, the controller 204 would understand that the two puffs taken in the face down orientation were accidental, therefore would count those two puffs in the session mode and thus determine the total number of puffs taken to be 15 (puff threshold) and thus provide an indication to the user after the fifteenth puff 500-15.

[0052] In a second scenario, with other things being the same as in the first scenario, the user ends up taking five puffs with the e-cig 100 facing down (free mode) before turning the e-cig 100 face up. In this scenario, the controller 204 would not count these five puffs in the session mode as the number of puffs exceeds the correction threshold. Therefore, even though the total number of puffs taken by the user is fifteen, no indication is provided to the user.

[0053] Fig. 6 shows a graphical representation of a vaping profile of the user. In the present example, the app provided on the smartphone linked with the e-cig 100 generates a vaping profile 600 of the user. As can be seen, the vaping profile 600 shows the total number of puffs taken by the user in the current puff session as well as the total quantity of steam or aerosol inhaled by the user in that day. In addition, there is information relating to vaping time and total number of sessions for that day with hourly analysis shown by a line graph. The profile 600 may also show the remaining battery level of the e-cig 100 and indicate the number of remaining sessions or vaping time left with the current battery usage. It is to be noted that the user's vaping history is monitored irrespective of the mode of operation.

[0054] Therefore, in both the session mode and the free mode, the user may be able to see the overall vaping profile on the app.

[0055] It is to be understand that the above described device and the method may be modified according to design choices and manufacturer's preferences. For example, modes of operation may be changed based on other positional orientations of the device. Moreover, the timing control and puff counting sequence may be altered. In addition, various thresholds and preset values may be either hard coded or user configurable.

[0056] The controller 204 may also regulate aerosol delivery to increase or decrease the substance in the aerosol and/or add flavours to the aerosol depending on the user's preference. The amount of substance in the aerosol can be modified (increased or decreased) in a number of ways. In one example, the amount of aerosol released from the consumable item 201b may be changed, thereby affecting the quantity of substance to be inhaled by the user. In another example, a multi-tank vaping device may be used which includes two or more liquid reservoirs each containing a liquid with different concentration of substance. By switching supply to the reservoir containing a different concentration liquid, it is possible to regulate the substance intake while maintaining the same aerosol amount. In yet another example, substance delivery can be modified by controlling the heating operation (e.g., by controlling the energy supplied to a heater) in heat-not-burn and vapour-based devices, or controlling a pressurized liquid source in vapour-based devices.

[0057] The processing steps described herein carried out by the main control unit, or controller, may be stored in a non-transitory computer-readable medium, or storage, associated with the main control unit. A computer-readable medium can include non-volatile media and volatile media. Volatile media can include semiconductor memories and dynamic memories, amongst others. Non-volatile media can include optical disks and magnetic disks, amongst others.

[0058] The foregoing description of illustrative embodiments has been presented for purposes of illustration and of description. It is not intended to be exhaustive or limiting with respect to the precise form disclosed, and modifications and variations are possible in light of the above teachings or may be acquired from practice of the disclosed embodiments.

[0059] As used herein, the term "non-transitory computer-readable media" is intended to be representative

of any tangible computer-based device implemented in any method or technology for short-term and long-term storage of information, such as, computer-readable instructions, data structures, program modules and submodules, or other data in any device. Therefore, the methods described herein may be encoded as executable instructions embodied in a tangible, non-transitory, computer readable medium, including, without limitation, a storage device, and/or a memory device. Such instructions, when executed by a processor, cause the processor to perform at least a portion of the methods described herein. Moreover, as used herein, the term "non-transitory computer-readable media" includes all tangible, computer-readable media, including, without limitation, non-transitory computer storage devices, including, without limitation, volatile and non-volatile media, and removable and non-removable media such as a firmware, physical and virtual storage, CD-ROMs, DVDs, and any other digital source such as a network or the Internet, as well as yet to be developed digital means, with the sole exception being a transitory, propagating signal.

[0060] As will be appreciated based on the foregoing specification, the above-described embodiments of the disclosure may be implemented using computer programming or engineering techniques including computer software, firmware, hardware or any combination or subset thereof. Any such resulting program, having computer-readable code means, may be embodied or provided within one or more computer-readable media, thereby making a computer program product, i.e., an article of manufacture, according to the discussed embodiments of the disclosure. The article of manufacture containing the computer code may be made and/or used by executing the code directly from one medium, by copying the code from one medium to another medium, or by transmitting the code over a network.

Claims

1. A method of operating an aerosol-generating device comprising:

   determining a positional orientation of the device when in use;
   monitoring usage of the device;
   activating a first mode of operation when the device is determined to be in a first orientation, wherein in the first mode providing a first indication to a user when the usage of the device reaches a first threshold; and
   activating a second mode of operation when the device is determined to be in a second orientation, wherein in the second mode providing no indication to the user.

2. The method of claim 1, wherein the first indication is provided only when the usage of the device in the first orientation reaches the first threshold.

3. The method of claim 1, further comprising retaining the first mode if the device is determined to be in the second orientation for less than a preset period of time and is returned to the first orientation within the preset period.

4. The method of claim 1, further comprising retaining the first mode if the usage of the device, when in the second orientation, is less than a preset number of puffs before the device is returned to the first orientation.

5. The method of claim 1 or 2, further comprising determining whether the device is in the first orientation at least once during a predetermined period of use and if so, providing a second indication to the user at the end of the predetermined period of use.

6. The method of claim 5, wherein the second indication is provided to the user when the usage of the device during the predetermined period of use reaches a second threshold.

7. The method of claim 6, further comprising identifying an aerosol source to automatically set the second threshold based on the aerosol source.

8. The method of claim 6, further comprising receiving an input from the user to set the second threshold.

9. The method of any of claims 6 to 8, further comprising providing the second indication to the user when the usage of the device reaches the second threshold after the predetermined period of use irrespective of active mode of operation.

10. The method of any preceding claim, further comprising counting a number of puffs to determine the usage of the device, wherein each puff is associated with a time stamp to analyse the usage overtime.

11. The method of claim 10, further comprising receiving an input from the user setting a number of puffs in a session as the first threshold for the first mode and if during the session the setting is changed by the user then resetting the puff count to zero.

12. The method of any preceding claim, wherein the difference between the first orientation and the second orientation is 180 degrees along the longitudinal axis of the device.

13. A control circuitry for use in an aerosol-generating device, the control circuitry configured to actuate the method of any of claims 1 to 12.

14. An aerosol-generating device comprising:

a body having an inlet and an outlet with an air channel defined between the inlet and the outlet;
an orientation sensor configured to detect a positional orientation of the device when in use;
a controller configured to:

monitor usage of the device;
activate a first mode of operation when the device is detected to be in a first orientation, wherein in the first mode an indication is provided to a user when the usage of the device reaches a first threshold; and
activate a second mode of operation when the device is detected to be in a second orientation, wherein in the second mode no indication is provided to the user.

15. A computer-readable storage medium comprising instructions which, when executed by a computer, cause the computer to carry out the steps of the method of claims 1 to 12.

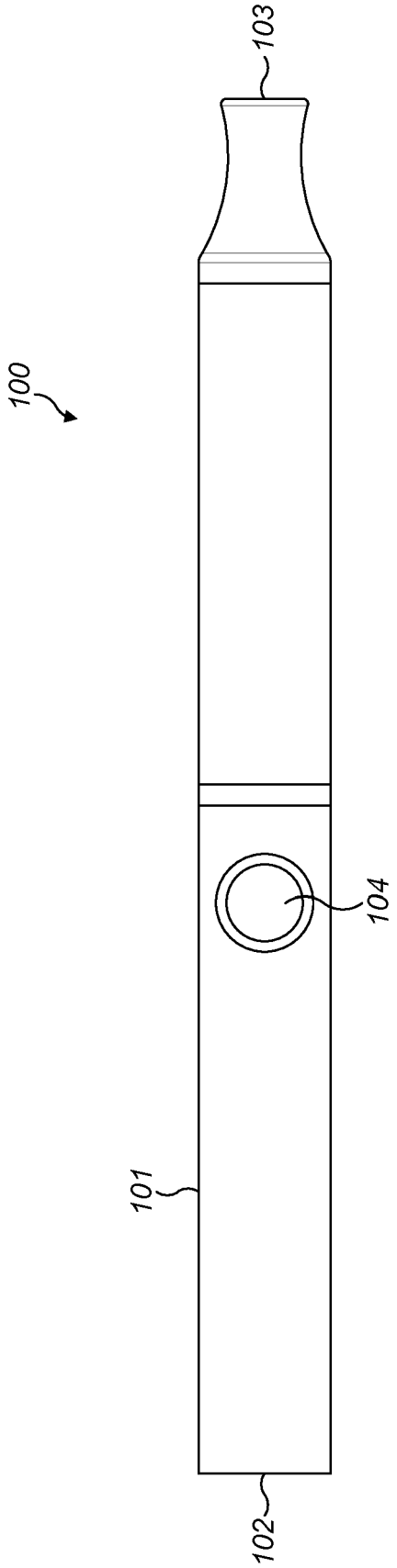

FIG. 1

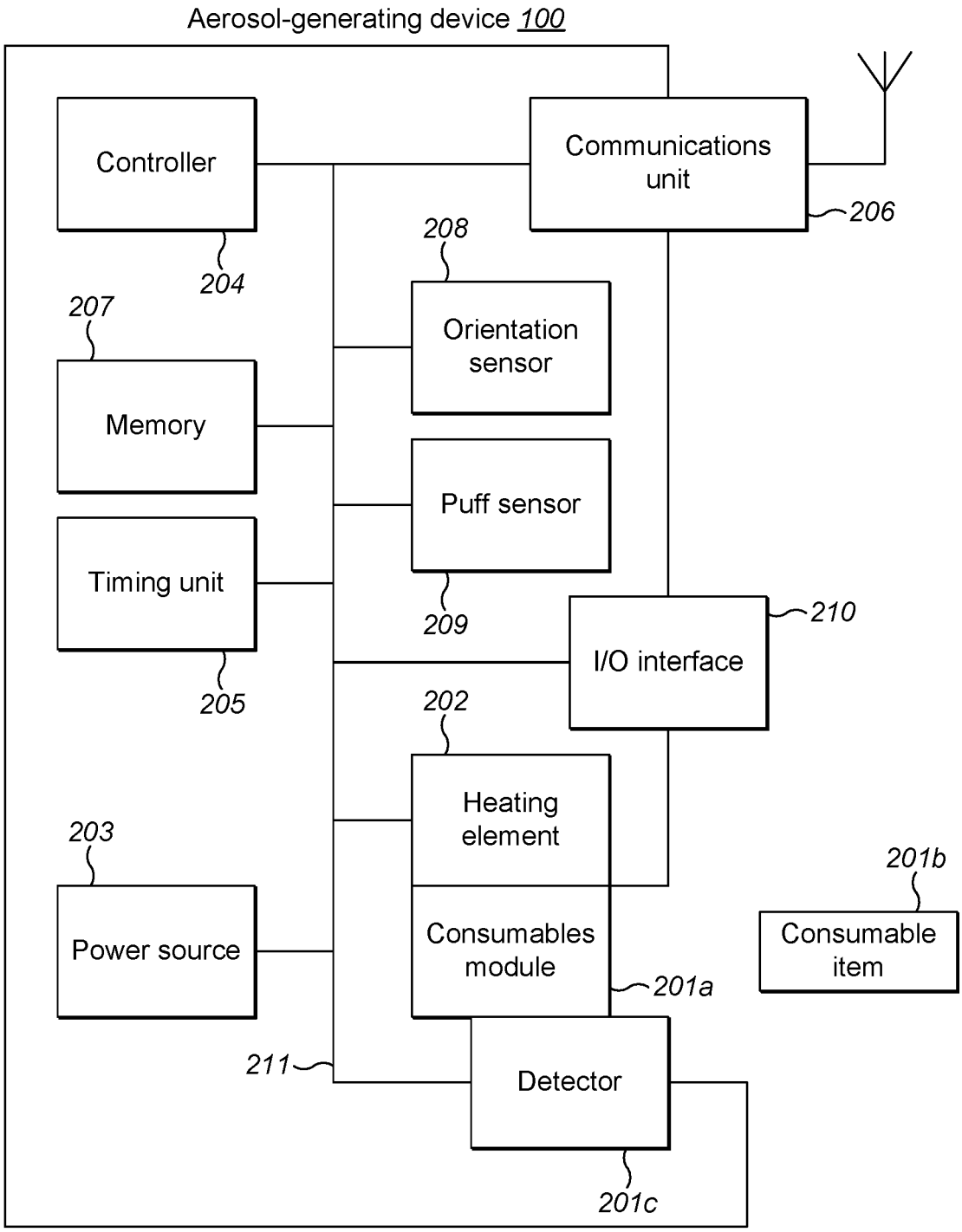
Aerosol-generating device 100
Controller
204
Communications unit
206
208
Orientation sensor
207
Memory
Puff sensor
209
Timing unit
205
I/O interface
210
202
Heating element
203
Power source
Consumables module
201a
201b
Consumable item
211
Detector
201c

FIG. 2

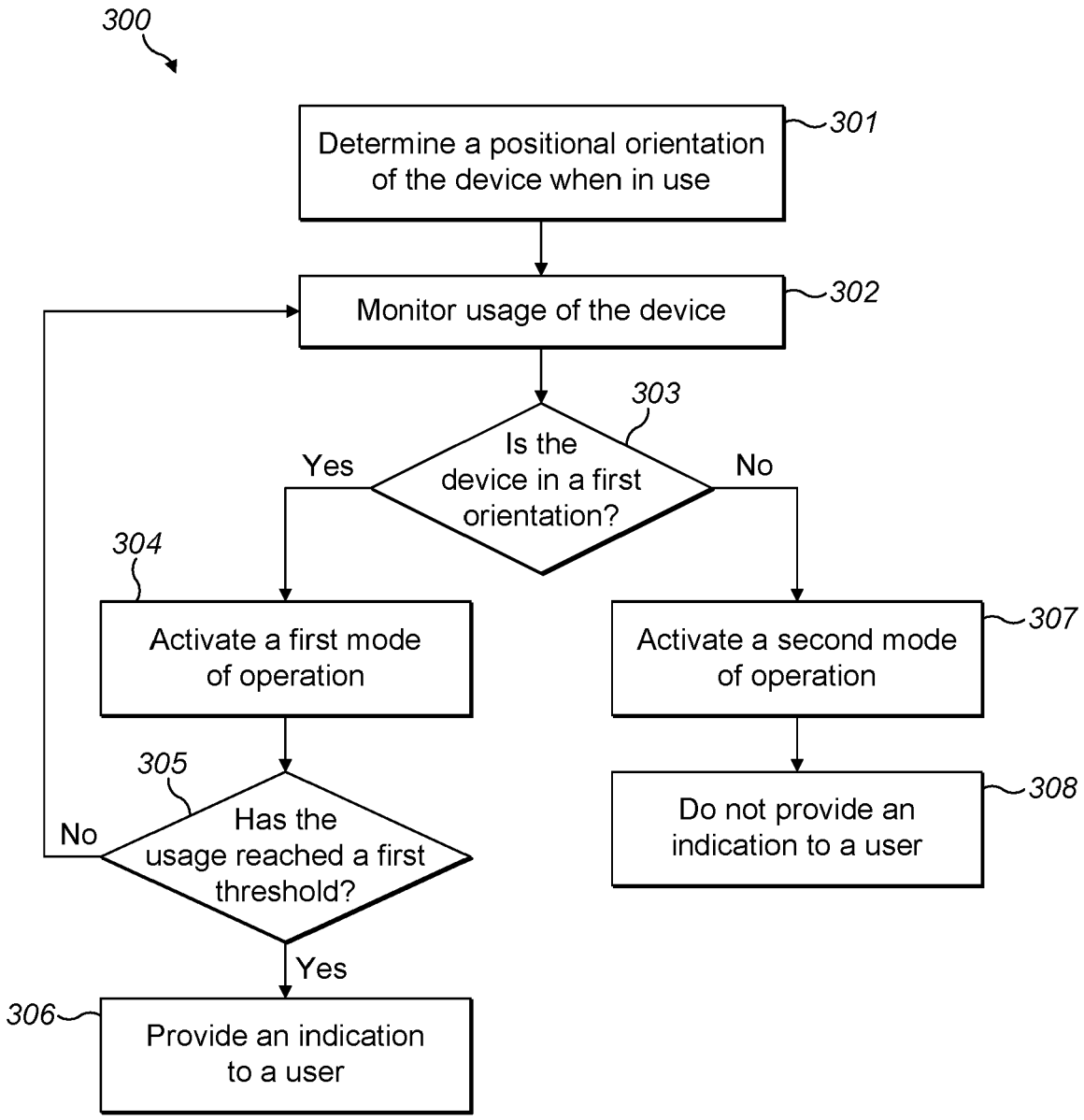
300
Determine a positional orientation of the device when in use
301
Monitor usage of the device
302
303
Is the device in a first orientation?
Yes
No
304
Activate a first mode of operation
307
Activate a second mode of operation
305
Has the usage reached a first threshold?
No
Yes
308
Do not provide an indication to a user
306
Provide an indication to a user

FIG. 3

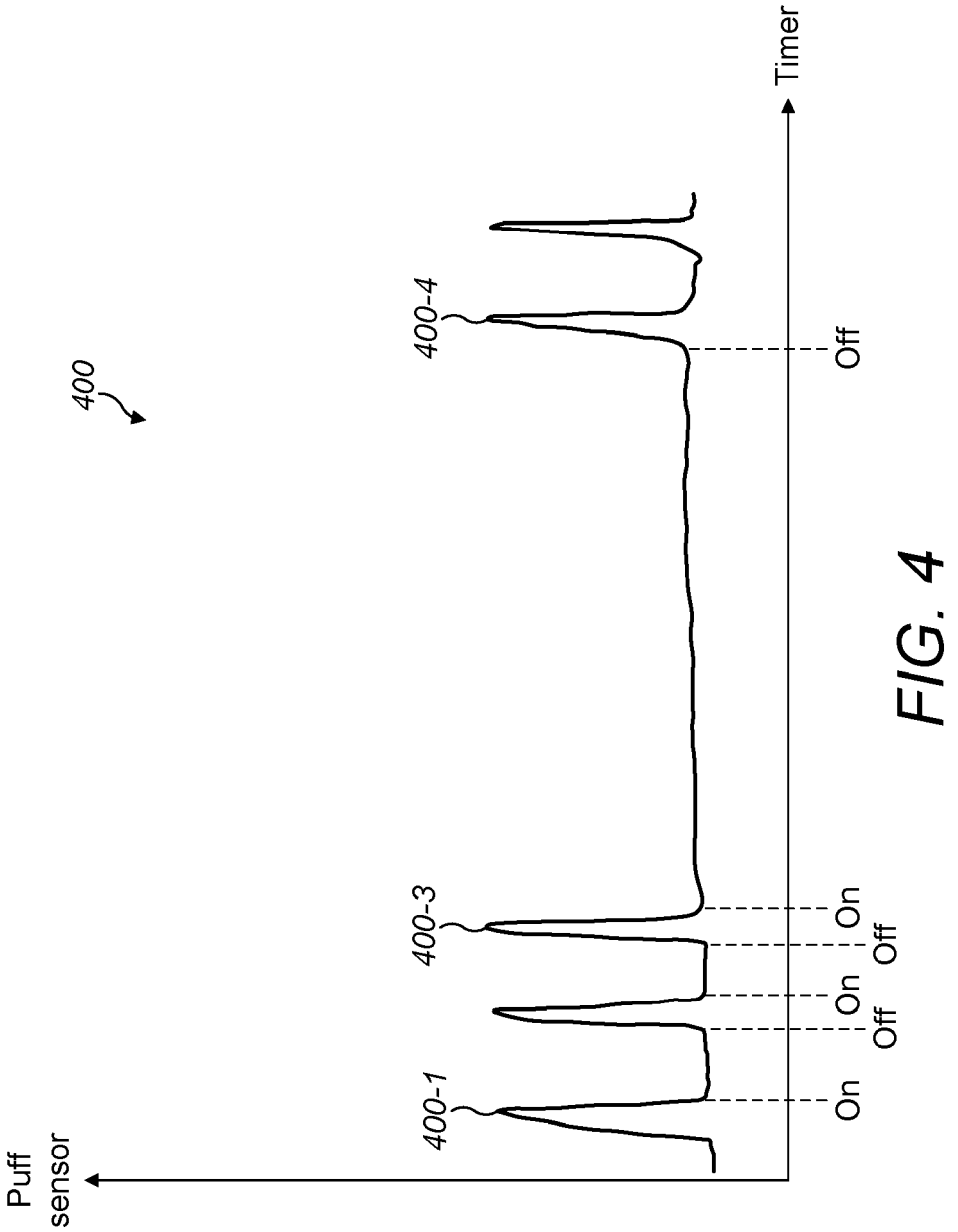

FIG. 4

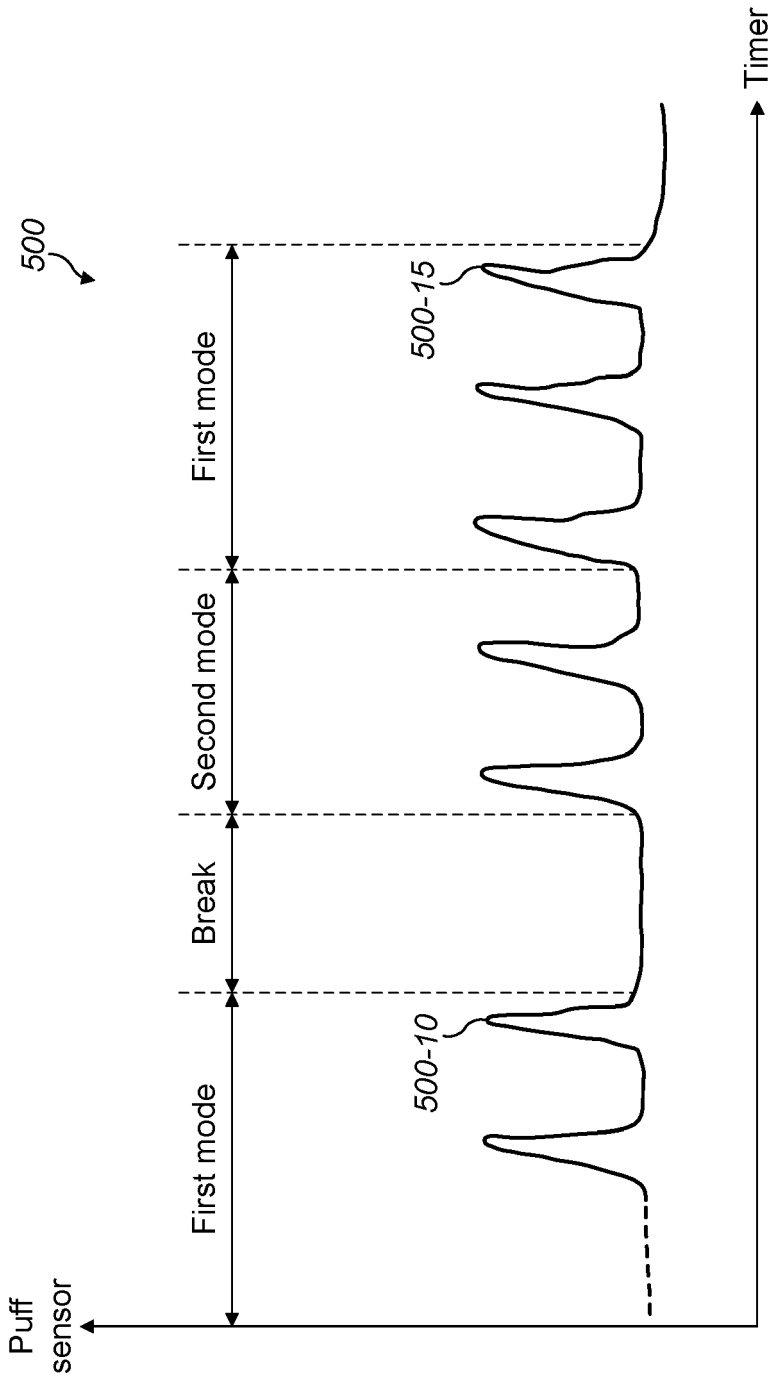
500
Puff sensor
Timer
First mode
Break
Second mode
First mode
500-10
500-15

FIG. 5

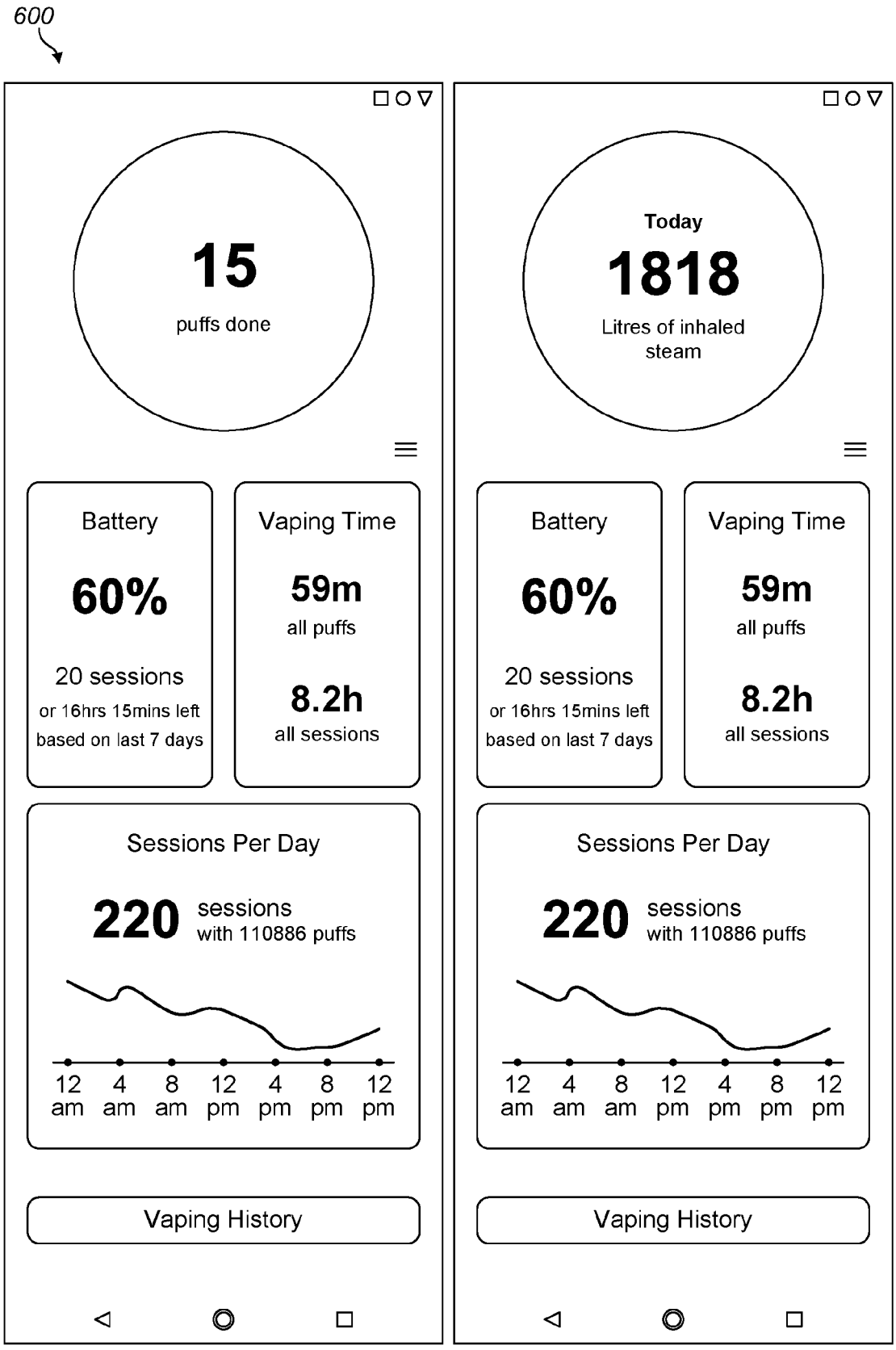
600
15
puffs done
Battery
60%
20 sessions
or 16hrs 15mins left
based on last 7 days
Vaping Time
59m
all puffs
8.2h
all sessions
Sessions Per Day
220 sessions
with 110886 puffs
12 am
4 am
8 am
12 pm
4 pm
8 pm
12 pm
Vaping History
Today
1818
Litres of inhaled steam
Battery
60%
20 sessions
or 16hrs 15mins left
based on last 7 days
Vaping Time
59m
all puffs
8.2h
all sessions
Sessions Per Day
220 sessions
with 110886 puffs
12 am
4 am
8 am
12 pm
4 pm
8 pm
12 pm
Vaping History

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 20 17 1187

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

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	10 September 2020	Coniglio, Carlo

CATEGORY OF CITED DOCUMENTS

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10-09-2020

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		ES 2747804 T3	11-03-2020
		HU E045349 T2	30-12-2019
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