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(54) **AEROSOL PROVISION DEVICE**

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(57)

ABSTRACT

There is provided an aerosol provision device. for providing an aerosol for inhalation by a user. comprising: control circuitry for controlling an activation state of the aerosol provision device: a first biometric detector arranged to detect a first property associated with a user of the aerosol provision device and provide a signal to the control circuitry: and. a second biometric detector arranged to detect a second property associated with a user of the aerosol provision device and provide a signal to the control circuitry. wherein the control circuitry is arranged to change an activation state of the aerosol provision device in response to receipt of signals from the first biometric detector and the second biometric detector associated with an authorised user, wherein the first property is different to the second property.

100

110



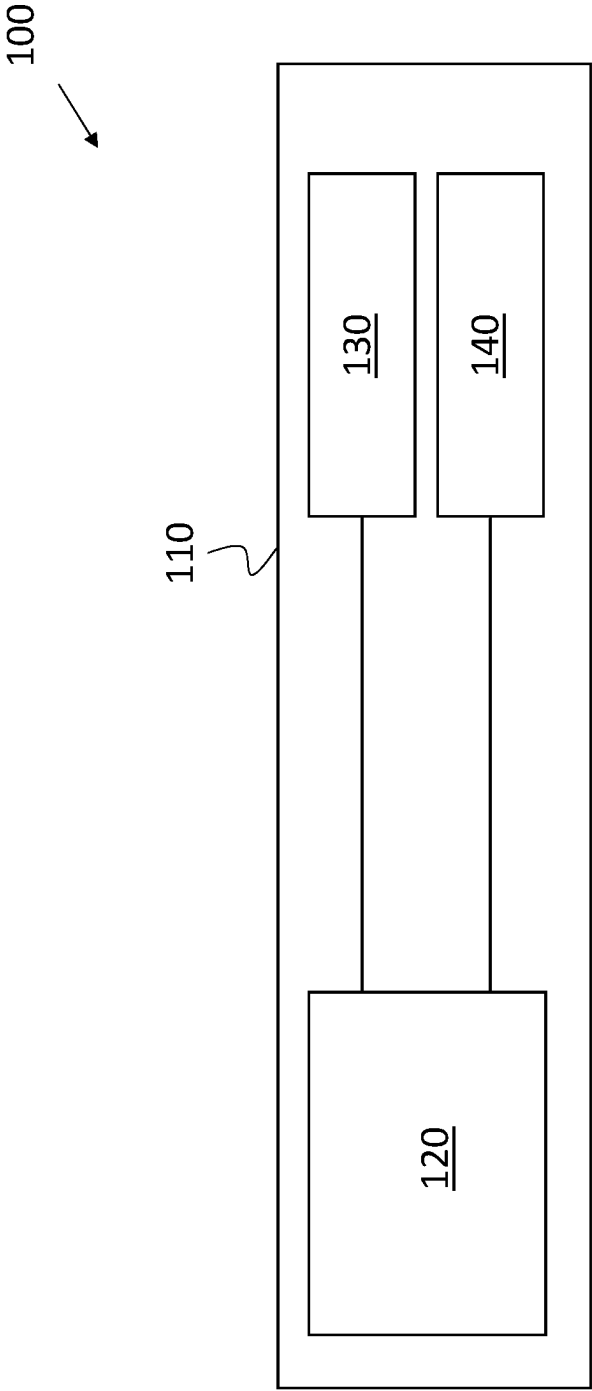


Figure 1

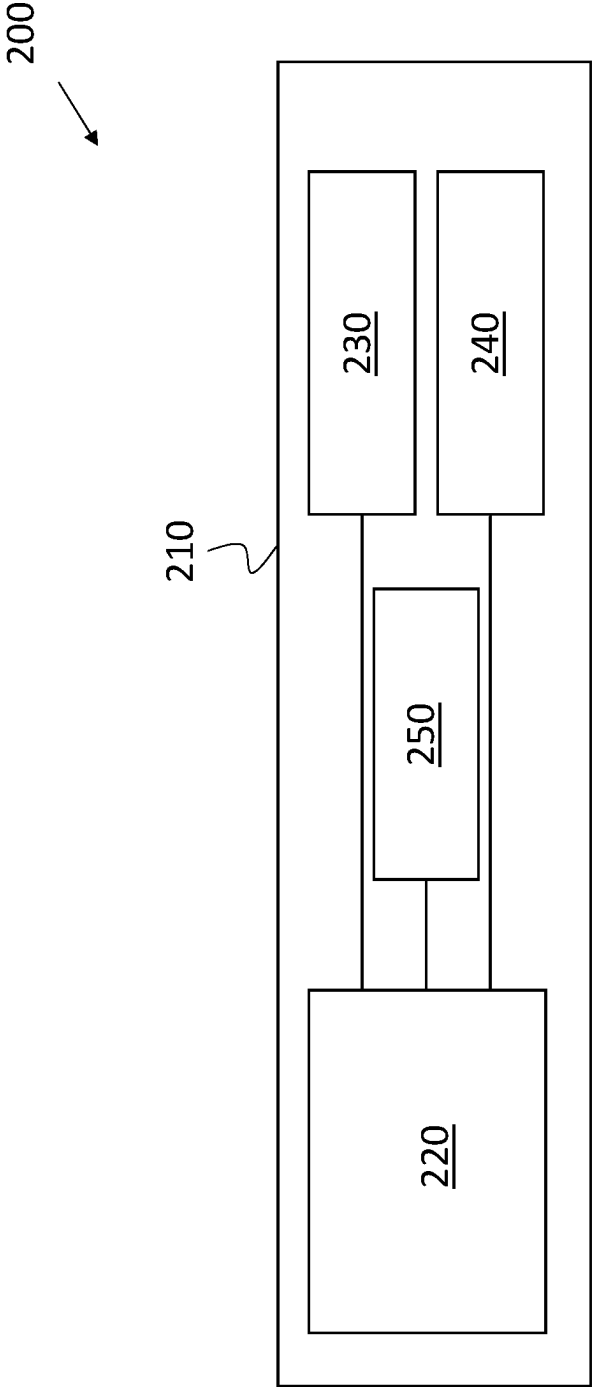


Figure 2

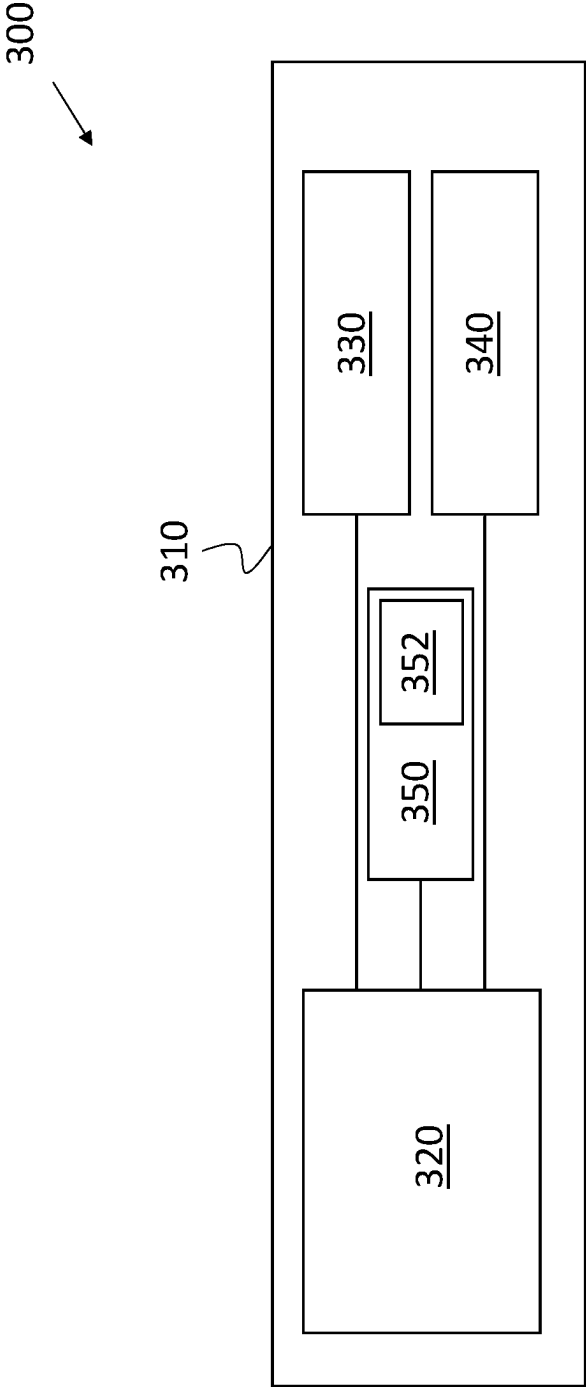


Figure 3

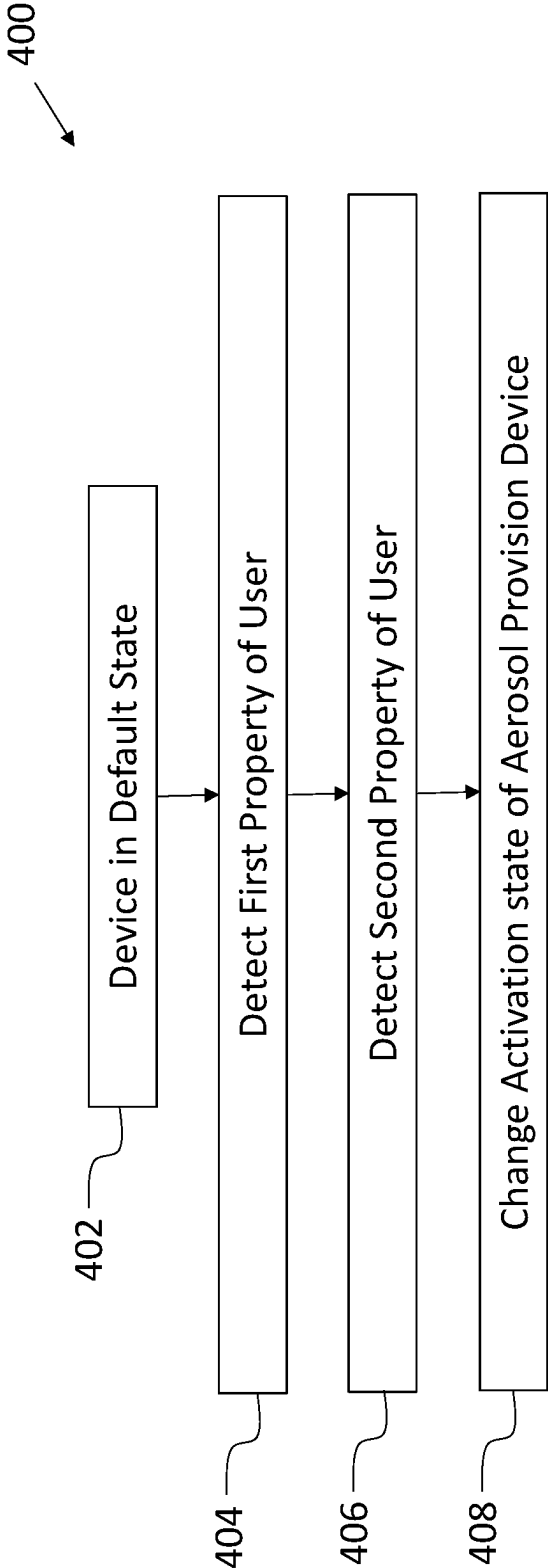


Figure 4

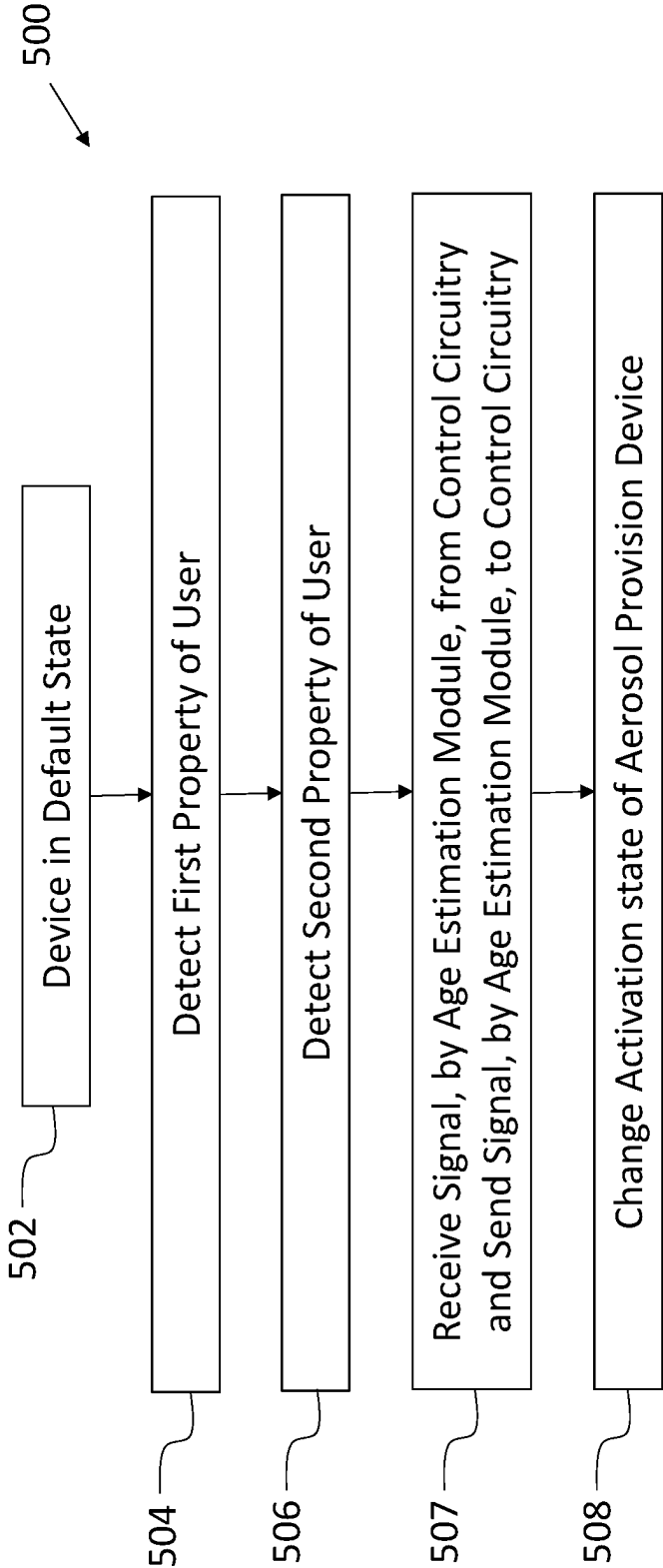


Figure 5

AEROSOL PROVISION DEVICE

TECHNICAL FIELD

[0001] The present invention relates to an aerosol provision device, a method of providing an aerosol for inhalation by a user, an aerosol provision system and aerosol provision means.

BACKGROUND

[0002] Aerosol provision systems are known. Common systems use heaters which are activated by a user to create an aerosol by an aerosol provision device from an aerosol generating material which is then inhaled by the user. The device may be activated by a user at the push of a button or merely by the act of inhalation. Modern systems can use consumable elements containing the aerosol generating material. It can be desirable for the manufacturer to enable control over the activation of the systems. This may avoid the activation of the system in undesirable circumstances.

[0003] The present invention is directed toward solving some of the above problems.

SUMMARY

[0004] Aspects of the invention are defined in the accompanying claims.

[0005] In accordance with some embodiments described herein, there is provided an aerosol provision device, for providing an aerosol for inhalation by a user, comprising: control circuitry for controlling an activation state of the aerosol provision device; a first biometric detector arranged to detect a first property associated with a user of the aerosol provision device and provide a signal to the control circuitry; and, a second biometric detector arranged to detect a second property associated with a user of the aerosol provision device and provide a signal to the control circuitry, wherein the control circuitry is arranged to change an activation state of the aerosol provision device in response to receipt of signals from the first biometric detector and the second biometric detector associated with an authorised user, wherein the first property is different to the second property.

[0006] Such an arrangement is able to identify a potential user of the aerosol provision device and allow authorised users to operate the device. In particular, the arrangement detects two biometric properties of a potential user and changes an activation state of the aerosol provision device accordingly.

[0007] The aerosol provision device of the present invention is able to operate in “offline” or “online” mode when identifying potential users. In this way, a valid user may operate the device in offline environment provided the user satisfies the criteria for operation. The user experience of the device is thereby improved.

[0008] The arrangement is also able to provide a “plug-and-play” approach. In that, the user may activate the device on first usage and the information from the biometric detectors can be used to alter the activation state of the device.

[0009] In this way, a valid user may have a full range of operational capabilities provided while an invalid user may have only a reduced subset or indeed no operational capabilities provided.

[0010] In accordance with some embodiments described herein, there is provided a method of providing an aerosol for inhalation by a user, the method comprising: detecting, by a first biometric detector, a first property of a user of a aerosol provision device and providing a signal to control circuitry of the aerosol provision device; detecting, by a second biometric detector, a second property of the user of the aerosol provision device and providing a signal to control circuitry; changing, by the control circuitry, an activation state of the aerosol provision device in response to receiving signals from the first biometric detector and the second biometric detector associated with an authorised user, wherein the first property is different to the second property.

[0011] In accordance with some embodiments described herein, there is provided an aerosol provision system, for providing an aerosol for inhalation by a user, comprising: an aerosol provision device comprising control circuitry for controlling an activation state of the aerosol provision device; a first biometric detector arranged to detect a first property associated with a user of the aerosol provision device and provide a signal for the control circuitry; and, a second biometric detector arranged to detect a second property associated with a user of the aerosol provision device and provide a signal for the control circuitry, wherein the control circuitry is arranged to change an activation state of the aerosol provision device in response to receipt of signals originating from the first biometric detector and the second biometric detector associated with an authorised user, wherein the first property is different to the second property.

[0012] In accordance with some embodiments described herein, there is provided aerosol provision means, for providing an aerosol for inhalation by a user, comprising: control means for controlling an activation state of the aerosol provision means; first biometric detecting means arranged to detect a first property associated with a user of the aerosol provision means and provide a signal to the control means; and, second biometric detecting means arranged to detect a second property associated with a user of the aerosol provision means and provide a signal to the control means, wherein the control means is arranged to change an activation state of the aerosol provision means in response to receipt of signals from the first biometric detecting means and the second biometric detecting means associated with an authorised user, wherein the first property is different to the second property.

DESCRIPTION OF DRAWINGS

[0013] The present teachings will now be described by way of example only with reference to the following figures:

[0014] FIG. 1 is a schematic view of an aerosol provision device according to an example;

[0015] FIG. 2 is a schematic view of an aerosol provision device according to an example;

[0016] FIG. 3 is a schematic view of an aerosol provision device according to an example;

[0017] FIG. 4 is a flow diagram according to an example; and,

[0018] FIG. 5 is a flow diagram according to an example.

[0019] While the invention is susceptible to various modifications and alternative forms, specific embodiments are shown by way of example in the drawings and are herein described in detail. It should be understood, however, that the drawings and detailed description of the specific embodi-

ments are not intended to limit the invention to the particular forms disclosed. On the contrary, the invention covers all modifications, equivalents and alternatives falling within the scope of the present invention as defined by the appended claims.

DETAILED DESCRIPTION

[0020] Aspects and features of certain examples and embodiments are discussed/described herein. Some aspects and features of certain examples and embodiments may be implemented conventionally and these are not discussed/described in detail in the interests of brevity. It will thus be appreciated that aspects and features of apparatus and methods discussed herein which are not described in detail may be implemented in accordance with any conventional techniques for implementing such aspects and features.

[0021] The present disclosure relates to aerosol provision systems, which may also be referred to as aerosol provision systems, such as e-cigarettes. Throughout the following description the term “e-cigarette” or “electronic cigarette” may sometimes be used, but it will be appreciated this term may be used interchangeably with aerosol provision system/device and electronic aerosol provision system/device. Furthermore, and as is common in the technical field, the terms “aerosol” and “vapour”, and related terms such as “vaporise”, “volatilise” and “aerosolise”, may generally be used interchangeably.

[0022] FIG. 1 illustrates a schematic view of an example of an aerosol provision device **100** according to the present invention. The aerosol provision device **100** has an aerosol provision device housing **110**. The aerosol provision device **100** has control circuitry **120**. The control circuitry **120** is arranged to control an activation state of the aerosol provision device **100**. The aerosol provision device **100** comprises a first biometric detector **130** arranged to detect a first property associated with a user of the aerosol provision device **100** and provide a signal to the control circuitry **120**. The aerosol provision device **100** further comprises second biometric detector **140** arranged to detect a second property associated with a user of the aerosol provision device **100** and provide a signal to the control circuitry **120**. The control circuitry **120** is arranged to change an activation state of the aerosol provision device **100** in response to receipt of signals from the first biometric detector **130** and the second biometric detector **140** associated with an authorised user. The first property is different to the second property.

[0023] In an example, the first property may be one relating to recognition of a face of a user, a voice of the user, a fingerprint of the user, and an iris of the user. The second property may one relating to recognition of a face of a user, a voice of the user, a fingerprint of the user, and an iris of the user different to the first property.

[0024] The full range of operating states of the aerosol provision device **100** may be very wide ranging such that the aerosol provision device **100** can be used with a correspondingly wide range of consumables. In this way, the user need not be limited to only certain types of consumable for use with the aerosol provision device **100**. However, from within this wide range, some operating states will not be suitable for use with some consumables. As such, it is important to offer states that will provide a desirable aerosol from the consumable. By offering all the possible states to all consumables, the onus would be put onto the user to work out

which operating states interact well with which consumables. This may decrease the user experience of the system.

[0025] The aerosol provision device **100** may comprise heating arrangements or the like for providing an aerosol from a consumable-the consumable may contain some aerosol generating material or the like. The control circuitry **120** may control the heating arrangement (or the like) according to the signal received from the first **130** and second **140** biometric detectors. The detectors **130**, **140** enable the control circuitry **120** to ascertain whether the user is a valid user of the aerosol provision device **100**. In an example, the biometric detectors **130**, **140** may provide signals to the control circuitry **120**, the control circuitry **120** may recognise the signals as belonging to a valid user and enable any operational mode of the device **100**. In another example, the biometric detectors **130**, **140** may provide signals to the control circuitry **120**, the control circuitry **120** may recognise the signals as belonging to an invalid user and prevent any operational mode of the device **100**. In this way, protection over the use of the aerosol provision device **100** is provided. This protection is not user intensive; the protection does not rely on the user taking some actions to provide the protection, rather the protection is provided for the user, increasing the user experience of the device **100**.

[0026] In an example, the first biometric detector **130** comprises at least one of: a face scanner; a projector scanner; a microphone; a fingerprint scanner; and, an iris scanner. Each of these options can provide a signal to the control circuitry **120** regarding a property of a potential user of the aerosol provision device **100**. Any other suitable biometric detector may also or alternatively be used. The control circuitry **120** is linked to the biometric detectors **130**, **140** either wirelessly or wired (as shown in FIG. 1). Prior to operation of the aerosol provision device **100**, the biometric detectors **130**, **140** detect a property of the user and provide a signal accordingly to the control circuitry **120**.

[0027] In an example, the second biometric detector **140** comprises at least one of: a face scanner; a projector scanner; a microphone; a fingerprint scanner; and, an iris scanner. Each of these options can provide a signal to the control circuitry **120** regarding a property of a potential user of the aerosol provision device **100**. While the biometric detectors **130**, **140** provide different properties to the control circuitry **120** this may be by virtue of the first biometric detector **130** being a face scanner-detecting a shape and distinctive elements of the users face-and the second biometric detector **140** being a microphone. In another example, the first biometric detector **130** may comprise a face scanner and a microphone, the second biometric detector **140** may comprise a face scanner and a microphone and each provides a signal to the control circuitry **120** that is different to the other. In this example, the first biometric detector **130** may detect a face of the potential user and the second biometric detector **140** may detect a sound of the voice of the potential user, each sending a corresponding signal to the control circuitry **120**. Such an arrangement would increase the resilience of the device **100**. In that, if the face scanner of the first biometric detector **130** is damaged or fails to operate, the first biometric detector **130** can use the microphone while the second biometric detector **140** uses the face scanner. This increases the overall lifetime of the device **100**.

[0028] Referring now to FIG. 2, there is shown a similar device **200** to the device **100** of FIG. 1. Similar features, to those features used in FIG. 1, are shown with the reference

numerals increased by 100. For example, the device 100 of FIG. 1 is similar to the device 200 of FIG. 2. Similar or identical features may not be discussed for conciseness.

[0029] The device 200 of FIG. 2 has control circuitry 220, and first and second biometric detectors 230, 240. The aerosol provision device 200 of FIG. 2 also has an age estimation module 250. The age estimation module 250 is arranged to receive a signal from the control circuitry 220 corresponding to the signals from the first biometric detector 230 and second biometric detector 240. The age estimation module 250 is further arranged to provide a signal to the control circuitry 220. The age estimation module 250 may be linked to the control circuitry 220 either wirelessly or wired (as shown in FIG. 2).

[0030] The age estimation module 250 receives a signal from the control circuitry 220 corresponding to the data signals from the detectors 230, 240. The age estimation module 250 may receive the biometric signals and associate the signals with a likely age range for the potential user. The age estimation module 250 may carry a memory storing a database or communicate with a remote database. The database may contain data on biometric properties and associated ages, for example a database of facial data including typical signs of aging, and associated age ranges. In a specific example, the database may contain data regarding the age range at which lines around the mouth and corners of eyes begin to appear, when they are prominent and when they are prevalent. The data obtained from one biometric detector 130, 140 may be compared by the age estimation module 250 against the data in the database and an age range associated with the potential user.

[0031] A more sophisticated database may factor in multiple aspects such as lines in the face, bags under the eyes, and prevalence of e.g. in males, facial hair. Together these factors can be used to indicate a probable age range of the potential user of the device 200. The age estimation module 250 performs an analysis of the signals from the two biometric detectors 230, 240, and provides a signal to the control circuitry 220 indicating whether the user is of a likely suitable or likely unsuitable age for use of the device.

[0032] By using two separate biometric detectors 230, 240, two separate factors may be considered, e.g. face and voice, or fingerprint and iris etc. Together these are used by the age estimation module 250 to provide a broad age estimation. This allows improved likelihood of detection of serious misalignments between the two factors, indicating that two users may have provided readings. If the readings do not align, the control circuitry 220 may not change the activation state of the aerosol provision device to an operational state, rather the control circuitry 220 may indicate to the user to submit further data via the detectors 230, 240. In this way, resilience against misuse is provided, improving the performance of the device 200.

[0033] In the event that the age verification module 250 detects the user is in an age range suitable for using the device 200 in all operational modes (such as heating age restricted aerosol generating material), the control circuitry 220 may allow any such activation of the device 200. In the event that the age verification module 250 detects the user is in a questionable age range-such as one that is in the range of acceptability but not clearly over that age-the control circuitry 220 may signal to the user that hard verification is required via another method. Other methods for such hard verification are known, such as Monzo-style verification.

[0034] In another operation mode, the age estimation module 250 is arranged to send an access signal to the control circuitry 220 based on signals from the first biometric detector 230 and second biometric detector 240 reaching predetermined thresholds. The age estimation module 250 is arranged to send a deny signal to the control circuitry 220 based on signals from at least one of the first biometric detector 230 and second biometric detector 240 not reaching a predetermined threshold. As such, where the user is deemed to be clearly over 30, and the signal from each detector indicates this, the age estimation module 250 sends an access signal to the control circuitry 220. Where the user is deemed to be between 17 and 25, the age estimation module 250 may send a hard verification request signal to the control circuitry 220. Where the user is deemed to be 10 to 15, a deny signal is sent to the control circuitry 220. Where the age estimation module 250 receives a signal from one detector that provides a different age range to the signal from the other detector, the age estimation module 250 can send a signal requesting a second access be made by the potential user. For example, a signal requesting a second access may be sent when the signal from the first biometric detector 230 indicates an age range of 40 to 55, while the signal from the second biometric detector 240 indicates an age range of 17 to 25.

[0035] This arrangement allows suitable handling of multiple potential users, ensuring that suitability of use is prioritised where necessary and where ease of access is prioritised where suitability of use is not a concern.

[0036] In an example, the control circuitry 220 is arranged to update an activation state of the aerosol provision device 200 in response to receipt of an access signal or deny signal from the age estimation module 250. In response to receipt of an access signal, the control circuitry 220 may update the device 200 to a full access mode where all functions are allowed. In response to receipt of a deny signal, the control circuitry 220 may update the device 200 to a no access mode, or age limited access mode, where all functions are denied or only partial functionality is provided.

[0037] In an example, the control circuitry 220 is arranged to provide a notification to a user in response to receipt of a deny signal from the age estimation module 250. The notification may be in the form of an audible signal, a visual signal, a haptic signal, a textual message or the like displayed on a screen or display or the like. Any suitable notification method may be used, including sending a signal to a personal device of the user, such as a smart device or the like.

[0038] Referring now to FIG. 3, there is shown a similar device 300 to the device 200 of FIG. 2. Similar features, to those features used in FIG. 2, are shown with the reference numerals increased by 100. For example, the device 200 of FIG. 2 is similar to the device 300 of FIG. 3. Similar or identical features may not be discussed for conciseness.

[0039] The device 300 of FIG. 3 has control circuitry 320, first and second biometric detectors 330, 340 and an age estimation module 350. The device 300 also has a communication module 352 comprised in the age estimation module 350. The communication module 352 is arranged to communicating with at least one of: a remote database; a remote computing arrangement; an onboard database; and, an onboard computing arrangement. This assists in providing feedback to the control circuitry 320 from the database,

furthermore this assists in providing the data collected in the device 300 for use in the database for other devices.

[0040] In the above example, the age estimation module 350 receives signals from the control circuitry 320 and compares the signal against a database. The database may be stored in a memory on board the device 300. This memory is on board memory and the database is therefore also on board. This may be advantageous as the device 300 need not have a communications element in the device 300 to communicate with a remotely held database, and the device 300 need not be connected to a communications network to access a remotely held database prior to each use session.

[0041] In a different example, the database of properties and associated operating states is held remotely, and the age estimation module 350 has a communication module 352 to contact the database. The communication module 352 may contact the database with a request for analysis of age for the signals from the control circuitry 320. The communication module 352, and therefore the age estimation module 350, is then provided with an indication as to a likely age range of the potential user. This arrangement may be advantageous as the device 300 need not include a memory element for carrying the database and the database can be remotely updated ensuring the device 300 need not have the on board database regularly updated. In this way recently amended age range estimation data can be provided to all devices 300 as soon as the amendments are uploaded to the central database. In this way, all users can be provided with the updates without each needing to update their own device 300.

[0042] In an example, the device 300 communicates with a database and the database is a look up table of signals and associated age ranges. In another example, the device 300 communicates with a computing arrangement and the computing arrangement utilises an artificial intelligence arrangement for assessing age based on the signals received from the control circuitry 320.

[0043] In response to receipt of a signal from at least one of: a remote database; a remote computing arrangement; an onboard database; and, an onboard computing arrangement, the age estimation module 350 is arranged to send a signal to the control circuitry 320. The control circuitry 320 then changes the activation state of the aerosol provision device 300 accordingly, fully enabling, partially enabling or preventing use of the device 300.

[0044] Biometric data belonging to the owner of the device 300 may be stored on board so as to enable a rapid approval of the regular user of the device 300. This may be arranged on purchase of the device 300 where the owner can be age assessed by a vendor of the device 300, via presentation of identification or the like. While irregular users may be age estimated against the database or the computing arrangement, details regarding the owner of the device 300 may be stored locally.

[0045] The present invention involves changing an activation state of the aerosol provision device. In an "operating state", elements of the aerosol provision device 300 used to generate an aerosol (such as an atomiser, heater or the like) may be activated. The specific activation of the device 300 may require an additional input which may be inhalation on the device 300, pressing a button on the device 300 or the like. Alternatively, the device 300 may automatically generate aerosol by a heater in response to receiving a signal associated with a valid potential user. The control circuitry

320 may receive such a signal from the age estimation module 350 and send a signal to the heater arrangement or the like to provide an aerosol from an aerosol generating material that may contained within, or separate to, the aerosol provision device 300.

[0046] The term "operating state" refers to a state in which the device 300 may be used to provide an aerosol. When the aerosol provision device 300 is combined with an aerosol generating material this is referred to herein as an aerosol provision system. The device 300 can provide a large number of "operating states". Specific aerosol generating material consumables may provide a suitable aerosol for a user under a suitable heating profile (fast, slow, high temperature, low temperature, etc.) or via a suitable heating mechanism (heater element, atomiser, vibrating plate, etc.). As such specific, operating states may dictate the performance of the system, such as selecting the heating mechanisms used and the heating profile used based on the identified user-one user may be able to store a preferred heating profile to be associated with their biometric data. In this way, in response to identification of user 1, corresponding heating mechanism 1 is offered to provide heating profile 1 on the aerosol generating material. In response to identification of user 2, corresponding heating mechanism 2 may be offered to provide heating profile 2 on the aerosol generating material. In this way, different users are provided a bespoke aerosol, in response to recognition of that user. This improves the ease of use, and the use experience, of a device 300 for a user.

[0047] FIG. 4 shows a method 400 of use of an aerosol provision device. In the method 400, the device may start in a default state 402, which may be a non-operating state such that non-valid users cannot use the device. Alternatively, the default operating state may be a restricted operating state where only partial operation of the device is possible.

[0048] When a user intends to use the aerosol provision device, the device detects a first property of the user 404. The device detects the first property using a first biometric detector (which may contain a number of individual sensors/detectors as explained above). In the specific examples mentioned above these may include a microphone, face sensor, iris scanner or the like. The device then detects a second property of the user 406. The device detects the second property using a second biometric detector (which may contain a number of individual sensors/detectors as also explained above). The first property is different to the second property.

[0049] In step 408, there is a change of activation state of the aerosol provision device. This may take the form of updating the activation state to an operating state such as fully enabled for use, partially enabled for use or prevented from use. As discussed above, this change is based on the detected properties from the user. These are used to ascertain a suitability of use for the user based on the estimated age of the user.

[0050] This method provides a user-friendly age verification process that provides suitable protection against invalid users while not impeding overly use for valid users. The method offers a balance between overly strict and overly lenient access protection for the device.

[0051] FIG. 5 shows a method 500 of use of an aerosol provision device. The method 500 is similar to the method 400, with numerals increased by 100 for similar steps. The method 500 has steps of the device starting in a default state

502, the device detecting a first property of the user **504**, the device detecting a second property of the user **506**, and changing an activation state of the aerosol provision device **508**. The methods **500** also has additional step **507** wherein an age estimation module receives a signal from the control circuitry and then the age estimation module sends a signal to the control circuitry.

[0052] The signal from the age estimation module may be an access signal to allow a valid user to use the device, or a deny signal to prevent an invalid user from using the device. As explained above, the device may also have partial use programs enabled for certain users. The age estimation module may send a partial access signal to the control circuitry when such a user is identified.

[0053] The device or system disclosed herein may be arranged so that sensors or detectors provide signals directly, or indirectly, to the control circuitry. In this way, control can be provided over which specific electrical component performs analysis of the signal from the sensors or detectors.

[0054] In an example, the sensors or detectors may provide a signal to a remote server that performs the analysis of the signal. The server may then message the control circuitry with a signal stating simply either unlock or lock device, according to the data from the biometric detectors. The control circuitry can then be a more simplistic component which is cheaper to produce.

[0055] The term “in response to” is used herein to indicate a second event (such as a signal or change of state of an aerosol provision device) that occurs subsequent to a first event. The second event may occur at a later time, after a predetermined time, or immediately after the first event.

[0056] The device and system herein are described as comprising several components that enable several advantages. The components may be disclosed as on-board the device or within the system. The components may be distributed and therefore not necessarily be located on-board the device. The functionality of the device can be provided by communicatively connected components, and such communication may be wireless, enabling such distribution. At which point it is reasonable to foresee that a distributed array of components will operate in the manner of the devices and systems disclosed herein. Components of the device or system may be contained in a further device such as a smartphone, computer, or remote server or the like.

[0057] The method and device disclosed herein enable protection over the use of the device without requiring an arduous authorisation process. This improves the user experience of the device and the safety of general use of the device.

[0058] In a particular example, the device disclosed herein may operate with a flavour pod which is replaceable in the device—this may be referred to as a consumable. The flavour may be any of tobacco and glycol and may include extracts (e.g., licorice, hydrangea, Japanese white bark magnolia leaf, chamomile, fenugreek, clove, menthol, Japanese mint, aniseed, cinnamon, herb, wintergreen, cherry, berry, peach, apple, Drambuie, bourbon, scotch, whiskey, spearmint, peppermint, lavender, cardamon, celery, cascarrilla, nutmeg, sandalwood, bergamot, geranium, honey essence, rose oil, vanilla, lemon oil, orange oil, cassia, caraway, cognac, jasmine, ylang-ylang, sage, fennel, piment, ginger, anise, coriander, coffee, or a mint oil from any species of the genus *Mentha*), flavour enhancers, bitterness receptor site blockers, sensorial receptor site activators or stimulators, sugars

and/or sugar substitutes (e.g., sucralose, acesulfame potassium, aspartame, saccharine, cyclamates, lactose, sucrose, glucose, fructose, sorbitol, or mannitol), and other additives such as charcoal, chlorophyll, minerals, botanicals, or breath freshening agents. They may be imitation, synthetic or natural ingredients or blends thereof.

[0059] When combined with an aerosol generating medium, the aerosol provision device as disclosed herein may be referred to as an aerosol provision system.

[0060] Thus there has been described an aerosol provision device, for providing an aerosol for inhalation by a user, comprising: control circuitry for controlling an activation state of the aerosol provision device; a first biometric detector arranged to detect a first property associated with a user of the aerosol provision device and provide a signal to the control circuitry; and, a second biometric detector arranged to detect a second property associated with a user of the aerosol provision device and provide a signal to the control circuitry, wherein the control circuitry is arranged to change an activation state of the aerosol provision device in response to receipt of signals from the first biometric detector and the second biometric detector associated with an authorised user, wherein the first property is different to the second property.

[0061] The aerosol provision system may be used in a tobacco industry product, for example a non-combustible aerosol provision system.

[0062] In one embodiment, the tobacco industry product comprises one or more components of a non-combustible aerosol provision system, such as a heater and an aerosolizable substrate.

[0063] In one embodiment, the aerosol provision system is an electronic cigarette also known as a vaping device.

[0064] In one embodiment the electronic cigarette comprises a heater, a power supply capable of supplying power to the heater, an aerosolizable substrate such as a liquid or gel, a housing and optionally a mouthpiece.

[0065] In one embodiment the aerosolizable substrate is contained in or on a substrate container. In one embodiment the substrate container is combined with or comprises the heater.

[0066] In one embodiment, the tobacco industry product is a heating product which releases one or more compounds by heating, but not burning, a substrate material. The substrate material is an aerosolizable material which may be for example tobacco or other non-tobacco products, which may or may not contain nicotine. In one embodiment, the heating device product is a tobacco heating product.

[0067] In one embodiment, the heating product is an electronic device.

[0068] In one embodiment, the tobacco heating product comprises a heater, a power supply capable of supplying power to the heater, an aerosolizable substrate such as a solid or gel material.

[0069] In one embodiment the heating product is a non-electronic article.

[0070] In one embodiment the heating product comprises an aerosolizable substrate such as a solid or gel material, and a heat source which is capable of supplying heat energy to the aerosolizable substrate without any electronic means, such as by burning a combustion material, such as charcoal.

[0071] In one embodiment the heating product also comprises a filter capable of filtering the aerosol generated by heating the aerosolizable substrate.

[0072] In some embodiments the aerosolizable substrate material may comprise an aerosol or aerosol generating agent or a humectant, such as glycerol, propylene glycol, triacetin or diethylene glycol.

[0073] In one embodiment, the tobacco industry product is a hybrid system to generate aerosol by heating, but not burning, a combination of substrate materials. The substrate materials may comprise for example solid, liquid or gel which may or may not contain nicotine. In one embodiment, the hybrid system comprises a liquid or gel substrate and a solid substrate. The solid substrate may be for example tobacco or other non-tobacco products, which may or may not contain nicotine. In one embodiment, the hybrid system comprises a liquid or gel substrate and tobacco.

[0074] In order to address various issues and advance the art, the entirety of this disclosure shows by way of illustration various embodiments in which the claimed invention(s) may be practiced and provide for a superior electronic aerosol provision system. The advantages and features of the disclosure are of a representative sample of embodiments only, and are not exhaustive and/or exclusive. They are presented only to assist in understanding and teach the claimed features. It is to be understood that advantages, embodiments, examples, functions, features, structures, and/or other aspects of the disclosure are not to be considered limitations on the disclosure as defined by the claims or limitations on equivalents to the claims, and that other embodiments may be utilised and modifications may be made without departing from the scope and/or spirit of the disclosure. Various embodiments may suitably comprise, consist of, or consist essentially of, various combinations of the disclosed elements, components, features, parts, steps, means, etc. In addition, the disclosure includes other inventions not presently claimed, but which may be claimed in future.

1. An aerosol provision device, for providing an aerosol for inhalation by a user, comprising:

control circuitry for controlling an activation state of the aerosol provision device;

a first biometric detector arranged to detect a first property associated with a user of the aerosol provision device and provide a signal to the control circuitry; and,

a second biometric detector arranged to detect a second property associated with a user of the aerosol provision device and provide a signal to the control circuitry,

wherein the control circuitry is arranged to change an activation state of the aerosol provision device in response to receipt of signals from the first biometric detector and the second biometric detector associated with an authorised user,

wherein the first property is different to the second property.

2. An aerosol provision device according to claim 1, wherein the first biometric detector comprises at least one of: a face scanner; a projector scanner; a microphone; a fingerprint scanner; and, an iris scanner.

3. An aerosol provision device according to claim 1, wherein the second biometric detector comprises at least one of: a face scanner; a projector scanner; a microphone; a fingerprint scanner; and, an iris scanner.

4. An aerosol provision device according to claim 1, further comprising an age estimation module,

the age estimation module arranged to receive a signal from the control circuitry corresponding to the signals

from the first biometric detector and second biometric detector, and the age estimation module further arranged to provide a signal to the control circuitry.

5. An aerosol provision device according to claim 4, wherein the age estimation module is arranged to send an access signal to the control circuitry based on signals from the first biometric detector and second biometric detector reaching predetermined thresholds, and

wherein the age estimation module is arranged to send a deny signal to the control circuitry based on signals from at least one of the first biometric detector and second biometric detector not reaching a predetermined threshold.

6. An aerosol provision device according to claim 5, wherein the control circuitry is arranged to provide a notification to a user in response to receipt of a deny signal from the age estimation module.

7. An aerosol provision device according to claim 5, wherein the control circuitry is arranged to update an activation state of the aerosol provision device in response to receipt of an access signal or deny signal from the age estimation module.

8. An aerosol provision device according to claim 4, wherein the age estimation module comprises a communication module for communicating with at least one of: a remote database; a remote computing arrangement; an onboard database;

and, an onboard computing arrangement.

9. An aerosol provision device according to claim 8, wherein the age estimation module is arranged to send a signal to the control circuitry in response to receipt of a signal from at least one of: a remote database; a remote computing arrangement; an onboard database; and, an onboard computing arrangement.

10. A method of providing an aerosol for inhalation by a user, the method comprising:

detecting, by a first biometric detector, a first property of a user of a aerosol provision device and providing a signal to control circuitry of the aerosol provision device;

detecting, by a second biometric detector, a second property of the user of the aerosol provision device and providing a signal to control circuitry;

changing, by the control circuitry, an activation state of the aerosol provision device in response to receiving signals from the first biometric detector and the second biometric detector associated with an authorised user,

wherein the first property is different to the second property.

11. A method according to claim 10, wherein detecting a first property of a user comprises: scanning a face of the user; recording a voice of the user; scanning a fingerprint of the user; and scanning the eyes of a user.

12. A method according to claim 10, wherein detecting a second property of a user comprises: scanning a face of the user; recording a voice of the user;

scanning a fingerprint of the user; and scanning the eyes of a user.

13. A method according to claim 10, further comprising: receiving, by an age estimation module, a signal from the control circuitry corresponding to the signals from the first biometric detector and second biometric detector; sending, by the age estimation module, a signal to the control circuitry.

14. A method according to claim **13**, wherein sending, by the age estimation module, a signal to the control circuitry comprises:

sending, by the age estimation module, an access signal to the control circuitry based on signals from the first biometric detector and second biometric detector reaching predetermined thresholds, and

sending, by the age estimation module, a deny signal to the control circuitry based on signals from at least one of the first biometric detector and second biometric detector not reaching a predetermined threshold.

15. A method according to claim **13**, further comprising: sending, by a communication module of the age estimation module, a signal to at least one of: a remote database; a remote computing arrangement; an onboard database; and, an onboard computing arrangement, to estimate an age of the user.

16. An aerosol provision system, for providing an aerosol for inhalation by a user, comprising:

an aerosol provision device comprising control circuitry for controlling an activation state of the aerosol provision device;

a first biometric detector arranged to detect a first property associated with a user of the aerosol provision device

and provide a signal for the control circuitry; and, a second biometric detector arranged to detect a second property associated with a user of the aerosol provision device and provide a signal for the control circuitry,

wherein the control circuitry is arranged to change an activation state of the aerosol provision device in response to receipt of signals originating from the first biometric detector and the second biometric detector associated with an authorised user,

wherein the first property is different to the second property.

17. An aerosol provision system according to claim **16**, wherein the first biometric detector and the second biometric detector are arranged to provide signals to at least one of:

the control circuitry; and,

a server arranged to process the signals originating from the first biometric detector and the second biometric detector and provide a signal to the control circuitry.

18. An aerosol provision system according to claim **16**, wherein the signal from the server is a lock or unlock signal.

19. (canceled)

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