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(54) **SMOKING SUBSTITUTE SYSTEM**

(57) The present disclosure relates to a heated tobacco (HT) device comprising feedback means having a haptic element for generating a haptic feedback output having a first intensity in a first mode and a second intensity in a second mode. The first intensity is different

to the second intensity. The device further comprises a user input means for receiving a user input. The device is configured to switch between the first and second modes upon receipt of the user input.

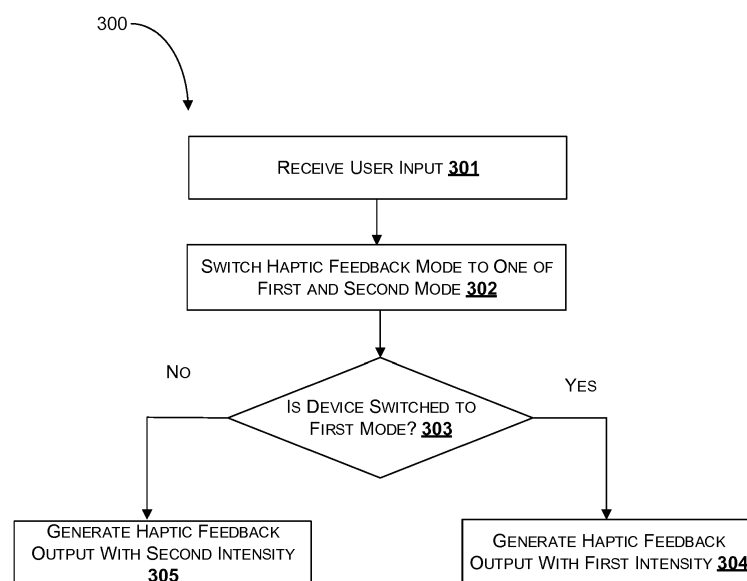


FIGURE 3

Description

TECHNICAL FIELD

[0001] The present invention relates to a smoking substitute device for receiving a consumable and a method of controlling operation of the smoking substitute device.

BACKGROUND

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

[0003] Conventional combustible smoking articles, such as cigarettes, typically comprise a cylindrical rod of tobacco comprising shreds of tobacco which is surrounded by a wrapper, and usually also a cylindrical filter axially aligned in an abutting relationship with the wrapped tobacco rod. The filter typically comprises a filtration material which is circumscribed by a plug wrap. The wrapped tobacco rod and the filter are joined together by a wrapped band of tipping paper that circumscribes the entire length of the filter and an adjacent portion of the wrapped tobacco rod. A conventional cigarette of this type is used by lighting the end opposite to the filter, and burning the tobacco rod. The smoker receives mainstream smoke into their mouth by drawing on the mouth end or filter end of the cigarette.

[0004] 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 (or "substitute smoking systems") in order to avoid the smoking of tobacco.

[0005] 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.

[0006] Smoking substitute systems include electronic systems that permit a user to simulate the act of smoking by producing an aerosol (also referred to as a "vapour") that is drawn into the lungs through the mouth (inhaled) and then exhaled. The inhaled aerosol typically bears nicotine and/or flavourings without, or with fewer of, the odour and health risks associated with traditional smoking.

[0007] In general, smoking substitute systems are intended to provide a substitute for the rituals of smoking, whilst providing the user with a similar experience and satisfaction to those experienced with traditional smoking and with combustible tobacco products. Some smoking substitute systems use smoking substitute articles (also referred to as a "consumables") that are designed to resemble a traditional cigarette and are cylindrical in form with a mouthpiece at one end.

[0008] 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.

[0009] There are a number of different categories of smoking substitute systems, each utilising a different smoking substitute approach.

10 [0010] One approach for a smoking substitute system 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. The vapour may contain nicotine and/or flavourings. In the HT approach the intention is that the tobacco is heated but not burned, i.e. the tobacco does not undergo combustion.

20 [0011] A typical HT smoking substitute system may include a device and a consumable. The consumable may include the tobacco material. The device and consumable 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.

30 [0012] As the vapour passes through the consumable (entrained in the airflow) from the location of vaporisation to an outlet of the consumable (e.g. a mouthpiece), the vapour cools and condenses to form an aerosol for inhalation by the user. The aerosol will normally contain the volatile compounds.

35 [0013] In HT smoking substitute systems, heating as opposed to burning 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.

40 [0014] Another approach is the so-called "vaping" approach, in which a vaporisable liquid, typically referred to (and referred to herein) as "e-liquid", is heated by a heating device (referred to herein as an electronic cigarette or "e-cigarette" device) to produce an aerosol vapour which is inhaled by a user. The e-liquid typically includes a base liquid as well as nicotine and/or a flavourant. The resulting vapour therefore also typically contains nicotine and/or a flavourant. The base liquid may include propylene glycol and/or vegetable glycerine.

50 [0015] A typical e-cigarette device includes a mouthpiece, a power source (typically a battery), a tank for containing e-liquid, as well as a heating device. In use, electrical energy is supplied from the power source to the

heating device, which heats the e-liquid to produce an aerosol (or "vapour") which is inhaled by a user through the mouthpiece.

[0016] E-cigarettes can be configured in a variety of ways. For example, there are "closed system" vaping smoking substitute systems, which typically have a sealed tank and heating element. The tank is 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 main body which includes the power source, wherein the main body is configured to be physically and electrically coupled to a consumable including the tank and the heating element. In this way, when the tank of a consumable has been emptied, that consumable is disposed of. The main body can be reused by connecting it to a new, replacement, consumable. Another subset of closed system vaping smoking substitute systems are completely disposable, and intended for one-use only.

[0017] There are also "open system" vaping smoking substitute systems which typically have a tank that is configured to be refilled by a user. In this way the entire device can be used multiple times.

[0018] There may be a need for improved design of smoking substitute systems to enhance the user experience and improve the function of the smoking substitute system.

[0019] The present disclosure has been devised in the light of the above considerations.

SUMMARY OF THE INVENTION

[0020] At its most general, the present invention relates to operating a smoking substitute system in different haptic feedback modes.

[0021] According to a first aspect of the present invention, there is provided a heated tobacco (HT) or heat-not-burn (HNB) device comprising feedback means having a haptic element for generating a haptic feedback output having a first intensity in a first mode and a second intensity in a second mode, the first intensity being different to the second intensity, wherein the device further comprises a user input means for receiving a user input, the device being configured to switch between the first and second modes upon receipt of the user input.

[0022] By providing a HT/HNB device having feedback means including a haptic element operable at two different intensity levels, the user is able to select a desired vibration intensity level. Thus the user experience is enhanced through the choice and tailoring of the haptic feedback output.

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

[0024] Optionally, the first intensity is zero such that in the first mode, vibration of the haptic element is suppressed. In other embodiments, the first intensity and second intensity are finite such that the haptic element is configured to vibrate in both the first and second mode.

The second intensity may be greater than the first intensity.

[0025] The input means is configured to receive a user input to switch between the first and second modes i.e. a mode selection input. In some embodiments, the input means is further configured to receive a first mode parameter selection input and/or a second mode parameter selection input. The first mode parameter selection input and the second mode parameter selection input may each independently comprise one or more parameters selected from intensity (amplitude), frequency, duration, pulse sequence/pattern.

[0026] The input means may form part of a user interface (UI) on the device (e.g. as a touch screen). In some embodiments the UI may comprise a power button to switch the device between an ON state (power supplied to a heater) and an OFF state (no power supplied to the heater).

[0027] The user input means may comprise a wireless interface configured to receive the user input by wireless communication (e.g. via Bluetooth (e.g. a Bluetooth low-energy connection) or Wi-Fi) with an external device.

[0028] The external device may be a mobile device. For example, the external device may be a smart phone, tablet, smart watch, or smart car. An application (e.g. app) may be installed on the external device (e.g. mobile device). The application may facilitate communication between the device and the external device via the wireless connection.

[0029] Upon receipt of the user input, the UI or the wireless interface may be configured to generate an input signal. The device may further comprise a controller or may be connectable to a controller for receiving the input signal.

[0030] The controller may comprise a microcontroller that may e.g. be mounted on a printed circuit board (PCB). The controller may also comprise a memory, e.g. non-volatile memory for storing the mode selection and any user-defined first mode and/or second mode parameters.

[0031] The controller may be configured to control the operation of the heater (and e.g. the heating element). Thus, the controller may be configured to control vaporisation of an aerosol forming part of an aerosol-forming article engaged with the device. The controller may be configured to control the voltage applied by power source to the heater. For example, the controller may be configured to toggle between applying a full output voltage (of the power source) to the heater and applying no voltage to the heater (in the OFF state). Alternatively or additionally, the control unit may implement a more complex heater control protocol.

[0032] The device may comprise a power source or may be connectable to a power source (e.g. a power source separate to the device). The power source may be electrically connectable to a heater. In that respect, altering (e.g. toggling) the electrical connection of the power source to the heater may affect a state of the heat-

er. For example, toggling the electrical connection of the power source to the heater may toggle the heater between an ON state and an OFF state. The power source may be a power store. For example, the power source may be a battery or rechargeable battery (e.g. a lithium ion battery).

[0033] The device may comprise an input connection (e.g. a USB port, Micro USB port, USB-C port, etc.). The input connection may be configured for connection to an external source of electrical power, such as a mains electrical supply outlet. The input connection may, in some cases, be used as a substitute for an internal power source (e.g. battery or rechargeable battery). That is, the input connection may be electrically connectable to the heater (for providing power to the heater). Hence, in some forms, the input connection may form at least part of the power source of the device.

[0034] Where the power source comprises a rechargeable power source (such as a rechargeable battery), the input connection may be used to charge and recharge the power source.

[0035] The device may further comprise a voltage regulator to regulate the output voltage supplied by the power source to form a regulated voltage. The regulated voltage may subsequently be applied to the heater.

[0036] The controller may be configured to monitor the charge of the power source and generate a 'depletion' output signal when the charge is below a predetermined value. The feedback means may be configured to receive the 'depletion' output signal and to cause the haptic element to generate the haptic feedback output in either the first mode or second mode depending on the mode previously selected by the user input.

[0037] The device may further comprise a puff sensor (e.g. airflow sensor). The puff sensor may be configured to detect a user drawing on an end (i.e. a terminal (mouth) end) of the aerosol-forming article. The puff sensor may, for example, be a pressure sensor or a microphone. The puff sensor may be configured to produce a puff signal indicative of a puff state. The signal may be indicative of the user drawing (an aerosol from the aerosol-forming article) such that it is e.g. in the form of a binary signal. Alternatively or additionally, the signal may be indicative of a characteristic of the draw (e.g. a flow rate of the draw, length of time of the draw, etc.).

[0038] The controller may be configured to monitor the time elapsed between consecutive puff signals and generate an 'idle' output signal when the time elapsed exceeds a predetermined time. The feedback means may be configured to receive the 'idle' output signal and to cause the haptic element to generate the haptic feedback output in either the first mode or second mode depending on the mode previously selected by the user input.

[0039] In some embodiments, the controller may be configured to monitor the time elapsed since the initiation of the smoking cycle and/or the number of puff signals received and/or the duration and/or flow rate of each puff and to generate a 'spent' output signal when the smoking

cycle is approaching its end (i.e. when the smoking substitute article is nearly spent). The feedback means may be configured to receive the 'idle' output signal and to cause the haptic element to generate the haptic feedback output in either the first mode or second mode depending on the mode previously selected by the user input.

[0040] In some embodiments, the feedback means may additionally comprise a visual element e.g. a light to indicate a condition of the device (and/or the aerosol-forming article) to the user. The condition of the device (and/or aerosol-forming article) indicated to the user may comprise a condition indicative of the operation of the heater. For example, the condition may comprise whether the heater is in the OFF state or the ON state. The feedback means may further comprise an audio element.

[0041] The device may comprise an elongate body. An end of the elongate body may be configured for engagement with an aerosol-forming article (e.g. a heated tobacco (HT) consumable). The device may comprise a cavity that is configured for receipt of at least a portion of the consumable (i.e. for engagement with the consumable). The aerosol-forming article may be of the type that comprises an aerosol former (e.g. carried by an aerosol-forming substrate).

[0042] The device may comprise a heater for heating the aerosol-forming article. The heater may comprise a heating element, which may be in the form of a rod that extends from the body of the device. The heating element may extend from the end of the body that is configured for engagement with the aerosol-forming article.

[0043] The heater (and thus the heating element) may be rigidly mounted to the body. The heating element may be elongate so as to define a longitudinal axis and may, for example, have a transverse profile (i.e. transverse to a longitudinal axis of the heating element) that is substantially circular (i.e. the heating element may be generally cylindrical). Alternatively, the heating element may have a transverse profile that is rectangular (i.e. the heater may be a "blade heater"). The heating element may alternatively be in the shape of a tube (i.e. the heater may be a "tube heater"). The heating element may take other forms (e.g. the heating element may have an elliptical transverse profile). The shape and/or size (e.g. diameter) of the transverse profile of the heating element may be generally consistent for the entire length (or substantially the entire length) of the heating element.

[0044] The heating element may be between 15 mm and 25 mm long, e.g. between 18 mm and 20 mm long, e.g. around 19 mm long. The heating element may have a diameter of between 1.5 mm and 2.5 mm, e.g. a diameter between 2 mm and 2.3 mm, e.g. a diameter of around 2.15 mm.

[0045] The heating element may be formed of ceramic. The heating element may comprise a core (e.g. a ceramic core) comprising Al₂O₃. The core of the heating element may have a diameter of 1.8 mm to 2.1 mm, e.g. between 1.9 mm and 2 mm. The heating element may comprise an outer layer (e.g. an outer ceramic layer) comprising

Al₂O₃. The thickness of the outer layer may be between 160 μm and 220 μm, e.g. between 170 μm and 190 μm, e.g. around 180 μm. The heating element may comprise a heating track, which may extend longitudinally along the heating element. The heating track may be sandwiched between the outer layer and the core of the heating element. The heating track may comprise tungsten and/or rhenium. The heating track may have a thickness of around 20 μm.

[0046] The heating element may be located in the cavity (of the device), and may extend (e.g. along a longitudinal axis) from an internal base of the cavity towards an opening of the cavity. The length of the heating element (i.e. along the longitudinal axis of the heater) may be less than the depth of the cavity. Hence, the heating element may extend for only a portion of the length of the cavity. That is, the heating element may not extend through (or beyond) the opening of the cavity.

[0047] The heating element may be configured for insertion into the aerosol-forming article (e.g. a HT consumable) when it is received in the cavity. In that respect, a distal end (i.e. distal from a base of the heating element where it is mounted to the device) of the heating element may comprise a tapered portion, which may facilitate insertion of the heating element into the aerosol-forming article. The heating element may fully penetrate the aerosol-forming article when the aerosol-forming article is received in the cavity. That is, the entire length, or substantially the entire length, of the heating element may be received in the aerosol-forming article.

[0048] The heating element may have a length that is less than, or substantially the same as, an axial length of an aerosol-forming substrate forming part of an aerosol-forming article (e.g. a HT consumable). Thus, when such the aerosol-forming article is engaged with the device, the heating element may only penetrate the aerosol-forming substrate, rather than other components of the aerosol-forming article. The heating element may penetrate the aerosol-forming substrate for substantially the entire axial length of the aerosol-forming-substrate of the aerosol-forming article. Thus, heat may be transferred from (e.g. an outer circumferential surface of) the heating element to the surrounding aerosol-forming substrate, when penetrated by the heating element. That is, heat may be transferred radially outwardly (in the case of a cylindrical heating element) or e.g. radially inwardly (in the case of a tube heater).

[0049] Where the heater is a tube heater, the heating element of the tube heater may surround at least a portion of the cavity. When the portion of the aerosol-forming article is received in the cavity, the heating element may surround a portion of the aerosol-forming article (i.e. so as to heat that portion of the aerosol-forming article). In particular, the heating element may surround an aerosol-forming substrate of the aerosol-forming article. That is, when an aerosol-forming article is engaged with the device, the aerosol-forming substrate of the aerosol-forming article may be located adjacent an inner surface of the

(tubular) heating element. When the heating element is activated, heat may be transferred radially inwardly from the inner surface of the heating element to heat the aerosol-forming substrate.

[0050] The cavity may comprise a (e.g. circumferential) wall (or walls) and the (tubular) heating element may extend around at least a portion of the wall(s). In this way, the wall may be located between the inner surface of the heating element and an outer surface of the aerosol-forming article. The wall (or walls) of the cavity may be formed from a thermally conductive material (e.g. a metal) to allow heat conduction from the heating element to the aerosol-forming article. Thus, heat may be conducted from the heating element, through the cavity wall (or walls), to the aerosol-forming substrate of an aerosol-forming article received in the cavity.

[0051] In some embodiments the device may comprise a cap disposed at the end of the body that is configured for engagement with the aerosol-forming article. Where the device comprises a heater having a heating element, the cap may at least partially enclose the heating element. The cap may be moveable between an open position in which access is provided to the heating element, and a closed position in which the cap at least partially encloses the heating element. The cap may be slideably engaged with the body of the device, and may be slideable between the open and closed positions.

[0052] The cap may define at least a portion of the cavity of the device. That is, the cavity may be fully defined by the cap, or each of the cap and body may define a portion of the cavity. The cap may comprise an opening to the cavity. The opening may be configured for receipt of at least a portion of the aerosol-forming article. That is, the aerosol-forming article may be inserted through the opening and into the cavity (so as to be engaged with the device).

[0053] The cap may be configured such that when the aerosol-forming article is engaged with the device (e.g. received in the cavity), only a portion of the aerosol-forming article is received in the cavity. That is, a portion of the aerosol-forming article (not received in the cavity) may protrude from (i.e. extend beyond) the opening. This (protruding) portion of the aerosol-forming article may be a terminal (e.g. mouth) end of the aerosol-forming article, which may be received in a user's mouth for the purpose of inhaling aerosol formed by the device.

[0054] In a second aspect, there is provided a system (e.g. a smoking substitute system) comprising a device according to the first aspect and an aerosol-forming article. The aerosol-forming article may comprise an aerosol-forming substrate at an upstream end of the aerosol-forming article. The article may be in the form of a smoking substitute article, e.g. heated tobacco (HT) consumable (also known as a heat-not-burn (HNB) consumable).

[0055] As used herein, the terms "upstream" and "downstream" are intended to refer to the flow direction of the vapour/aerosol i.e. with the downstream end of the article/consumable being the mouth end or outlet where

the aerosol exits the consumable for inhalation by the user. The upstream end of the article/consumable is the opposing end to the downstream end.

[0056] The aerosol-forming substrate is capable of being heated to release at least one volatile compound that can form an aerosol. The aerosol-forming substrate may be located at the upstream end of the article/consumable.

[0057] In order to generate an aerosol, the aerosol-forming substrate comprises at least one volatile compound that is intended to be vaporised/aerosolised and that may provide the user with a recreational and/or medicinal effect when inhaled. Suitable chemical and/or physiologically active volatile compounds include the group consisting of: nicotine, cocaine, caffeine, opiates and opoids, cathine and cathinone, kavalactones, misticin, beta-carboline alkaloids, salvinorin A together with any combinations, functional equivalents to, and/or synthetic alternatives of the foregoing.

[0058] The aerosol-forming substrate may comprise plant material. The plant material may comprise least one plant material selected from the list including *Amaranthus dubius*, *Arctostaphylos uva-ursi* (Bearberry), *Argemone mexicana*, *Amica*, *Artemisia vulgaris*, Yellow Tees, *Galea zacatechichi*, *Canavalia maritima* (Baybean), *Cecropia mexicana* (Guamora), *Cestrum nocturnum*, *Cynoglossum virginianum* (wild comfrey), *Cytisus scoparius*, *Damiana*, *Entada rheedii*, *Eschscholzia californica* (California Poppy), *Fittonia albivenis*, *Hippobroma longiflora*, *Humulus japonica* (Japanese Hops), *Humulus lupulus* (Hops), *Lactuca virosa* (Lettuce Opium), *Lagdera alata*, *Leonotis leonurus*, *Leonurus cardiaca* (Motherwort), *Leonurus sibiricus* (Honeyweed), *Lobelia cardinalis*, *Lobelia inflata* (Indian-tobacco), *Lobelia siphilitica*, *Nepeta cataria* (Catnip), *Nicotiana species* (Tobacco), *Nymphaea alba* (White Lily), *Nymphaea caerulea* (Blue Lily), Opium poppy, *Passiflora incarnata* (Passionflower), *Pedicularis densiflora* (Indian Warrior), *Pedicularis groenlandica* (Elephant's Head), *Salvia divinorum*, *Salvia dorrii* (Tobacco Sage), *Salvia species* (Sage), *Scutellaria galericulata*, *Scutellaria lateriflora*, *Scutellaria nana*, *Scutellaria species* (Skullcap), *Sida acuta* (Wireweed), *Sida rhombifolia*, *Silene capensis*, *Syzygium aromaticum* (Clove), *Tagetes lucida* (Mexican Tarragon), *Tarhonanthus camphoratus*, *Tumera diffusa* (Damiana), *Verbascum* (Mullein), *Zamia latifolia* (Maconha Brava) together with any combinations, functional equivalents to, and/or synthetic alternatives of the foregoing.

[0059] The plant material may be tobacco. Any type of tobacco may be used. This includes, but is not limited to, flue-cured tobacco, burley tobacco, Maryland Tobacco, dark-air cured tobacco, oriental tobacco, dark-fired tobacco, perique tobacco and rustica tobacco. This also includes blends of the above mentioned tobaccos.

[0060] The tobacco may comprise one or more of leaf tobacco, stem tobacco, tobacco powder, tobacco dust, tobacco derivatives, expanded tobacco, homogenised tobacco, shredded tobacco, extruded tobacco, cut rag tobacco and/or reconstituted tobacco (e.g. slurry recon

or paper recon).

[0061] The aerosol-forming substrate may comprise a gathered sheet of homogenised (e.g. paper/slurry recon) tobacco or gathered shreds/strips formed from such a sheet.

[0062] The aerosol-forming substrate may comprise one or more additives selected from humectants, flavourants, fillers, aqueous/non-aqueous solvents and binders.

[0063] The flavourant may be provided in solid or liquid form. It may include menthol, liquorice, chocolate, fruit flavour (including e.g. citrus, cherry etc.), vanilla, spice (e.g. ginger, cinnamon) and tobacco flavour. The flavourant may be evenly dispersed throughout the aerosol-forming substrate or may be provided in isolated locations and/or varying concentrations throughout the aerosol-forming substrate.

[0064] The aerosol-forming substrate may be formed in a substantially cylindrical shape such that the article/consumable resembles a conventional cigarette. It may have a diameter of between 5 and 10mm e.g. between 6 and 9mm or 6 and 8mm e.g. around 7 mm. It may have an axial length of between 10 and 15mm e.g. between 11 and 14mm such as around 12 or 13mm.

[0065] The article/consumable may comprise at least one filter element. There may be a terminal filter element at the downstream/mouth end of the article/consumable.

[0066] The or at least one of the filter element(s) (e.g. the terminal filter element) may be comprised of cellulose acetate or polypropylene tow. The at least one filter element (e.g. the terminal filter element) may be comprised of activated charcoal. The at least one filter element (e.g. the terminal element) may be comprised of paper. The or each filter element may be at least partly (e.g. entirely) circumscribed with a plug wrap e.g. a paper plug wrap.

[0067] The terminal filter element (at the downstream end of the article/consumable) may be joined to the upstream elements forming the article/consumable by a circumscribing tipping layer e.g. a tipping paper layer. The tipping paper may have an axial length longer than the axial length of the terminal filter element such that the tipping paper completely circumscribes the terminal filter element plus the wrapping layer surrounding any adjacent upstream element.

[0068] In some embodiments, the article/consumable may comprise an aerosol-cooling element which is adapted to cool the aerosol generated from the aerosol-forming substrate (by heat exchange) before being inhaled by the user.

[0069] The article/consumable may comprise a spacer element that defines a space or cavity between the aerosol-forming substrate and the downstream end of the consumable. The spacer element may comprise a cardboard tube. The spacer element may be circumscribed by the (paper) wrapping layer.

[0070] According to a third aspect of the present invention, there is provided a method of using the system according to the second aspect, the method comprising inserting the aerosol-forming article into the device; and

heating the article using the heater of the device.

[0071] In some embodiments the method may comprise inserting the article into a cavity within a body of the device and penetrating the article with the heating element of the device upon insertion of the article.

[0072] According to a fourth aspect of the present invention, there is provided a method of operating a smoking substitute device for receiving a consumable, the method comprising receiving a user input at user input means, and, in response to the user input, switching the device between a first mode in which the device outputs a haptic feedback output with a first intensity and a second mode in which the device outputs a haptic feedback output with a second intensity, the first intensity being different to the second intensity.

[0073] Optionally, the first intensity is zero such that in the first mode, the method comprises suppressing vibration of the device. In other embodiments, the first intensity and second intensity are finite. The second intensity may be greater than the first intensity. In these embodiments, the method comprises vibrating the device at a greater intensity in the second mode than in the first mode.

[0074] The method comprises receiving a user input to switch between the first and second modes i.e. a mode selection input. In some embodiments, the method further comprises receiving a first mode parameter selection input and/or a second mode parameter selection input. The first mode parameter selection input and the second mode parameter selection input may each independently comprise one or more parameters selected from intensity (amplitude), frequency, duration, pulse sequence/pattern.

[0075] In some embodiments, the method may comprise inputting the user input on a user interface (UI) on the device. In other embodiments, the method may comprise inputting the user input via an external device connected to a wireless interface on the device by wireless communication (e.g. via Bluetooth (e.g. a Bluetooth low-energy connection) or Wi-Fi).

[0076] The external device may be a mobile device. For example, the external device may be a smart phone, tablet, smart watch, or smart car. An application (e.g. app) may be installed on the external device (e.g. mobile device). The application may facilitate communication between the device and the external device via the wireless connection.

[0077] Upon receipt of the user input, the method comprises generation of a user input signal by the UI or the wireless interface. The method may further comprise receiving the user input signal at a controller (as described above for the first aspect).

[0078] The method may comprise storing the mode selection and any user-defined first mode and/or second mode parameters in the memory of the controller.

[0079] The device may comprise a power source or may be connectable to a power source (e.g. a power source separate to the device).

[0080] The method may comprise monitoring the

charge of the power source (e.g. using the controller) and generating a 'depletion' output signal when the charge is below a predetermined value. The method may comprise receiving the 'depletion' output signal at a feedback means comprising a haptic element and generating the haptic feedback output in either the first mode or second mode depending on the mode previously selected by the user input.

[0081] The device may further comprise a puff sensor (e.g. airflow sensor) (as described above for the first aspect).

[0082] The method may comprise monitoring (e.g. by the controller) the time elapsed between consecutive puff signals and generating an 'idle' output signal when the time elapsed exceeds a predetermined time. The method may comprise receiving the 'idle' output signal at the feedback means and causing the haptic element to generate the haptic feedback output in either the first mode or second mode depending on the mode previously selected by the user input.

[0083] In some embodiments, the method may comprise monitoring (e.g. using the controller) the time elapsed since the initiation of the smoking cycle and/or the number of puff signals received and/or the duration and/or flow rate of each puff and generating a 'spent' output signal when the smoking cycle is approaching its end (i.e. when the smoking substitute article is nearly spent). The method may comprise receiving the 'spent' output signal at the feedback means and causing the haptic element to generate the haptic feedback output in either the first mode or second mode depending on the mode previously selected by the user input.

[0084] The invention includes the combination of the aspects and preferred features described except where such a combination is clearly impermissible or expressly avoided.

[0085] The skilled person will appreciate that except where mutually exclusive, a feature or parameter described in relation to any one of the above aspects may be applied to any other aspect. Furthermore, except where mutually exclusive, any feature or parameter described herein may be applied to any aspect and/or combined with any other feature or parameter described herein.

SUMMARY OF THE FIGURES

[0086] So that the invention may be understood, and so that further aspects and features thereof may be appreciated, embodiments illustrating the principles of the invention will now be discussed in further detail with reference to the accompanying figures, in which:

Figure 1A is a schematic of a smoking substitute system;

Figure 1B is a schematic of a variation of the smoking substitute system of Figure 1A;

Figure 2A is a front view of a first embodiment of a smoking substitute system with the consumable engaged with the device;

Figure 2B is a front view of the first embodiment of the smoking substitute system with the consumable disengaged from the device;

Figure 2C is a section view of the consumable of the first embodiment of the smoking substitute system;

Figure 2D is a detailed view of an end of the device of the first embodiment of the smoking substitute system;

Figure 2E is a section view of the first embodiment of the substitute smoking system; and

Figure 3 is a flowchart illustrating method of operating a smoking substitute device for receiving a consumable in accordance with few embodiments of the present invention.

DETAILED DESCRIPTION OF THE INVENTION

[0087] Aspects and embodiments of the present invention will now be discussed with reference to the accompanying figures. Further aspects and embodiments will be apparent to those skilled in the art. All documents mentioned in this text are incorporated herein by reference.

[0088] Figure 1A is a schematic providing a general overview of a smoking substitute system 100. The system 100 includes a substitute smoking device 101 and an aerosol-forming article in the form of a consumable 102, which comprises an aerosol former 103. The system is configured to vaporise the aerosol former by heating the aerosol former 103 (so as to form a vapour/aerosol for inhalation by a user).

[0089] In the illustrated system, the heater 104 forms part of the consumable 102 and is configured to heat the aerosol former 103. Heat from the heater 104 vaporises the aerosol former 103 to produce a vapour. The vapour subsequently condenses to form an aerosol, which is ultimately inhaled by the user.

[0090] The system 100 further comprises a power source 105 that forms part of the device 101. In other embodiments the power source 105 may be external to (but connectable to) the device 101. The power source 105 is electrically connectable to the heater 104 such that the power source 105 is able to supply power to the heater 104 (i.e. for the purpose of heating the aerosol former 103). Thus, control of the electrical connection of the power source 105 to the heater 104 provides control of the state of the heater 104. The power source 105 may be a power store, for example a battery or rechargeable battery (e.g. a lithium ion battery).

[0091] The system 100 further comprises an I/O mod-

ule comprising a connector 106 (e.g. in the form of a USB port, Micro USB port, USB-C port, etc.). The connector 106 is configured for connection to an external source of electrical power, e.g. a mains electrical supply outlet. The connector 106 may be used in substitution for the power source 105. That is the connector 106 may be electrically connectable to the heater 104 so as to supply electricity to the heater 104. In such embodiments, the device may not include a power source, and the power source of the system may instead comprise the connector 106 and an external source of electrical power (to which the connector 106 provides electrical connection).

[0092] In some embodiments, the connector 106 may be used to charge and recharge the power source 105 where the power source 105 includes a rechargeable battery.

[0093] The system 100 also comprises a user interface (UI) 107. Although not shown, the UI 107 may include input means to receive commands (a user input) from a user. The input means of the UI 107 allows the user to control at least one aspect of the operation of the system 100. The input means may, for example, be in the form of a button, touchscreen, switch, microphone, etc.

[0094] The UI 107 also comprises feedback means to convey information to the user. The feedback means comprises a haptic element (vibration generator). It may also include a visual element (e.g. lights (e.g. LEDs), a display screen) and/or an audio element (e.g. a speaker).

[0095] The system 100 further comprises a controller 108 and a memory 109 coupled to the controller 108. In the illustrated embodiment, the controller 108 is a component of the device 101, but in other embodiments may be separate from (but connectable to) the device 101. The controller 108 is configured to receive user input and switch the haptic feedback mode of the device from a first mode to a second mode and vice-versa in response to the user input. The memory 109 stores controller-executable instructions that causes the controller 108 to perform one or more functions. For example, the memory 109 stores the user mode selection (i.e. selection of a first mode wherein the haptic element is configured to vibrate at a first intensity (which may be zero or finite) or second mode where the haptic element is configured to vibrate at a second intensity (greater than the first intensity). The memory may also store user-defined parameters e.g. frequency, duration or pulse pattern of the haptic feedback output in the first/second modes.

[0096] The controller 108 is configured to control the operation of the heater 104 and, for example, may be configured to control the voltage applied from the power source 105 to the heater 104. The controller 108 may be configured to toggle the supply of power to the heater 104 between an on state, in which the full output voltage of the power source 105 is applied to the heater 104, and an off state, in which the no voltage is applied to the heater 104.

[0097] Although not shown, the system 100 may also comprise a voltage regulator to regulate the output volt-

age from the power source 105 to form a regulated voltage. The regulated voltage may then be applied to the heater 104.

[0098] In addition to being connected to the heater 104, the controller 108 is operatively connected to the UI 107. Thus, the controller 108 may receive an input signal from the input means of the UI 107. Similarly, the controller 108 may transmit output signals to the UI 107. In response, the feedback means of the UI 107 may convey information, based on the output signals, to a user. The controller 108 is also configured to provide an output signal to the feedback means to generate the haptic feedback output by the haptic element with either the first or second intensity depending on the mode selected by the user in the user input at the input means.

[0099] Figure 1B is a schematic showing a variation of the system 100 of Figure 1A. In the system 100' of Figure 1B, the heater 104 forms part of the device 101, rather than the consumable 102. In this variation, the heater 104 is electrically connected to the power source 105, for example.

[0100] Figures 2A and 2B illustrate a heated-tobacco (HT) smoking substitute system 200. The system 200 is an example of the systems 100, 100' described in relation to Figures 1A or 1B. System 200 includes an HT device 201 and an HT consumable 202. The description of Figures 1A and 1B above is applicable to the system 200 of Figures 2A and 2B, and will thus not be repeated.

[0101] The device 201 and the consumable 202 are configured such that the consumable 202 can be engaged with the device 201. Figure 2A shows the device 201 and the consumable 202 in an engaged state, whilst Figure 2B shows the device 201 and the consumable 202 in a disengaged state.

[0102] The device 201 comprises a body 209 and cap 210. In use the cap 210 is engaged at an end of the body 209. Although not apparent from the figures, the cap 210 is moveable relative to the body 209. In particular, the cap 210 is slideable and can slide along a longitudinal axis of the body 209.

[0103] The device 201 comprises a feedback means (forming part of the UI of the device 201) in the form of a haptic element (not shown), a visual element (a plurality of light-emitting diodes (LEDs) 211) arranged linearly along the longitudinal axis of the device 201 and on an outer surface of the body 209 of the device 201. A button 212 is also arranged on an outer surface of the body 209 of the device 201 and is axially spaced (i.e. along the longitudinal axis) from the plurality of LEDs 211.

[0104] Figure 2C show a detailed section view of the consumable 202 of the system 200. The consumable 202 generally resembles a cigarette. In that respect, the consumable 202 has a generally cylindrical form with a diameter of 7 mm and an axial length of 70 mm. The consumable 202 comprises an aerosol forming substrate 213, a terminal filter element 215, an upstream filter element 215 and a spacer element 216. In other embodiments, the consumable may further comprise a cooling

element. A cooling element may exchange heat with vapour that is formed by the aerosol-forming substrate 213 in order to cool the vapour so as to facilitate condensation of the vapour.

[0105] The aerosol-forming substrate 213 is substantially cylindrical and is located at an upstream end 217 of the consumable 202, and comprises the aerosol former of the system 200. In that respect, the aerosol forming substrate 213 is configured to be heated by the device 201 to release a vapour. The released vapour is subsequently entrained in an airflow flowing through the aerosol-forming substrate 213. The airflow is produced by the action of the user drawing on a downstream 218 (i.e. terminal or mouth end) of the consumable 202.

[0106] In the present embodiment, the aerosol forming substrate 213 comprises tobacco material that may, for example, include any suitable parts of the tobacco plant (e.g. leaves, stems, roots, bark, seeds and flowers). The tobacco may comprise one or more of leaf tobacco, stem tobacco, tobacco powder, tobacco dust, tobacco derivatives, expanded tobacco, homogenised tobacco, shredded tobacco, extruded tobacco, cut rag tobacco and/or reconstituted tobacco (e.g. slurry recon or paper recon). For example, the aerosol-forming substrate 213 may comprise a gathered sheet of homogenised (e.g. paper/slurry recon) tobacco or gathered shreds/strips formed from such a sheet.

[0107] In order to generate an aerosol, the aerosol forming substrate 213 comprises at least one volatile compound that is intended to be vaporised/aerosolised and that may provide the user with a recreational and/or medicinal effect when inhaled. The aerosol-forming substrate 213 may further comprise one or more additives. For example, such additives may be in the form of humectants (e.g. propylene glycol and/or vegetable glycerine), flavourants, fillers, aqueous/non-aqueous solvents and/or binders.

[0108] The terminal filter element 214 is also substantially cylindrical, and is located downstream of the aerosol forming substrate 213 at the downstream end 218 of the consumable 202. The terminal filter element 214 is in the form of a hollow bore filter element having a bore 219 (e.g. for airflow) formed therethrough. The diameter of the bore 219 is 2 mm. The terminal filter element 214 is formed of a porous (e.g. monoacetate) filter material. As set forth above, the downstream end 218 of the consumable 202 (i.e. where the terminal filter 214 is located) forms a mouthpiece portion of the consumable 202 upon which the user draws. Airflow is drawn from the upstream end 217, thorough the components of the consumable 202, and out of the downstream end 218. The airflow is driven by the user drawing on the downstream end 218 (i.e. the mouthpiece portion) of the consumable 202.

[0109] The upstream filter element 215 is located axially adjacent to the aerosol-forming substrate 213, between the aerosol-forming substrate 213 and the terminal filter element 214. Like the terminal filter 214, the upstream filter element 215 is in the form of a hollow bore

filter element, such that it has a bore 220 extending axially therethrough. In this way, the upstream filter 215 may act as an airflow restrictor. The upstream filter element 215 is formed of a porous (e.g. monoacetate) filter material. The bore 220 of the upstream filter element 214 has a larger diameter (3 mm) than the terminal filter element 214.

[0110] The spacer 216 is in the form of a cardboard tube, which defines a cavity or chamber between the upstream filter element 215 and the terminal filter element 214. The spacer 216 acts to allow both cooling and mixing of the vapour/aerosol from the aerosol-forming substrate 213. The spacer has an external diameter of 7 mm and an axial length of 14mm.

[0111] Although not apparent from the figure, the aerosol-forming substrate 213, upstream filter 215 and spacer 216 are circumscribed by a paper wrapping layer. The terminal filter 214 is circumscribed by a tipping layer that also circumscribes a portion of the paper wrapping layer (so as to connect the terminal filter 214 to the remaining components of the consumable 202). The upstream filter 215 and terminal filter 214 are circumscribed by further wrapping layers in the form of plug wraps.

[0112] Returning now to the device 201, Figure 2D illustrates a detailed view of the end of the device 201 that is configured to engage with the consumable 202. The cap 210 of the device 201 includes an opening 221 to an internal cavity 222 (more apparent from Figure 2D) defined by the cap 210. The opening 221 and the cavity 222 are formed so as to receive at least a portion of the consumable 202. During engagement of the consumable 202 with the device 201, a portion of the consumable 202 is received through the opening 221 and into the cavity 222. After engagement (see Figure 2B), the downstream end 218 of the consumable 202 protrudes from the opening 221 and thus protrudes also from the device 201. The opening 221 includes laterally disposed notches 226. When a consumable 202 is received in the opening 221, these notches 226 remain open and could, for example, be used for retaining a cover to cover the end of the device 201.

[0113] Figure 2E shows a cross section through a central longitudinal plane through the device 201. The device 201 is shown with the consumable 202 engaged therewith.

[0114] The device 201 comprises a heater 204 comprising heating element 223. The heater 204 forms part of the body 209 of the device 201 and is rigidly mounted to the body 209. In the illustrated embodiment, the heater 204 is a rod heater with a heating element 223 having a circular transverse profile. In other embodiments the heater may be in the form of a blade heater (e.g. heating element with a rectangular transverse profile) or a tube heater (e.g. heating element with a tubular form).

[0115] The heating element 223 of the heater 204 projects from an internal base of the cavity 222 along a longitudinal axis towards the opening 221. As is apparent from the figure, the length (i.e. along the longitudinal axis)

of the heating element is less than a depth of the cavity 222. In this way, the heating element 223 does not protrude from or extend beyond the opening 221.

[0116] When the consumable 202 is received in the cavity 222 (as is shown in Figure 2E), the heating element 223 penetrates the aerosol-forming substrate 213 of the consumable 202. In particular, the heating element 223 extends for nearly the entire axial length of the aerosol-forming substrate 213 when inserted therein. Thus, when the heater 204 is activated, heat is transferred radially from an outer circumferential surface the heating element 223 to the aerosol-forming substrate 213.

[0117] The device 201 further comprises an electronics cavity 224. A power source, in the form of a rechargeable battery 205 (a lithium ion battery), is located in electronics cavity 224.

[0118] The device 201 includes a connector (i.e. forming part of an I/O module of the device 201) in the form of a USB port 206. The connector may alternatively be, for example, a micro-USB port or a USB-C port for examples. The USB port 206 may be used to recharge the rechargeable battery 205.

[0119] The device 201 includes the controller 208 (not shown) located in the electronics cavity 224. The controller comprises a microcontroller mounted on a printed circuit board (PCB). The USB port 206 is also connected to the controller 208 (i.e. connected to the PCB and microcontroller).

[0120] The controller 208 is configured to control at least one function of the device 201. For example, the controller 208 is configured to control the operation of the heater 204. Such control of the operation of the heater 204 may be accomplished by the controller toggling the electrical connection of the rechargeable battery 205 to the heater 204. For example, the controller 208 is configured to control the heater 204 in response to a user depressing the button 212. Depressing the button 212 may cause the controller to allow a voltage (from the rechargeable battery 205) to be applied to the heater 204 (so as to cause the heating element 223 to be heated).

[0121] The controller 208 is configured to receive a user input signal from the input means and switch the device between a first mode where the haptic element of the feedback means vibrates at a first intensity and a second mode where the haptic element of the feedback means vibrates at a second (greater) intensity. The haptic feedback output provides the user with information about the current state of the device 201 (e.g. battery charge level) or progress of a smoking cycle of the device 201 (e.g. consumable nearly spent, user idle).

[0122] The device 201 comprises a further input means (i.e. in addition to the button 212) in the form of a puff sensor 225. The puff sensor 225 is configured to detect a user drawing (i.e. inhaling) at the downstream end 218 of the consumable 202. The puff sensor 225 may, for example, be in the form of a pressure sensor, flowmeter or a microphone. The puff sensor 225 is operatively connected to the controller 208 in the electronics cavity 224,

such that a puff signal from the puff sensor 225, indicative of a puff state (i.e. drawing or not drawing), forms an input to the controller 208 (and can thus be responded to by the controller 208).

[0123] At an appropriate time, e.g. when the time elapsed between consecutive puff signals (detected by the puff sensor in the device) exceeds a predetermined time, the controller 208 generates an output signal (e.g. an 'idle' output signal) which is received by the feedback means. The output signal provided by the controller also provides an indication to the feedback means of the user-selected mode (i.e. first mode or second mode) and any user-defined parameters of the haptic feedback output in the selected mode. Thus, the output signal from the controller 208 causes the haptic element of the feedback means to vibrate at the (optionally user-defined) first or second intensity.

[0124] In one example, the first mode may be a haptic feedback OFF mode i.e. the first intensity may be zero such that the vibration of the haptic element is suppressed. This may help conserve battery life. If vibration is desired, the first intensity can either be adjusted by the user input or the device can be switched to the second mode having a greater (finite) intensity.

[0125] The controller is also configured to control the LEDs 211 in response to (e.g. a detected) a condition of the device 201 or the consumable 202. For example, the controller may control the LEDs to indicate whether the device 201 is in an ON state or an OFF state (e.g. one or more of the LEDs may be illuminated by the controller when the device is in an ON state).

[0126] Figure 3 illustrates flowchart of method of operating a smoking substitute device for receiving a consumable.

[0127] As illustrated in Figure 3, the method 300 includes one or more blocks implemented by the controller 208 of the device 201. The method 300 may be described in the general context of controller executable instructions. Generally, controller executable instructions can include routines, programs, objects, components, data structures, procedures, modules, and functions, which perform particular functions or implement particular abstract data types.

[0128] The order in which the method 300 is described is not intended to be construed as a limitation, and any number of the described method blocks can be combined in any order to implement the method 300. Additionally, individual blocks may be deleted from the method 300 without departing from the scope of the subject matter described herein. Furthermore, the method 300 can be implemented in any suitable hardware, software, firmware, or combination thereof.

[0129] At block 301, the controller 208 receives user input via the user input means of the device 201. The user input may be the user request to switch the haptic feedback mode from the first mode to the second mode or from the second mode to the first mode

[0130] At block 302, the controller 208 switches the

haptic feedback mode to one of first and second mode. Based on the user input, the controller 208 switches the haptic feedback mode of the device 201 to one of the first mode and the second mode from the current mode.

Each of the first and the second mode is configured with different parameters. In one example, each of the first and second intensity is defined according to one or more amplitude (intensity) of haptic feedback, frequency of haptic feedback, and number of haptic feedback vibrations. The intensity of the first mode (the first intensity) may be zero.

[0131] At block 303, the controller 208 detects whether the device 201 switched to first mode. If the controller 208 switches the haptic feedback mode to the first mode, then the method proceeds to block 304 along the "YES" path to generate (in response to some condition of the device or smoking cycle) haptic feedback output with the first intensity. Otherwise, the method proceeds to block 305 along the "NO" path to generate the haptic feedback output with the second intensity.

[0132] At block 304, the controller 208 is configured to activate the haptic element (vibration generator) of the feedback means to generate the haptic feedback output with a first intensity, if the controller 208 switches the haptic feedback mode to the first mode as determined at block 303. In one example, the first mode may be haptic feedback OFF mode. If the controller 208 switches to the first mode, i.e., OFF mode, then the controller 208 generates the haptic feedback output with the first intensity for example intensity having zero value, thereby generating no haptic feedback output.

[0133] At block 305, the controller 208 outputs the haptic feedback output with second (greater) intensity. If the controller 208 switches the haptic feedback mode to the second mode, then the controller 208 is configured to activate the haptic element (vibration generator) of the feedback means to generate the haptic feedback output with a second intensity (in response to some condition of the device or smoking cycle). In an example, the second mode may be haptic feedback ON mode. If the controller 208 switches to the second mode, i.e., ON mode, then the controller 208 generates the haptic feedback output with the second intensity i.e., intensity having a non-zero value.

[0134] By switching the haptic feedback mode to different modes, the user is allowed to turn OFF the haptic feedback output, and turn back ON the haptic feedback mode based on user's interest. This will enable conserving the battery whenever the haptic feedback mode is turned OFF.

[0135] The features disclosed in the foregoing description, or in the following claims, or in the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for obtaining the disclosed results, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

[0136] While the invention has been described in conjunction with the exemplary embodiments described above, many equivalent modifications and variations will be apparent to those skilled in the art when given this disclosure. Accordingly, the exemplary embodiments of the invention set forth above are considered to be illustrative and not limiting. Various changes to the described embodiments may be made without departing from the spirit and scope of the invention.

[0137] For the avoidance of any doubt, any theoretical explanations provided herein are provided for the purposes of improving the understanding of a reader. The inventors do not wish to be bound by any of these theoretical explanations.

[0138] Any section headings used herein are for organizational purposes only and are not to be construed as limiting the subject matter described.

[0139] 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.

[0140] It must be noted that, as used in the specification and the appended claims, the singular forms "a," "an," and "the" include plural referents unless the context clearly dictates otherwise. Ranges may be expressed herein as from "about" one particular value, and/or to "about" another particular value. When such a range is expressed, another embodiment includes from the one particular value and/or to the other particular value. Similarly, when values are expressed as approximations, by the use of the antecedent "about," it will be understood that the particular value forms another embodiment. The term "about" in relation to a numerical value is optional and means, for example, +/- 10%.

[0141] The words "preferred" and "preferably" are used herein refer to embodiments of the invention that may provide certain benefits under some circumstances. It is to be appreciated, however, that other embodiments may also be preferred under the same or different circumstances. The recitation of one or more preferred embodiments therefore does not mean or imply that other embodiments are not useful, and is not intended to exclude other embodiments from the scope of the disclosure, or from the scope of the claims.

Claims

1. A heated tobacco (HT) device comprising feedback means having a haptic element for generating a haptic feedback output having a first intensity in a first mode and a second intensity in a second mode, the first intensity being different to the second intensity, wherein the device further comprises a user input

means for receiving a user input, the device being configured to switch between the first and second modes upon receipt of the user input.

2. Device according to claim 1 wherein the first intensity is zero such that in the first mode, the device is configured to suppress vibration of the haptic element.
3. Device according to claim 1 wherein the first intensity and second intensity are finite such that the haptic element is configured to vibrate in both the first and second mode and wherein the second intensity is greater than the first intensity.
4. Device according to any one of the preceding claims wherein the input means is configured to receive a first mode parameter selection input and/or a second mode parameter selection input, herein the first mode parameter selection input and the second mode parameter selection input each independently comprise one or more parameters selected from intensity (amplitude), frequency, duration, pulse sequence/pattern.
5. Device according to any one of the preceding claims wherein the user input means forms part of a user interface (UI) on the device.
6. Device according to any one of the preceding claims wherein the user input means comprises a wireless interface configured to receive the user input by wireless communication with an external device.
7. Device according to any one of the preceding claims comprising a controller operatively connected to the user input means and the feedback means.
8. A device according to claim 7 further comprising a power source wherein the controller is configured to monitor the charge of the power source and generate a 'depletion' output signal when the charge is below a predetermined value and the feedback means is configured to receive the 'depletion' output signal and to cause the haptic element to generate the haptic feedback output in either the first mode or second mode depending on the mode previously selected by the user input.
9. A device according to claim 7 or 8 further comprising a puff sensor wherein the controller is configured to monitor the time elapsed between consecutive puff signals and generate an 'idle' output signal when the time elapsed exceeds a predetermined time and wherein the feedback means is configured to receive the 'idle' output signal and to cause the haptic element to generate the haptic feedback output in either the first mode or second mode depending on the mode previously selected by the user input.

10. A device according to claim 9 wherein the controller is configured to monitor the time elapsed since the initiation of the smoking cycle and/or the number of puff signals received and/or the duration and/or flow rate of each puff and to generate a 'spent' output signal when the smoking cycle is approaching its end and wherein the feedback means is configured to receive the 'idle' output signal and to cause the haptic element to generate the haptic feedback output in either the first mode or second mode depending on the mode previously selected by the user input. 5 10
11. A method of operating a smoking substitute device for receiving a consumable, the method comprising receiving a user input at a user input means, and, in response to the user input, switching the device between a first mode in which the device outputs a haptic feedback output with a first intensity and a second mode in which the device outputs a haptic feedback output with a second intensity, the first intensity being different to the second intensity. 15 20
12. A method according to claim 11 further comprising receiving a first mode parameter selection input and/or a second mode parameter selection input, wherein the first mode parameter selection input and the second mode parameter selection input each independently comprise one or more parameters selected from intensity (amplitude), frequency, duration, pulse sequence/pattern. 25 30
13. A method according to claim 12 comprising storing the mode selection and any user-defined first mode and/or second mode parameters in a memory of a controller. 35
14. A method according to any one of claims 11 to 13 comprising monitoring the charge of a power source, generating a 'depletion' output signal when the charge is below a predetermined value, receiving the 'depletion' output signal at a feedback means comprising a haptic element and generating the haptic feedback output in either the first mode or second mode depending on the mode previously selected by the user input. 40 45
15. A method according to any one of claims 11 to 14 comprising monitoring the time elapsed between consecutive puff signals generated by a puff sensor, generating an 'idle' output signal when the time elapsed exceeds a predetermined time, receiving the 'idle' output signal at the feedback means and causing the haptic element to generate the haptic feedback output in either the first mode or second mode depending on the mode previously selected by the user input. 50 55

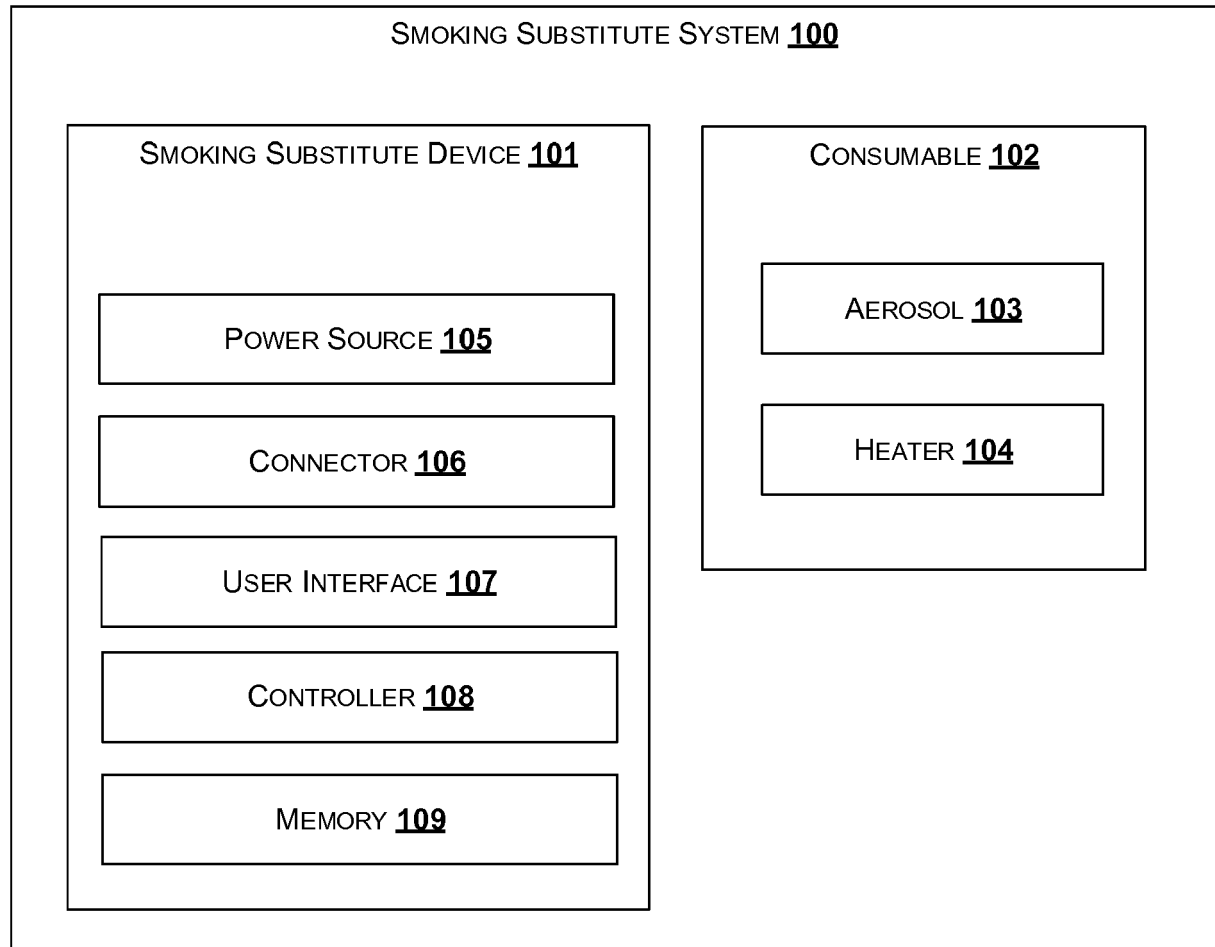


FIGURE 1A

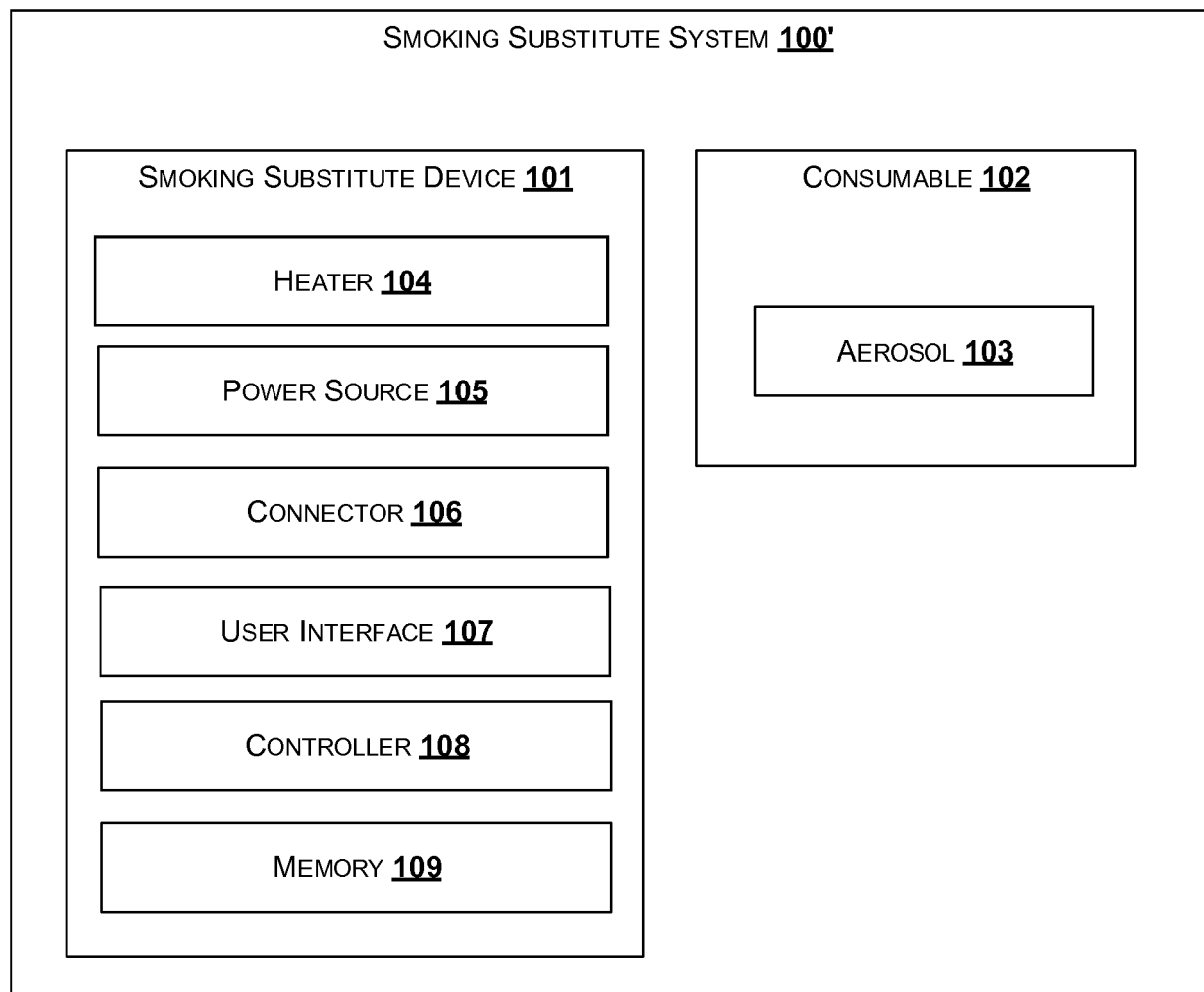


FIGURE 1B

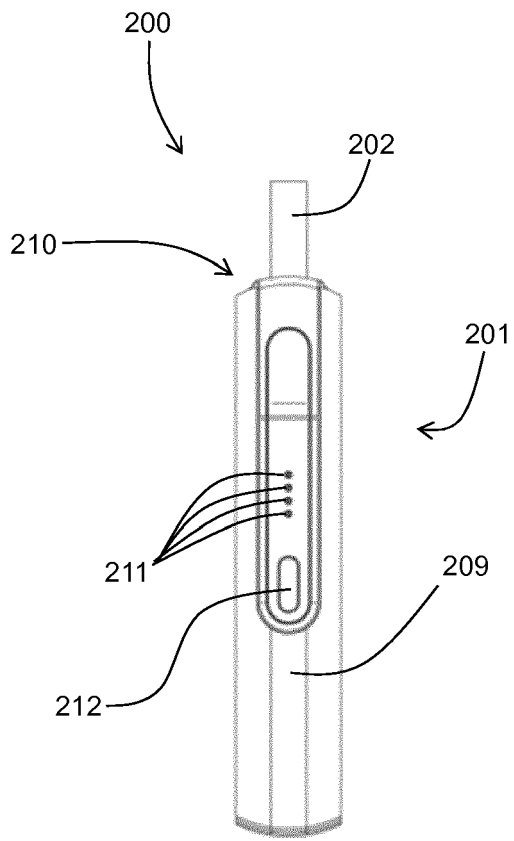


FIGURE 2A

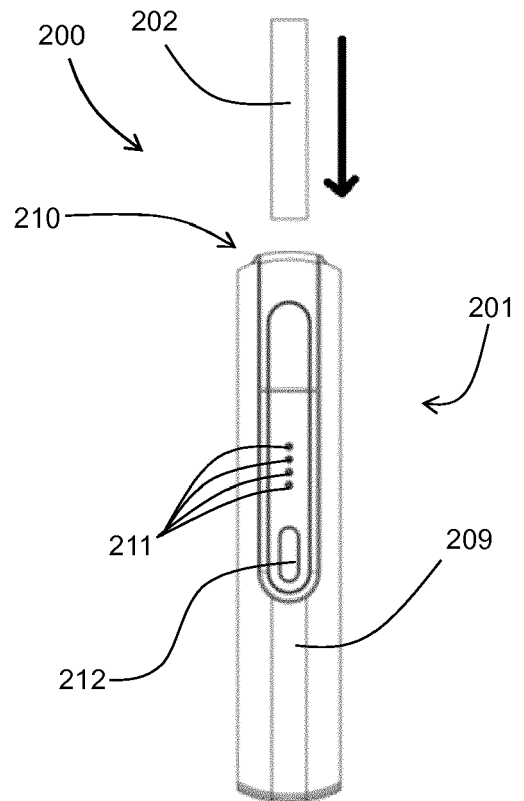


FIGURE 2B

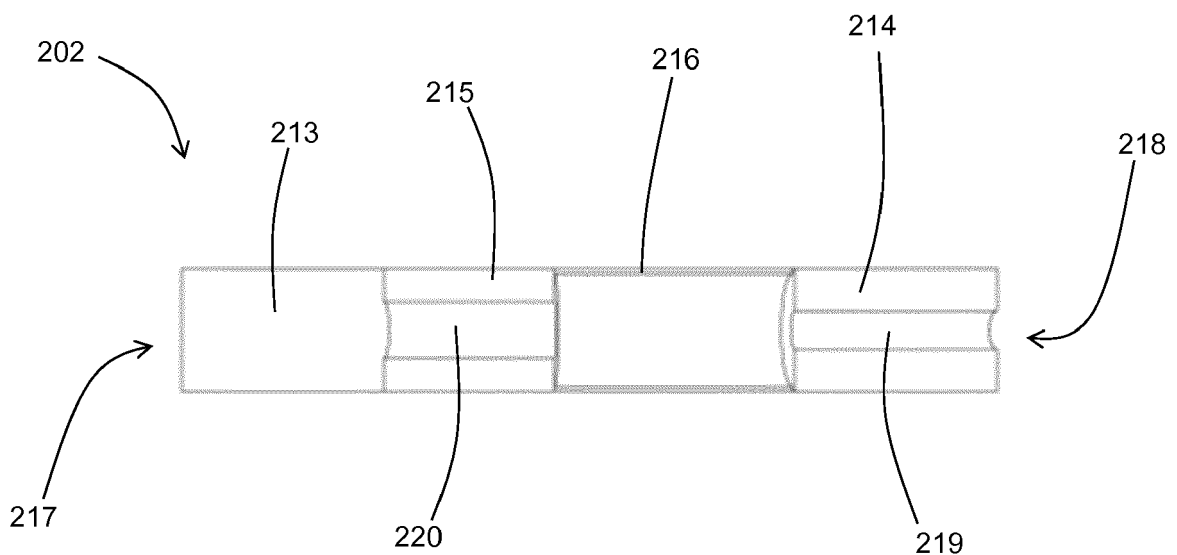


FIGURE 2C

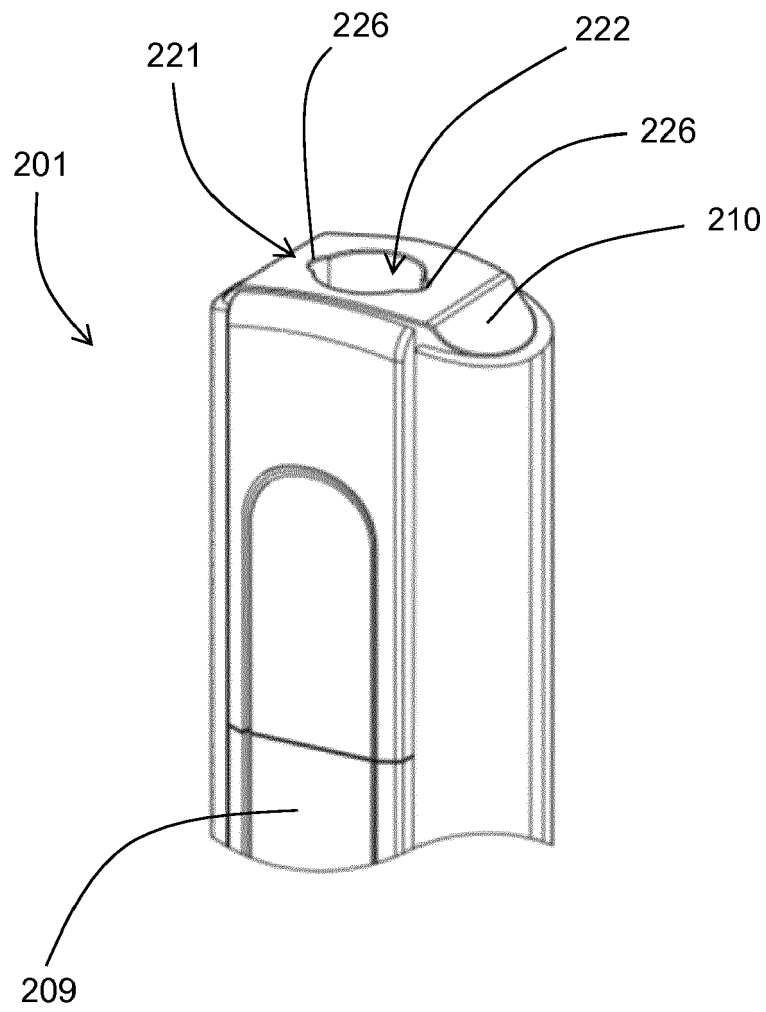


FIGURE 2D

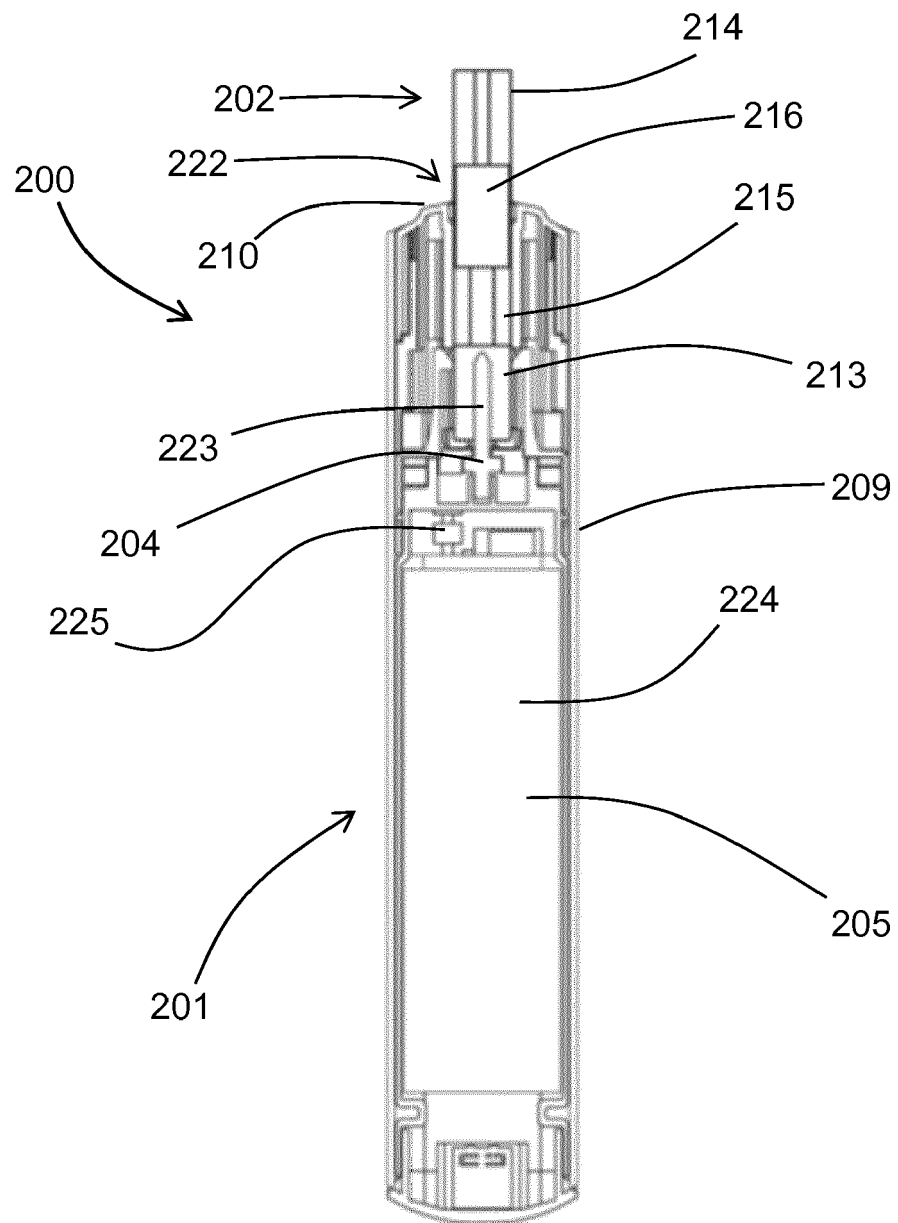


FIGURE 2E

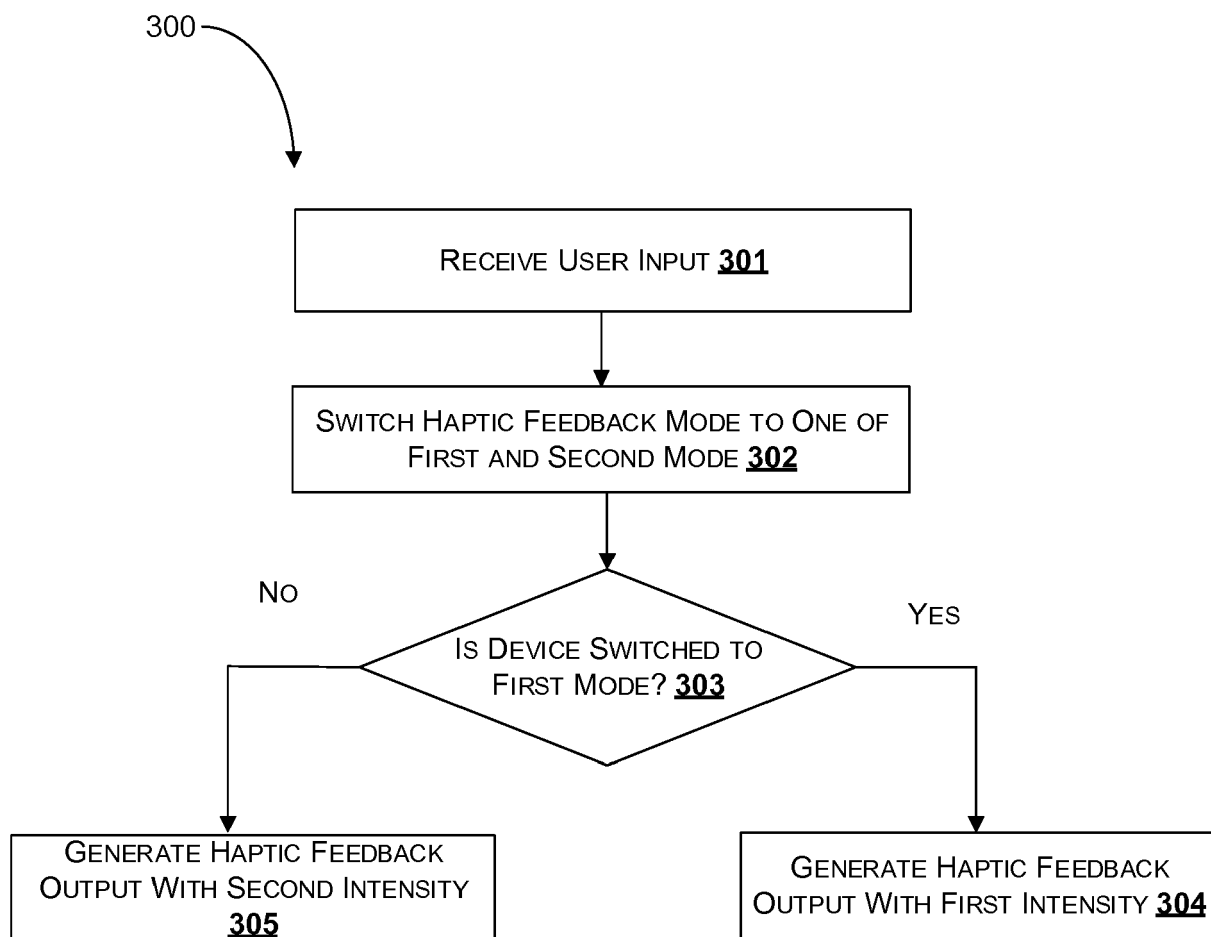


FIGURE 3



EUROPEAN SEARCH REPORT

Application Number
EP 19 02 0151

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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	US 2015/020825 A1 (GALLOWAY MICHAEL RYAN [US] ET AL) 22 January 2015 (2015-01-22)	1,2, 5-11, 13-15	INV. A24F47/00
A	* paragraphs [0040] - [0042], [0049]; figures *	3,4,12	
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A	* paragraphs [0030], [0057], [0067]; figures 2,3 *	3-10, 12-15	
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