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(54) **ELECTRONIC AEROSOL PROVISION SYSTEM**
ELEKTRONISCHES AEROSOLVERSORGUNGSSYSTEM
SYSTÈME ÉLECTRONIQUE DE FOURNITURE D'AÉROSOLS

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(56) References cited:
WO-A1-2014/140320
WO-A1-2019/215213
WO-A2-2016/120344
US-A1- 2016 022 930
US-A1- 2019 001 087

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Description

Field

[0001] The present disclosure relates to non-combustible aerosol provision systems.

Background

[0002] Electronic aerosol provision systems such as electronic cigarettes (e-cigarettes) generally contain a reservoir of a source liquid containing a formulation, typically including nicotine, from which an aerosol is generated, e.g. through heat vaporisation. An aerosol source for an aerosol provision system may thus comprise a heater having a heating element arranged to receive source liquid from the reservoir, for example through wicking / capillary action. While a user inhales on the device, electrical power is supplied to the heating element to vaporise source liquid in the vicinity of the heating element to generate an aerosol for inhalation by the user. Such devices are usually provided with one or more air inlet holes located away from a mouthpiece end of the system. When a user sucks on a mouthpiece connected to the mouthpiece end of the system, air is drawn in through the inlet holes and past the aerosol source. There is a flow path connecting between the aerosol source and an opening in the mouthpiece so that air drawn past the aerosol source continues along the flow path to the mouthpiece opening, carrying some of the aerosol from the aerosol source with it. The aerosol-carrying air exits the aerosol provision system through the mouthpiece opening for inhalation by the user.

[0003] Other aerosol provision devices generate aerosol from a solid material, such as tobacco or a tobacco derivative. Such devices operate in a broadly similar manner to the liquid-based systems described above, in that the solid tobacco material is heated to a vaporisation temperature to generate an aerosol which is subsequently inhaled by a user.

[0004] In most aerosol provision devices, users seek consistent delivery on a puff-by-puff basis such that each puff tastes the same and/or provides the same desired effect. However, the devices described above are not always capable of providing consistent delivery.

[0005] WO2016/120344 discloses apparatus for heating aerosol generating material.

[0006] US2019/0001087 discloses a personal vaporizing device.

[0007] US2016/0022930 discloses an aerosol-generating system with differential heating.

[0008] WO2019/215213 discloses an aerosol provision device configured to receive a plurality of aerosolisable materials.

[0009] Various approaches are described which seek to help address some of these issues.

Summary

[0010] An aerosol provision device is disclosed herein in accordance with claim 1.

[0011] A method of generating aerosol using an aerosol generating device is disclosed herein in accordance with claim 14.

[0012] According to a first aspect of certain embodiments there is provided an aerosol provision device for generating aerosol from an article comprising portions of aerosol generating material, the device comprising: a receptacle for receiving the article comprising portions of aerosol generating material; an outlet fluidly coupled to the receptacle; at least one aerosol generating component configured to perform an aerosolisation process on one or more of the portions of aerosol generating material when the article is received in the receptacle; and control circuitry for controlling the aerosol generating component, wherein the control circuitry is configured to cause the at least one aerosol generating component to generate an amount of aerosol from a respective portion of aerosol generating material based on the distance of the respective portion of aerosol generating material from the outlet.

[0013] In some examples, the control circuitry is configured to generate an amount of aerosol from the respective portion of aerosol generating material such that, regardless of distance of the respective portion of aerosol generating material from the outlet, a substantially constant amount of aerosol passes through the outlet.

[0014] The control circuitry is configured to cause the aerosol generating component to generate an increasing amount of aerosol from the respective portion of aerosol generating material the further away the respective portion is located from the outlet.

[0015] In some examples, the control circuitry is configured to cause the aerosol generating component to generate an amount of aerosol from the portion of aerosol generating material based on a function of the distance of the portion of the aerosol generating material from the outlet.

[0016] In some examples, the at least one aerosol generating component is at least one heating element arranged to heat the portions of aerosol generating material.

[0017] In some examples, the control circuitry is configured to set the operational temperature for the at least one heating element based on the distance of the respective portion of aerosol generating material from the outlet.

[0018] In some examples, the control circuitry is configured to set the operational temperature of the heating elements closer to the outlet to be lower than the operational temperature of the heating elements further from the outlet.

[0019] In some examples, the control circuitry is configured to set the heating duration for the at least one heating element based on the distance of the respective portion of aerosol generating material from the outlet.

[0020] In some examples, the portions of aerosol generating material are arranged in an N x M array with respect to the outlet when received in the receptacle, and the control circuitry is configured to cause the aerosol generating component to generate X different amounts of aerosol, where X is determined according to:

$$X = \frac{2N+1+(-1)^{N+1}}{4} \times M.$$

[0021] In some examples, the at least one aerosol generating components comprises a plurality of aerosol generating components arranged in an N x M array, and the control circuitry is configured to cause the each of the plurality of aerosol generating components to operate at one of X different power levels, where X is determined according to:

$$X = \frac{2N+1+(-1)^{N+1}}{4} \times M.$$

[0022] According to a second aspect of certain embodiments there is provided an aerosol provision system, the system comprising the aerosol provision device according to the first aspect and further comprising an article comprising portions of aerosol generating material.

[0023] In some examples, each portion of aerosol generating material is substantially the same.

[0024] In some examples, the properties of the aerosol generating material differ based on the distance from the outlet when the aerosol generating material is received in the receptacle.

[0025] In some examples, the aerosol generating material is an amorphous solid.

[0026] According to a third aspect of certain embodiments there is provided a method of generating aerosol using an aerosol generating device, the method comprising: determining the distance between a portion of aerosol generating material and an outlet on the device through which generated aerosol can be inhaled by a user; setting an amount of aerosol to be generated from the portion of the aerosol generating material based on the determined distance; and generating an aerosol from the portion of aerosol generating material.

[0027] According to a fourth aspect of certain embodiments there is provided an aerosol provision means for generating aerosol from an article comprising portions of aerosol generating material, the means comprising: a receiving means for receiving the article comprising portions of aerosol generating material; an outlet means fluidly coupled to the receiving means; at least one aerosol generating means configured to perform an aerosolisation process on one or more of the portions of aerosol generating material when the article is received in the receiving means; and control means for controlling the aerosol generating means, wherein the control means is configured to cause the at least one aerosol generating means to generate an amount of aerosol from a respective portion of aerosol generating material based on the distance of the respective portion of aerosol generating material from the outlet means.

[0028] It will be appreciated that features and aspects of the invention described above in relation to the first and other aspects of the invention are equally applicable to, and may be combined with, embodiments of the invention according to other aspects of the invention as appropriate, and not just in the specific combinations described above.

Brief Description of the Drawings

[0029] Embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a cross-section of a schematic representation of an aerosol provision system comprising an aerosol provision device and a aerosol generating article, the device comprising a plurality of heating elements and the article comprising a plurality of portions of aerosol generating material;

Figures 2A to 2C are a variety of views from different angles of the aerosol provision article of Figure 1;

Figure 3 is cross-sectional, top-down view of the heating elements of the aerosol provision device of Figure 1;

Figure 4 is a top-down view of an exemplary touch sensitive panel for operating various functions of the aerosol provision system;

Figure 5 is a reproduction of Figure 3 further including additional arrows marking the distances between heating elements and the outlet of the device of Figure 1;

Figure 6 is an example of a cross-section of a schematic representation of an aerosol provision system comprising an aerosol provision device and a aerosol generating article, the device comprising a plurality of induction work coils and the article comprising a plurality of portions of aerosol generating material and corresponding susceptor portions; and

Figures 7A to 7C are a variety of views from different angles of the aerosol provision article of Figure 6.

Detailed Description

[0030] 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.

[0031] The present disclosure relates to a "non-combustible" aerosol provision system. A "non-combustible" aerosol provision system is one where a constituent aerosolisable material of the aerosol provision system (or component thereof) is not combusted or burned in order to facilitate delivery of an aerosol to a user. Furthermore, and as is common in the technical field, the terms "vapour" and "aerosol", and related terms such as "vaporise", "volatilise" and "aerosolise", may generally be used interchangeably.

[0032] In some implementations, the non-combustible aerosol provision system is an electronic cigarette, also known as a vaping device or electronic nicotine delivery system (END), although it is noted that the presence of nicotine in the aerosolisable material is not a requirement. Throughout the following description the term "e-cigarette" or "electronic cigarette" is sometimes used but this term may be used interchangeably with aerosol (vapour) provision system.

[0033] Typically, the non-combustible aerosol provision system may comprise a non-combustible aerosol provision device and an article (sometimes referred to as a consumable) for use with the non-combustible aerosol provision device. However, it is envisaged that articles which themselves comprise a means for powering an aerosol generating component may themselves form the non-combustible aerosol provision system.

[0034] The article, part or all of which, is intended to be consumed during use by a user. The article may comprise or consist of aerosolisable material. The article may comprise one or more other elements, such as a filter or an aerosol modifying substance (e.g. a component to add a flavour to, or otherwise alter the properties of, an aerosol that passes through or over the aerosol modifying substance).

[0035] Non-combustible aerosol provision systems often, though not always, comprise a modular assembly including both a reusable aerosol provision device and a replaceable article. In some implementations, the non-combustible aerosol provision device may comprise a power source and a controller (or control circuitry). The power source may, for example, be an electric power source, such as a battery or rechargeable battery. In some implementations, the non-combustible aerosol provision device may also comprise an aerosol generating component. However, in other implementations the article may comprise partially, or entirely, the aerosol generating component.

[0036] In some implementations, the aerosol generating component is a heater capable of interacting with the aerosolisable material so as to release one or more volatiles from the aerosolisable material to form an aerosol. In some embodiments, the aerosol generating component is capable of generating an aerosol from the aerosolisable material without heating. For example, the aerosol generating component may be capable of generating an aerosol from the aerosolisable material without applying heat thereto, for example via one or more of vibrational, mechanical, pressurisation or electrostatic means.

[0037] In some implementations, the heater may comprise one or more electrically resistive heaters, including for example one or more nichrome resistive heater(s) and/or one or more ceramic heater(s). The one or more heaters may comprise one or more induction heaters which includes an arrangement comprising one or more susceptors which may form a chamber into which an article comprising aerosolisable material is inserted or otherwise located in use. Alternatively or in addition, one or more susceptors may be provided in the aerosolisable material. Other heating arrangements may also be used.

[0038] The article for use with the non-combustible aerosol provision device generally comprises an aerosolisable material. Aerosolisable material, which also may be referred to herein as aerosol generating material, is material that is capable of generating aerosol, for example when heated, irradiated or energized in any other way. Aerosolisable material may, for example, be in the form of a solid, liquid or gel which may or may not contain nicotine and/or flavourants. In the following disclosure, the aerosolisable material is described as comprising an "amorphous solid", which may alternatively be referred to as a "monolithic solid" (i.e. non-fibrous). In some implementations, the amorphous solid may be a dried gel. The amorphous solid is a solid material that may retain some fluid, such as liquid, within it. In some implementations, the aerosolisable material may for example comprise from about 50wt%, 60wt% or 70wt% of amorphous solid, to about 90wt%, 95wt% or 100wt% of amorphous solid. However, it should be appreciated that principles of the present disclosure may be applied to other aerosolisable materials, such as tobacco, reconstituted tobacco, a liquid, such as an e-liquid, etc.

[0039] As appropriate, the aerosolisable material may comprise any one or more of: an active constituent, a carrier constituent, a flavour, and one or more other functional constituents.

[0040] The active constituent as used herein may be a physiologically active material, which is a material intended to achieve or enhance a physiological response. The active constituent may for example be selected from nutraceuticals, nootropics, psychoactives. The active constituent may be naturally occurring or synthetically obtained. The active constituent may comprise for example nicotine, caffeine, taurine, theine, vitamins such as B6 or B12 or C, melatonin, cannabinoids, or constituents, derivatives, or combinations thereof. The active constituent may comprise one or more constituents, derivatives or extracts of tobacco, cannabis or another botanical. As noted herein, the active constituent may comprise one or more constituents, derivatives or extracts of cannabis, such as one or more cannabinoids or terpenes.

[0041] In some embodiments, the aerosolisable material or the amorphous solid comprises one or more cannabinoid compounds selected from the group consisting of: cannabidiol (CBD), tetrahydrocannabinol (THC), tetrahydrocannabinolic acid (THCA), cannabidiolic acid (CBDA), cannabinol (CBN), cannabigerol (CBG), cannabichromene (CBC), cannabicyclol (CBL), cannabivarin (CBV), tetrahydrocannabivarin (THCV), cannabidivarin (CBDV), cannabichromevarin (CBCV), cannabigerovarin (CBGV), cannabigerol monomethyl ether (CBGM) and cannabielsoin (CBE), cannabicitran (CBT).

[0042] The aerosolisable material or the amorphous solid may comprise one or more cannabinoid compounds selected from the group consisting of cannabidiol (CBD) and THC (tetrahydrocannabinol).

[0043] The aerosolisable material or the amorphous solid may comprise cannabidiol (CBD).

[0044] The aerosolisable material or the amorphous solid may comprise nicotine and cannabidiol (CBD).

[0045] The aerosolisable material or the amorphous solid may comprise nicotine, cannabidiol (CBD), and THC (tetrahydrocannabinol).

[0046] In some embodiments, the active constituent comprises nicotine. In some embodiments, the active constituent comprises caffeine, melatonin or vitamin B12.

[0047] As noted herein, the active constituent may comprise or be derived from one or more botanicals or constituents, derivatives or extracts thereof. As used herein, the term "botanical" includes any material derived from plants including, but not limited to, extracts, leaves, bark, fibres, stems, roots, seeds, flowers, fruits, pollen, husk, shells or the like. Alternatively, the material may comprise an active compound naturally existing in a botanical, obtained synthetically. The material may be in the form of liquid, gas, solid, powder, dust, crushed particles, granules, pellets, shreds, strips, sheets, or the like. Example botanicals are tobacco, eucalyptus, star anise, hemp, cocoa, cannabis, fennel, lemongrass, peppermint, spearmint, rooibos, chamomile, flax, ginger, ginkgo biloba, hazel, hibiscus, laurel, licorice (liquorice), matcha, mate, orange skin, papaya, rose, sage, tea such as green tea or black tea, thyme, clove, cinnamon, coffee, aniseed (anise), basil, bay leaves, cardamom, coriander, cumin, nutmeg, oregano, paprika, rosemary, saffron, lavender, lemon peel, mint, juniper, elderflower, vanilla, wintergreen, beefsteak plant, curcuma, turmeric, sandalwood, cilantro, bergamot, orange blossom, myrtle, cassis, valerian, pimento, mace, damien, marjoram, olive, lemon balm, lemon basil, chive, carvi, verbena, tarragon, geranium, mulberry, ginseng, theanine, theacrine, maca, ashwagandha, damiana, guarana, chlorophyll, baobab or any combination thereof. The mint may be chosen from the following mint varieties: Mentha Arventis, Mentha c.v.,Mentha niliaca, Mentha piperita, Mentha piperita citrata c.v.,Mentha piperita c.v, Mentha spicata crispa, Mentha cardifolia, Memtha longifolia, Mentha suaveolens variegata, Mentha pulegium, Mentha spicata c.v. and Mentha suaveolens

[0048] In some embodiments, the active constituent comprises or is derived from one or more botanicals or constituents, derivatives or extracts thereof and the botanical is tobacco.

[0049] In some embodiments, the active constituent comprises or derived from one or more botanicals or constituents, derivatives or extracts thereof and the botanical is selected from eucalyptus, star anise, cocoa and hemp.

[0050] In some embodiments, the active constituent comprises or derived from one or more botanicals or constituents, derivatives or extracts thereof and the botanical is selected from rooibos and fennel.

[0051] In certain embodiments, the aerosolisable material or the amorphous solid comprises a gelling agent. The gelling agent may comprise one or more compounds selected from cellulosic gelling agents, non-cellulosic gelling agents, guar gum, acacia gum and mixtures thereof.

[0052] In some embodiments, the cellulosic gelling agent is selected from the group consisting of: hydroxymethyl cellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, carboxymethylcellulose (CMC), hydroxypropyl methylcellulose (HPMC), methyl cellulose, ethyl cellulose, cellulose acetate (CA), cellulose acetate butyrate (CAB), cellulose acetate propionate (CAP) and combinations thereof.

[0053] In some embodiments, the gelling agent comprises (or is) one or more of hydroxyethyl cellulose, hydroxypropyl cellulose, hydroxypropyl methylcellulose (HPMC), carboxymethylcellulose, guar gum, or acacia gum.

[0054] In some embodiments, the gelling agent comprises (or is) one or more non-cellulosic gelling agents, including, but not limited to, agar, xanthan gum, gum Arabic, guar gum, locust bean gum, pectin, carrageenan, starch, alginate, and combinations thereof. In preferred embodiments, the non-cellulose based gelling agent is alginate or agar.

[0055] The aerosolisable material or the amorphous solid may comprise an acid. The acid may be an organic acid. In some of these embodiments, the acid may be at least one of a monoprotic acid, a diprotic acid and a triprotic acid. In some such embodiments, the acid may contain at least one carboxyl functional group. In some such embodiments, the acid may be at least one of an alpha-hydroxy acid, carboxylic acid, dicarboxylic acid, tricarboxylic acid and keto acid. In some such embodiments, the acid may be an alpha-keto acid.

[0056] In some such embodiments, the acid may be at least one of succinic acid, lactic acid, benzoic acid, citric acid, tartaric acid, fumaric acid, levulinic acid, acetic acid, malic acid, formic acid, sorbic acid, benzoic acid, propanoic and pyruvic acid.

[0057] Suitably the acid is lactic acid. In other embodiments, the acid is benzoic acid. In other embodiments the acid may be an inorganic acid. In some of these embodiments the acid may be a mineral acid. In some such embodiments, the acid may be at least one of sulphuric acid, hydrochloric acid, boric acid and phosphoric acid. In some embodiments, the acid is levulinic acid.

[0058] In certain embodiments, the aerosolisable material or the amorphous solid comprises a gelling agent comprising a cellulosic gelling agent and/or a non-cellulosic gelling agent, an active substance and an acid.

[0059] In some implementations, the aerosolisable material comprises a flavour (or flavourant).

[0060] As used herein, the terms "flavour" and "flavourant" refer to materials which, where local regulations permit, may be used to create a desired taste, aroma or other somatosensorial sensation in a product for adult consumers. They may include naturally occurring flavour materials, botanicals, extracts of botanicals, synthetically obtained materials, or combinations thereof (e.g., tobacco, cannabis, licorice (liquorice), hydrangea, eugenol, Japanese white bark magnolia leaf, chamomile, fenugreek, clove, maple, matcha, menthol, Japanese mint, aniseed (anise), cinnamon, turmeric, Indian spices, Asian spices, herb, wintergreen, cherry, berry, red berry, cranberry, peach, apple, orange, mango, clementine, lemon, lime, tropical fruit, papaya, rhubarb, grape, durian, dragon fruit, cucumber, blueberry, mulberry, citrus fruits, Drambuie, bourbon, scotch, whiskey, gin, tequila, rum, spearmint, peppermint, lavender, aloe vera, cardamom, celery, cascarilla, nutmeg, sandalwood, bergamot, geranium, khat, naswar, betel, shisha, pine, honey essence, rose oil, vanilla, lemon oil, orange oil, orange blossom, cherry blossom, cassia, caraway, cognac, jasmine, ylang-ylang, sage, fennel, wasabi, piment, ginger, coriander, coffee, hemp, a mint oil from any species of the genus Mentha, eucalyptus, star anise, cocoa, lemongrass, rooibos, flax, ginkgo biloba, hazel, hibiscus, laurel, mate, orange skin, rose, tea such as green tea or black tea, thyme, juniper, elderflower, basil, bay leaves, cumin, oregano, paprika, rosemary, saffron, lemon peel, mint, beefsteak plant, curcuma, cilantro, myrtle, cassis, valerian, pimento, mace, damien, marjoram, olive, lemon balm, lemon basil, chive, carvi, verbena, tarragon, limonene, thymol, camphene), 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. They may be in any suitable form, for example, liquid such as an oil, solid such as a powder, or gas.

[0061] In some embodiments, the flavour comprises menthol, spearmint and/or peppermint. In some embodiments, the flavour comprises flavour components of cucumber, blueberry, citrus fruits and/or redberry. In some embodiments, the flavour comprises eugenol. In some embodiments, the flavour comprises flavour components extracted from tobacco. In some embodiments, the flavour comprises flavour components extracted from cannabis.

[0062] In some embodiments, the flavour may comprise a sensate, which is intended to achieve a somatosensorial sensation which are usually chemically induced and perceived by the stimulation of the fifth cranial nerve (trigeminal nerve), in addition to or in place of aroma or taste nerves, and these may include agents providing heating, cooling, tingling, numbing effect. A suitable heat effect agent may be, but is not limited to, vanillyl ethyl ether and a suitable cooling agent may be, but not limited to eucolyptol, WS-3.

[0063] The carrier constituent may comprise one or more constituents capable of forming an aerosol. In some embodiments, the carrier constituent may comprise one or more of glycerine, glycerol, propylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol, 1,3-butylene glycol, erythritol, meso-Erythritol, ethyl vanillate, ethyl laurate, a diethyl suberate, triethyl citrate, triacetin, a diacetin mixture, benzyl benzoate, benzyl phenyl acetate, tributyrin, lauryl acetate, lauric acid, myristic acid, and propylene carbonate.

[0064] In some embodiments, the carrier constituent comprises one or more polyhydric alcohols, such as propylene glycol, triethylene glycol, 1 ,3-butanediol and glycerin; esters of polyhydric alcohols, such as glycerol mono-, di- or triacetate; and/or aliphatic esters of mono-, di- or polycarboxylic acids, such as dimethyl dodecanedioate and dimethyl tetradecanedioate.

[0065] The one or more other functional constituents may comprise one or more of pH regulators, colouring agents, preservatives, binders, fillers, stabilizers, and/or antioxidants.

[0066] The aerosolisable material may be present on or in a carrier support (or carrier component) to form a substrate. The carrier support may, for example, be or comprise paper, card, paperboard, cardboard, reconstituted aerosolisable material, a plastics material, a ceramic material, a composite material, glass, a metal, or a metal alloy.

[0067] In some implementations, the article for use with the non-combustible aerosol provision device may comprise aerosolisable material or an area for receiving aerosolisable material. In some implementations, the article for use with the non-combustible aerosol provision device may comprise a mouthpiece, or alternatively the non-combustible aerosol provision device may comprise a mouthpiece which communicates with the article. The area for receiving aerosolisable material may be a storage area for storing aerosolisable material. For example, the storage area may be a reservoir.

[0068] Figure 1 is a cross-sectional view through a schematic representation of an aerosol provision system 1 in accordance with certain embodiments of the disclosure. The aerosol provision system 1 comprises two main components, namely an aerosol provision device 2 and an aerosol generating article 4.

[0069] The aerosol provision device 2 comprises an outer housing 21, a power source 22, control circuitry 23, a plurality of aerosol generating components 24, a receptacle 25, a mouthpiece end 26, an air inlet 27, an air outlet 28, a touch-sensitive panel 29, an inhalation sensor 30, and an end of use indicator 31.

[0070] The outer housing 21 may be formed from any suitable material, for example a plastics material. The outer housing 21 is arranged such that the power source 22, control circuitry 23, aerosol generating components 24, receptacle 25 and inhalation sensor 30 are located within the outer housing 21. The outer housing 21 also defines the air inlet 27 and air outlet 28, described in more detail below. The touch sensitive panel 29 and end of use indicator are located on the exterior of the outer housing 21.

[0071] The outer housing 21 further includes a mouthpiece end 26. The outer housing 21 and mouthpiece end 26 are formed as a single component (that is, the mouthpiece end 26 forms a part of the outer housing 21). The mouthpiece end 26 is defined as a region of the outer housing 21 which includes the air outlet 28 and is shaped in such a way that a user may comfortably place their lips around the mouthpiece end 26 to engage with air outlet 28. In Figure 1, the thickness of the outer housing 21 decreases towards the air outlet 28 to provide a relatively thinner portion of the device 2 which may be more easily accommodated by the lips of a user. In other implementations, however, the mouthpiece end 26 may be a removable component that is separate from but able to be coupled to the outer housing 21, and may be removed for cleaning and/or replacement with another mouthpiece end 26..

[0072] The power source 22 is configured to provide operating power to the aerosol provision device 2. The power source 22 may be any suitable power source, such as a battery. For example, the power source 22 may comprise a rechargeable battery, such as a Lithium Ion battery. The power source 22 may be removable or form an integrated part of the aerosol provision device 2. In some implementations, the power source 22 may be recharged through connection of the device 2 to an external power supply (such as mains power) through an associated connection port, such as a USB port (not shown) or via a suitable wireless receiver (not shown).

[0073] The control circuitry 23 is suitably configured / programmed to control the operation of the aerosol provision device to provide certain operating functions of aerosol provision device 2. The control circuitry 23 may be considered to logically comprise various sub-units / circuitry elements associated with different aspects of the aerosol provision devices' operation. For example, the control circuitry 23 may comprise a logical sub-unit for controlling the recharging of the power source 22. Additionally, the control circuitry 23 may comprise a logical sub-unit for communication, e.g., to facilitate data transfer from or to the device 2. However, a primary function of the control circuitry 23 is to control the aerosolisation of aerosol generating material, as described in more detail below. It will be appreciated the functionality of the control circuitry 23 can be provided in various different ways, for example using one or more suitably programmed programmable computer(s) and / or one or more suitably configured application-specific integrated circuit(s) / circuitry / chip(s) / chipset(s) configured to provide the desired functionality. The control circuitry 23 is connected to the power supply 23 and receives power from the power source 22 and may be configured to distribute or control the power supply to other components of the aerosol provision device 2.

[0074] In the described implementation, the aerosol provision device 2 further comprises a receptacle 25 which is arranged to receive an aerosol generating article 4.

[0075] The aerosol generating article 4 comprises a carrier component 42 and aerosol generating material 44. The aerosol generating article 4 is shown in more detail in Figures 2A to 2C.

[0076] Figure 2A is a top-down view of the article 4, Figure 2B is an end-on view along the longitudinal (length) axis of the article 4, and Figure 2C is a side-on view along the width axis of the article 4.

[0077] The article 4 comprises a carrier component 42 which in this implementation is formed of card. The carrier component 42 forms the majority of the article 4, and acts as a base for the aerosol generating material 44 to be deposited on.

[0078] The carrier component 42 is broadly cuboidal in shape has a length l, a width w and a thickness t_c as shown in Figures 2A to 2C. By way of a concrete example, the length of the carrier component 42 may be 30 to 80 mm, the width may be 7 to 25 mm, and the thickness may be between 0.2 to 1 mm. However, it should be appreciated that the above are exemplary dimensions of the carrier component 42, and in other implementations the carrier component 42 may have different dimensions as appropriate. In some implementations, the carrier component 42 may comprise one or more protrusions extending in the length and/or width directions of the carrier component 42 to help facilitate handling of the article 4 by the user.

[0079] In the example shown in Figures 1 and 2, the article 4 comprises a plurality of discrete portions of aerosol generating material 44 disposed on a surface of the carrier component 42. More specifically, the article 4 comprises six discrete portions of aerosol generating material 44, labelled 44a to 44f, disposed in a two by three array. However, it should be appreciated that in other implementations a greater or lesser number of discrete portions may be provided, and/or the portions may be disposed in a different array (e.g., a one by six array). In the example shown, the aerosol generating material 44 is disposed at discrete, separate locations on a single surface of the component carrier 42. The discrete portions of aerosol generating material 44 are shown as having a circular footprint, although it should be appreciated that the discrete portions of aerosol generating material 44 may take any other footprint, such as square or rectangular, as appropriate. The discrete portions of aerosol generating material 44 have a diameter d and a thickness t_a as shown in Figures 2A to 2C. The thickness ta may take any suitable value, for example the thickness ta may be in the range of 50μm to 1.5 mm. In some embodiment, the thickness ta is from about 50 μm to about 200 μm, or about 50 μm to about 100 μm, or about 60 μm to about 90 μm, suitably about 77 μm. In other embodiments, the thickness ta may be greater than 200 μm, e.g., from about 50 μm to about 400μm, or to about 1 mm, or to about 1.5 mm.

[0080] The discrete portions of aerosol generating material 44 are separate from one another such that each of the discrete portions may be energised (e.g., heated) individually / selectively to produce an aerosol. In some implementations, the portions of aerosol generating material 44 may have a mass no greater than 20 mg, such that the amount of material to be aerosolised by a given aerosol generating component 24 at any one time is relatively low. For example, the mass per portion may be equal to or lower than 20 mg, or equal to or lower than 10 mg, or equal to or lower than 5 mg. Of course, it should be appreciated that the total mass of the article 4 may be greater than 20 mg.

[0081] In the described implementation, the aerosol generating material 44 is an amorphous solid. Generally, the amorphous solid may comprise a gelling agent (sometimes referred to as a binder) and an aerosol generating agent (which might comprise glycerol, for example). Optionally, the aerosol generating material may comprise one or more of the following: an active substance (which may include a tobacco extract), a flavourant, an acid, and a filler. Other components may also be present as desired. Suitable active substances, flavourants, acids and fillers are described above in relation to the aerosolisable material.

[0082] Thus the aerosol generating agent may comprise one or more of glycerol, propylene glycol, diethylene glycol, triethylene glycol, tetraethylene glycol, 1,3-butylene glycol, erythritol, meso-Erythritol, ethyl vanillate, ethyl laurate, a diethyl suberate, triethyl citrate, triacetin, a diacetin mixture, benzyl benzoate, benzyl phenyl acetate, tributyrin, lauryl acetate, lauric acid, myristic acid, and propylene carbonate.

[0083] In some embodiments, the aerosol generating agent comprises one or more polyhydric alcohols, such as propylene glycol, triethylene glycol, 1 ,3-butanediol and glycerin; esters of polyhydric alcohols, such as glycerol mono-, di- or triacetate; and/or aliphatic esters of mono-, di- or polycarboxylic acids, such as dimethyl dodecanedioate and dimethyl tetradecanedioate.

[0084] The gelling agent may comprise one or more compounds selected from cellulosic gelling agents, non-cellulosic gelling agents, guar gum, acacia gum and mixtures thereof.

[0085] In some embodiments, the cellulosic gelling agent is selected from the group consisting of: hydroxymethyl cellulose, hydroxyethyl cellulose, hydroxypropyl cellulose, carboxymethylcellulose (CMC), hydroxypropyl methylcellulose (HPMC), methyl cellulose, ethyl cellulose, cellulose acetate (CA), cellulose acetate butyrate (CAB), cellulose acetate propionate (CAP) and combinations thereof.

[0086] In some embodiments, the gelling agent comprises (or is) one or more of hydroxyethyl cellulose, hydroxypropyl cellulose, hydroxypropyl methylcellulose (HPMC), carboxymethylcellulose, guar gum, or acacia gum.

[0087] In some embodiments, the gelling agent comprises (or is) one or more non-cellulosic gelling agents, including, but not limited to, agar, xanthan gum, gum Arabic, guar gum, locust bean gum, pectin, carrageenan, starch, alginate, and combinations thereof. In preferred embodiments, the non-cellulose based gelling agent is alginate or agar.

[0088] The aerosol-generating material may comprise an acid. The acid may be an organic acid. In some of these embodiments, the acid may be at least one of a monoprotic acid, a diprotic acid and a triprotic acid. In some such embodiments, the acid may contain at least one carboxyl functional group. In some such embodiments, the acid may be at least one of an alpha-hydroxy acid, carboxylic acid, dicarboxylic acid, tricarboxylic acid and keto acid. In some such embodiments, the acid may be an alpha-keto acid.

[0089] In some such embodiments, the acid may be at least one of succinic acid, lactic acid, benzoic acid, citric acid, tartaric acid, fumaric acid, levulinic acid, acetic acid, malic acid, formic acid, sorbic acid, benzoic acid, propanoic and pyruvic acid.

[0090] Suitably the acid is lactic acid. In other embodiments, the acid is benzoic acid. In other embodiments the acid may be an inorganic acid. In some of these embodiments the acid may be a mineral acid. In some such embodiments, the acid may be at least one of sulphuric acid, hydrochloric acid, boric acid and phosphoric acid. In some embodiments, the acid is levulinic acid.

[0091] In certain embodiments, the aerosol-generating material comprises a gelling agent comprising a cellulosic gelling agent and/or a non-cellulosic gelling agent, an active substance and an acid.

[0092] In some embodiments, the aerosol-generating material comprises one or more cannabinoid compounds selected from the group consisting of: cannabidiol (CBD), tetrahydrocannabinol (THC), tetrahydrocannabinolic acid (THCA), cannabidiolic acid (CBDA), cannabinol (CBN), cannabigerol (CBG), cannabichromene (CBC), cannabicyclol (CBL), cannabivarin (CBV), tetrahydrocannabivarin (THCV), cannabidivarin (CBDV), cannabichromevarin (CBCV), cannabigerovarin (CBGV), cannabigerol monomethyl ether (CBGM) and cannabielsoin

(CBE), cannabicitran (CBT).

[0093] The aerosol-generating material may comprise one or more cannabinoid compounds selected from the group consisting of cannabidiol (CBD) and THC (tetrahydrocannabinol).

[0094] The aerosol-generating material may comprise cannabidiol (CBD).

[0095] The aerosol-generating material may comprise nicotine and cannabidiol (CBD).

[0096] The aerosol-generating material may comprise nicotine, cannabidiol (CBD), and THC (tetrahydrocannabinol).

[0097] An amorphous solid aerosolisable material offers some advantages over other types of aerosolisable materials commonly found in some electronic aerosol provision devices. For example, compared to electronic aerosol provision devices which aerosolise a liquid aerosolisable material, the potential for the amorphous solid to leak or otherwise flow from a location at which the amorphous solid is stored is greatly reduced. This means aerosol provision devices or articles may be more cheaply manufactured as the components do not necessarily require the same liquid-tight seals or the like to be used.

[0098] Compared to electronic aerosol provision devices which aerosolise a solid aerosolisable material, e.g., tobacco, a comparably lower mass of amorphous solid material can be aerosolised to generate an equivalent amount of aerosol (or to provide an equivalent amount of a constituent in the aerosol, e.g., nicotine). This is partially due to the fact that an amorphous solid can be tailored to not include unsuitable constituents that might be found in other solid aerosolisable materials (e.g., cellulosic material in tobacco, for example). For example, in some implementations, the mass per portion of amorphous solid is no greater than 20 mg, or no greater than 10 mg, or no greater than 5 mg. Accordingly, the aerosol provision device can supply relatively less power to the aerosol generating component and/or the aerosol generating component can be comparably smaller to generate a similar aerosol, thus meaning the energy requirements for the aerosol provision device may be reduced.

[0099] In some embodiments, the amorphous solid comprises tobacco extract. In these embodiments, the amorphous solid may have the following composition (by Dry Weight Basis, DWB): gelling agent (preferably comprising alginate) in an amount of from about 1wt% to about 60wt%, or about 10wt% to 30wt%, or about 15wt% to about 25wt%; tobacco extract in an amount of from about 10wt% to about 60wt%, or from about 40wt% to 55wt%, or from about 45wt% to about 50wt%; aerosol generating agent (preferably comprising glycerol) in an amount of from about 5wt% to about 60wt%, or from about 20wt% to about 40wt%, or from about 25wt% to about 35wt% (DWB). The tobacco extract may be from a single variety of tobacco or a blend of extracts from different varieties of tobacco. Such amorphous solids may be referred to as "tobacco amorphous solids", and may be designed to deliver a tobacco-like experience when aerosolised.

[0100] In one embodiment, the amorphous solid comprises about 20wt% alginate gelling agent, about 48wt% Virginia tobacco extract and about 32wt% glycerol (DWB).

[0101] The amorphous solid of these embodiments may have any suitable water content. For example, the amorphous solid may have a water content of from about 5wt% to about 15wt%, or from about 7wt% to about 13wt%, or about 10wt%.

[0102] Suitably, in any of these embodiments, the amorphous solid has a thickness t_a of from about 50 μm to about 200 μm, or about 50 μm to about 100 μm, or about 60 μm to about 90 μm, suitably about 77 μm.

[0103] In some implementations, the amorphous solid may comprise 0.5-60 wt% of a gelling agent; and 5-80 wt% of an aerosol generating agent, wherein these weights are calculated on a dry weight basis. Such amorphous solids may contain no flavour, no acid and no active substance. Such amorphous solids may be referred to as "aerosol generating agent rich" or "aerosol generating agent amorphous solids". More generally, this is an example of an aerosol generating agent rich aerosol generating material which, as the name suggests, is a portion of aerosol generating material which is designed to deliver aerosol generating agent when aerosolised.

[0104] In these implementations, the amorphous solid may have the following composition (DWB): gelling agent in an amount of from about 5wt% to about 40wt%, or about 10wt% to 30wt%, or about 15wt% to about 25wt%; aerosol generating agent in an amount of from about 10wt% to about 50wt%, or from about 20wt% to about 40wt%, or from about 25wt% to about 35wt% (DWB).

[0105] In some other implementations, the amorphous solid may comprise 0.5-60 wt% of a gelling agent; 5-80 wt% of an aerosol generating agent; and 1-60 wt% of a flavour, wherein these weights are calculated on a dry weight basis. Such amorphous solids may contain flavour, but no active substance or acid. Such amorphous solids may be referred to as "flavourant rich" or "flavour amorphous solids". More generally, this is an example of a flavourant rich aerosol generating material which, as the name suggests, is a portion of aerosol generating material which is designed to deliver flavourant when aerosolised.

[0106] In these implementations, the amorphous solid may have the following composition (DWB): gelling agent in an amount of from about 5wt% to about 40wt%, or about 10wt% to 30wt%, or about 15wt% to about 25wt%; aerosol generating agent in an amount of from about 10wt% to about 50wt%, or from about 20wt% to about 40wt%, or from about 25wt% to about 35wt% (DWB), flavour in an amount of from about 30wt% to about 60wt%, or from about 40wt% to 55wt%, or from about 45wt% to about 50wt%.

[0107] In some other implementations, the amorphous solid may comprise 0.5-60 wt% of a gelling agent; 5-80 wt% of an aerosol generating agent; and 5-60 wt% of at least one active substance, wherein these weights are calculated on a dry weight basis. Such amorphous solids may contain an active substance, but no flavour or acid. Such amorphous solids may be referred to as "active substance rich" or "active substance amorphous solids". For example, in one implementation, the active substance may be nicotine, and as such an amorphous solid as described above comprising nicotine may be referred to as a "nicotine amorphous solid". More generally, this is an example of an active substance rich aerosol generating material which, as the name suggests, is a portion of aerosol generating material which is designed to deliver an active substance when aerosolised.

[0108] In these implementations, amorphous solid may have the following composition (DWB): gelling agent in an amount of from about 5wt% to about 40wt%, or about 10wt% to 30wt%, or about 15wt% to about 25wt%; aerosol generating agent in an amount of from about 10wt% to about 50wt%, or from about 20wt% to about 40wt%, or from about 25wt% to about 35wt% (DWB), active substance in an amount of from about 30wt% to about 60wt%, or from about 40wt% to 55wt%, or from about 45wt% to about 50wt%.

[0109] In some other implementations, the amorphous solid may comprise 0.5-60 wt% of a gelling agent; 5-80 wt% of an aerosol generating agent; and 0.1 -10 wt% of an acid, wherein these weights are calculated on a dry weight basis. Such amorphous solids may contain acid, but no active substance and flavourant. Such amorphous solids may be referred to as "acid rich" or "acid amorphous solids". More generally, this is an example of an acid rich aerosol generating material which, as the name suggests, is a portion of aerosol generating material which is designed to deliver an acid when aerosolised.

[0110] In these implementations, the amorphous solid may have the following composition (DWB): gelling agent in an amount of from about 5wt% to about 40wt%, or about 10wt% to 30wt%, or about 15wt% to about 25wt%; aerosol generating agent in an amount of from about 10wt% to about 50wt%, or from about 20wt% to about 40wt%, or from about 25wt% to about 35wt% (DWB), acid in an amount of from about 0.1wt% to about 8 wt%, or from about 0.5wt% to 7wt%, or from about 1wt% to about 5wt%, or form about 1wt% to about 3wt%.

[0111] In some implementations, the amorphous solid may comprise a colourant. The addition of a colourant may alter the visual appearance of the amorphous solid. The presence of colourant in the amorphous solid may enhance the visual appearance of the amorphous solid and the aerosol-generating material. By adding a colourant to the amorphous solid, the amorphous solid may be colour-matched to other components of the aerosol-generating material or to other components of an article comprising the amorphous solid.

[0112] In some implementations, a variety of colourants may be used depending on the desired colour of the amorphous solid. The colour of amorphous solid may be, for example, white, green, red, purple, blue, brown or black. Other colours are also envisaged. Natural or synthetic colourants, such as natural or synthetic dyes, food-grade colourants and pharmaceutical-grade colourants may be used. In certain embodiments, the colourant is caramel, which may confer the amorphous solid with a brown appearance. In such embodiments, the colour of the amorphous solid may be similar to the colour of other components (such as tobacco material) in an aerosol-generating material comprising the amorphous solid. In some embodiments, the addition of a colourant to the amorphous solid renders it visually indistinguishable from other components in the aerosol-generating material.

[0113] In some implementations, the colourant may be incorporated during the formation of the amorphous solid (e.g. when forming a slurry comprising the materials that form the amorphous solid) or it may be applied to the amorphous solid after its formation (e.g. by spraying it onto the amorphous solid).

[0114] The article 4 may comprise a plurality of portions of aerosol generating material all formed form the same aerosol generating material (e.g., one of the amorphous solids described above). Alternatively, the article 4 may comprise a plurality of portions of aerosol generating material 44 where at least two portions are formed from different aerosol generating material (e.g., one of the amorphous solids described above).

[0115] The receptacle 25 is suitable sized to removably receive the article 4 therein. Although not shown, the device 2 may comprise a hinged door or removable part of the outer housing 21 to permit access to the receptacle 25 such that a user may insert and/or remove the article 4 from the receptacle 25. The hinged door or removable part of the outer housing 21 may also act to retain the article 4 within the receptacle 25 when closed. When the aerosol generating article 4 is exhausted or the user simply wishes to switch to a different aerosol generating article 4, the aerosol generating article 4 may be removed from the aerosol provision device 2 and a replacement aerosol generating article 4 positioned in the receptacle 25 in its place. Alternatively, the device 2 may include a permanent opening that communicates with the receptacle 25 and through which the article 4 can be inserted into the receptacle 25. In such implementations, a retaining mechanism for retaining the article 4 within the receptacle 25 of the device 2 may be provided.

[0116] As seen in Figure 1, the device 2 comprises a number of aerosol generating components 24. In the described implementation, the aerosol generating components 24 are heating elements 24, and more specifically resistive heating elements 24. Resistive heating elements 24 receive an electrical current and convert the electrical energy into heat. The resistive heating elements 24 may be formed from, or comprise, any suitable resistive heating material, such as NiChrome

(Ni20Cr80), which generates heat upon receiving an electrical current. In one implementation, the heating elements 24 may comprise an electrically insulating substrate on which resistive tracks are disposed.

[0117] Figure 3 is a cross-sectional, top-down view of the aerosol provision device 2 showing the arrangement of the heating elements 24 in more detail. In Figures 1 and 3, the heating elements 24 are positioned such that a surface of the heating element 24 forms a part of the surface of the receptacle 25. That is, an outer surface of the heating elements 24 is flush with the inner surface of the receptacle. More specifically, the outer surface of the heating element 24 that is flush with the inner surface of the receptacle 25 is a surface of the heating element 24 that is heated (i.e., its temperature increases) when an electrical current is passed through the heating element 24.

[0118] The heating elements 24 are arranged such that, when the article 4 is received in the receptacle 25, each heating element 24 aligns with a corresponding discrete portion of aerosol generating material 44. Hence, in this example, six heating elements 24 are arranged in a two by three array broadly corresponding to the arrangement of the two by three array of the six discrete portions of aerosol generating material 44 shown in Figures 2A to 2C. However, as discussed above, the number of heating elements 24 may be different in different implementations, for example there may be 8, 10, 12, 14, etc. heating elements 24. In some implementations, the number of heating elements 24 is greater than or equal to six but no greater than 20.

[0119] More specifically, the heating elements 24 are labelled 24a to 24f in Figure 3, and it should be appreciated that each heating element 24 is arranged to align with a corresponding portion of aerosol generating material 44 as denoted by the corresponding letter following the references 24/44. Accordingly, each of the heating elements 24 can be individually activated to heat a corresponding portion of aerosol generating material 44.

[0120] While the heating elements 24 are shown flush with the inner surface of the receptacle 25, in other implementations the heating elements 24 may protrude into the receptacle 25. In either case, the article 4 contacts the surfaces of the heating elements 24 when present in the receptacle 25 such that heat generated by the heating elements 24 is conducted to the aerosol generating material 44 through the carrier component 42.

[0121] In some implementations, to improve the heat-transfer efficiency, the receptacle may comprise components which apply a force to the surface of the carrier component 42 so as to press the carrier component 42 onto the heater elements 24, thereby increasing the efficiency of heat transfer via conduction to the aerosol generating material 44. Additionally or alternatively, the heater elements 24 may be configured to move in the direction towards/away from the article 4, and may be pressed into the surface of carrier component 42 that does not comprise the aerosol generating material 44.

[0122] In use, the device 2 (and more specifically the control circuitry 23) is configured to deliver power to the heating elements 24 in response to a user input. Broadly speaking, the control circuitry 23 is configured to selectively apply power to the heating elements 24 to subsequently heat the corresponding portions of aerosol generating material 44 to generate aerosol. When a user inhales on the device 2 (i.e., inhales at mouthpiece end 26), air is drawn into the device 2 through air inlet 27, into the receptacle 25 where it mixes with the aerosol generated by heating the aerosol generating material 44, and then to the user's mouth via air outlet 28. That is, the aerosol is delivered to the user through mouthpiece end 26 and air outlet 28.

[0123] The device 2 of Figure 1 includes a touch-sensitive panel 29 and an inhalation sensor 30. Collectively, the touch-sensitive panel 29 and inhalation sensor 30 act as mechanisms for a receiving a user input to cause the generation of aerosol, and thus may more broadly be referred to as user input mechanisms. The received user input may be said to be indicative of a user's desire to generate aerosol.

[0124] The touch-sensitive panel 29 may be a capacitive touch sensor and can be operated by a user of the device 2 placing their finger or another suitably conductive object (for example a stylus) on the touch-sensitive panel. In the described implementation, the touch-sensitive panel includes a region which can be pressed by a user to start aerosol generation. The control circuitry 23 may be configured to receive signalling from the touch-sensitive panel 29 and to use this signalling to determine if a user is pressing (i.e. activating) the region of the touch-sensitive panel 29. If the control circuitry 23 receives this signalling, then the control circuitry 23 is configured to supply power from the power source 22 to one or more of the heating elements 24. Power may be supplied for a predetermined time period (for example, three seconds) from the moment a touch is detected, or in response to the length of time the touch is detected for. In other implementations, the touch sensitive panel 29 may be replaced by a user actuatable button or the like.

[0125] The inhalation sensor 30 may be a pressure sensor or microphone or the like configured to detect a drop in pressure or a flow of air caused by the user inhaling on the device 2. The inhalation sensor 30 is located in fluid communication with the air flow pathway (that is, in fluid communication with the air flow path between inlet 27 and outlet 28). In a similar manner as described above, the control circuitry 23 may be configured to receive signalling from the inhalation sensor and to use this signalling to determine if a user is inhaling on the aerosol provision system 1. If the control circuitry 23 receives this signalling, then the control circuitry 23 is configured to supply power from the power source 22 to one or more of the heating elements 24. Power may be supplied for a predetermined time period (for example, three seconds) from the moment inhalation is detected, or in response to the length of time the inhalation is detected for.

[0126] In the described example, both the touch-sensitive panel 29 and inhalation sensor 30 detect the user's desire to begin generating aerosol for inhalation. The control circuitry 23 may be configured to only supply power to the heating element 24 when signalling from both the touch-sensitive panel 29 and inhalation sensor 30 are detected. This may help prevent inadvertent activation of the heating elements 24 from accidental activation of one of the user input mechanisms. However, in other implementations, the aerosol provision system 1 may have only one of a touch sensitive panel 29 and an inhalation sensor 30.

[0127] These aspects of the operation of the aerosol provision system 1 (i.e. puff detection and touch detection) may in themselves be performed in accordance with established techniques (for example using conventional inhalation sensor and inhalation sensor signal processing techniques and using conventional touch sensor and touch sensor signal processing techniques).

[0128] In some implementations, in response to detecting the signalling from either one or both of the touch-sensitive panel 29 and inhalation sensor 30, the control circuitry 23 is configured to sequentially supply power to each of the individual heating elements 24.

[0129] More specifically, the control circuitry 23 is configured to sequentially supply power to each of the individual heating elements 23 in response to a sequence of detections of the signalling received from either one or both of the touch-sensitive panel 29 and inhalation sensor 30. For example, the control circuitry 23 may be configured to supply power to a first heating element 24 of the plurality of heating elements 24 when the signalling is first detected (e.g., from when the device 2 is first switched on). When the signalling stops, or in response to the predetermined time from the signalling being detected elapsing, the control circuitry 23 registers that the first heating element 24 has been activated (and thus the corresponding discrete portion of aerosol generating material 44 has been heated). The control circuitry 23 determines that in response to receiving subsequent signalling from either one or both of the touch-sensitive panel 29 and inhalation sensor 30 that a second heating element 24 is to be activated. Accordingly, when the signalling from either one or both of the touch-sensitive panel 29 and inhalation sensor 30 is received by the control circuitry 23, the control circuitry 23 activates the second heating element 24. This process is repeated for remaining heating elements 24, such that all heating elements 24 are sequentially activated.

[0130] Effectively, this operation means that for each inhalation a different one of the discrete portions of aerosol generating material 44 is heated and an aerosol generated therefrom. In other words, a single discrete portion of aerosol generating material is heated per user inhalation.

[0131] In other implementations, the control circuitry 23 may be configured to activate the first heating element 24 a plurality of times (e.g., two) before determining that the second heating element 24 should be activated in response to subsequent signalling from either one or both of the touch-sensitive panel 29 and inhalation sensor 30, or activates each of the plurality of heating elements 24 once and when all heating elements 24 have be activated once, detection of subsequent signalling causes the heating elements to be sequentially activated a second time.

[0132] Such sequential activations may be dubbed "a sequential activation mode", which is primarily designed to deliver a consistent aerosol per inhalation (which may be measured in terms of total aerosol generated, or a total constituent delivered, for example). Hence, this mode may be most effective when each portion of the aerosol generating material 44 of the aerosol generating article 4 is substantially identical; that is, portions 44a to 44f are formed of the same material.

[0133] In some other implementations, in response to detecting the signalling from either one or both of the touch-sensitive panel 29 and inhalation sensor 30, the control circuitry 23 is configured to supply power to one or more of the heating elements 24 simultaneously.

[0134] In such implementations, the control circuitry 23 may be configured to supply power to selected ones of the heating elements 24 in response to a predetermined configuration. The predetermined configuration may be a configuration selected or determined by a user. For example, the touch-sensitive panel 29 may comprise a region that permits the user to individually select which of the heating elements 24 to activate when signalling from either one or both of the touch-sensitive panel 29 and inhalation sensor 30 is received by the control circuitry 23. In some implementations, the user may also be able to set the power level for each heating element 24 to be supplied to heating element 24 in response to receiving the signalling.

[0135] Figure 4 is a top-down view of the touch-sensitive panel 29 in accordance with such implementations. Figure 4 schematically shows outer housing 21 and touch-sensitive panel 29 as described previously. The touch-sensitive panel 29 comprises six regions 29a to 29f which correspond to each of the six heating elements 24, and a region 29g which corresponds to the region for indicating that a user wishes to start inhalation or generating aerosol as described previously. The six regions 29a to 29f each correspond to touch-sensitive regions which can be touched by a user to control the power delivery to each of the six corresponding heating elements 24. In the described implementation, each heating element 24 can have multiple states, e.g., an off state in which no power is supplied to the heating element 24, a low power state in which a first level of power is supplied to the heating element 24, and a high power state in which a second level of power is supplied to the heating element 24 where the second level of power is greater than the first level of power. However, in other implementations, fewer or greater states may be available to the heating elements 24. For example, each heating element 24 may have an off state in which no power is supplied to the heating element 24 and an on state in which power is supplied to the heating element 24.

[0136] Accordingly, a user can set which heating elements 24 (and subsequently which portions of aerosol generating material 44) are to be heated (and optionally to what extent they are to be heated) by interacting with the touch-sensitive panel 29 in advance of generating aerosol. For example, the user may repeatedly tap the regions 29a to 29f to cycle through the different states (e.g., off, low power, high power, off, etc.). Alternatively, the user may press and hold the region 29a to 29f to cycle through the different states, where the duration of the press determines the state.

[0137] The touch-sensitive panel 29 may be provided with one or more indicators for each of the respective regions 29a to 29f to indicate which state the heating element 24 is currently in. For example, the touch-sensitive panel may comprise one or more LEDs or similar illuminating elements, and the intensity of the LEDs signifies the current state of the heating element 24. Alternatively, a coloured LED or similar illuminating element may be provided and the colour indicates the current state. Alternatively, the touch-sensitive panel 29 may comprise a display element (e.g., which may underlie a transparent touch-sensitive panel 29 or be provided adjacent to the regions 29a to 29f of the touch-sensitive panel 29) which displays the current state of the heating element 24.

[0138] When the user has set the configuration for the heating elements 24, in response to detecting the signalling from either one or both of the touch-sensitive panel 29 (and more particularly region 29g of touch-sensitive panel 29) and inhalation sensor 30, the control circuitry 23 is configured to supply power to the selected heating elements 24 in accordance with the pre-set configuration.

[0139] Accordingly, such simultaneous heating element 24 activations may be dubbed "a simultaneous activation mode", which is primarily designed to deliver a customisable aerosol from a given article 4, with the intention of allowing a user to customise their experience on a session-by-session or even puff-by-puff basis. Hence, this mode may be most effective when portions of the aerosol generating material 44 of the aerosol generating article 4 are different from one another. For example, portions 44a and 44b are formed of one material, portions 44c and 44d are formed of a different material, etc. Accordingly, with this mode of operation, the user may select which portions to aerosolise at any given moment and thus which combinations of aerosols to be provided with.

[0140] In both of the simultaneous and sequential activation modes, the control circuitry 23 may be configured to generate an alert signal which signifies the end of use of the article 4, for example when each of the heating elements 24 has been sequentially activated a predetermined number of times, or when a given heating element 24 has been activated a predetermined number of times and/or for a given cumulative activation time and/or with a given cumulative activation power. In Figure 1, the device 2 includes an end of use indicator 31 which in this implementation is an LED. However, in other implementations, the end of use indicator 31 may comprise any mechanism which is capable of supplying an alert signal to a user; that is, the end of use indicator 31 may be an optical element to deliver an optical signal, a sound generator to deliver an aural signal, and/or a vibrator to deliver a haptic signal. In some implementations, the indicator 31 may be combined or otherwise provided by the touch-sensitive panel (e.g., if the touch-sensitive panel includes a display element). The device 2 may prevent subsequent activation of the device 2 when the alert signal is being output. The alert signal may be switched off, and the control circuitry 23 reset, when the user replaces the article 4 and/or switches off the alert signal via a manual means such as a button (not shown).

[0141] In more detail, in implementations where the sequential mode of activation is employed, the control circuitry 23 may be configured to count the number of times signalling from either one or both of the touch-sensitive panel 29 and inhalation sensor 30 is received during a period of usage, and once the count reaches a predetermined number, the article 4 is determined to reach the end of its life. For example, for an article 4 comprising six discrete portions of aerosol generating material 44, the predetermined number may be six, twelve, eighteen, etc. depending on the exact implementation at hand.

[0142] In implementations where the simultaneous mode of activation is employed, the control circuitry 23 may be configured to count the number of times one or each of the discrete portions of aerosol generating material 44 is heated. For example, the control circuitry 23 may count how many times a nicotine containing portion is heated, and when that reaches a predetermined number, determine an end of life of the article 4. Alternatively, the control circuitry 23 may be configured to separately count for each discrete portion of aerosol generating material 44 when that portion has been heated. Each portion may be attributed with the same or a different predetermined number and when any one of the counts for each of the portions of aerosol generating material reaches the predetermined number, the control circuitry 23 determines an end of life of the article 4.

[0143] In either of the implementations, the control circuity 23 may also factor in the length of time the portion of aerosol generating material has been heated for and/or the temperature to which the portion of the aerosol generating material has been heated. In this regard, rather than counting discrete activations, the control circuitry 23 may be configured to calculate a cumulative parameter indicative of the heating conditions experienced by each of the portions of aerosol generating material 44. The parameter may be a cumulative time, for example, whereby the temperature to which the material is used to adjust the length of time added to the cumulative time. For example, a portion heated at 200°C for three seconds may contribute three seconds to the cumulative time, whereas a portion heated at 250°C for three seconds may contribute four and a half seconds to the cumulative time.

[0144] The above techniques for determining the end of life of the article 4 should not be understood as an exhaustive list of ways of determining the end of life of the article 4, and in fact any other suitable way may be employed in accordance with the principles of the present disclosure.

[0145] In the implementation of the aerosol provision system 1 described above, a plurality of (discrete) portions of aerosol generating material 44 are provided which can be selectively aerosolised using the aerosol generating components 24. Such aerosol provision systems 1 offer advantages over other systems which are designed to heat a larger bulk quantity of material. In particular, for a given inhalation, only the selected portion (or portions) of aerosol generating material are aerosolised leading to a more energy efficient system overall.

[0146] In heated systems, several parameters affect the overall effectiveness of this system at delivering a sufficient amount of aerosol to a user on a per puff basis. On the one hand, the thickness of the aerosol generating material is important as this influences how quickly the aerosol generating material reaches an operational temperature (and subsequently generates aerosol). This may be important for several reasons, but may lead to more efficient use of energy from the power source 22 as the heating element may not need to be active for as long compared with heating a thicker portion of material. On the other hand, the total mass of the aerosol generating material that is heated affects the total amount of aerosol that can be generated, and subsequently delivered to the user. In addition, the temperature that the aerosol generating material is heated too may affect both how quickly the aerosol generating material reaches operational temperature and the amount of aerosol that is generated.

[0147] Amorphous solids (e.g., as described above) are particularly suited to the above application, in part because the amorphous solids are formed from selected ingredients / constituents and so can be engineered such that a relatively high proportion of the mass is the useful (or deliverable) constituents (e.g., nicotine and glycerol, for example). As such, amorphous solids may produce a relatively high proportion of aerosol from a given mass as compared to some other aerosol generating materials (e.g., tobacco), meaning that relatively smaller portions of amorphous solid can output a comparable amount of aerosol. In addition, amorphous solids do not tend to easily flow (if at all) which means problems around leakage when using a liquid aerosol generating material, for example, are largely mitigated.

[0148] In accordance with the present disclosure however, the inventors have found that in some instances devices 2 which have an array of aerosol generating components 24 (such as heating elements 24) designed to heat different ones of the portions of aerosol generating material to generate aerosol on a puff-by-puff basis can, in some instances, lead to inconsistencies in the amount of aerosol being delivered to the user per puff even if the heating conditions are broadly the same.

[0149] This is thought to be in part down to the fact that some of the portions of aerosol generating material 44 are provided at relatively different spatial distances relative to the opening 28 of the mouthpiece 26 such that, when the aerosol is first formed at a location adjacent to the portion of aerosol generating material, the distance by which that aerosol has to travel may vary.

[0150] Figure 5 is a reproduction of Figure 3 but additionally includes two arrows labelled D1 and D2. D1 extends from heating element 24a to the outlet 28 of the mouthpiece end 26, while D2 extends from heating element 24f to the outlet 28. As should be appreciated, the arrows D1 and D2 are representations of the distances along which the aerosol generated using the respective heating elements 24a and 24f by respective portions of aerosol generating material 44a and 44f.

[0151] Generally, as a hot aerosol travels it cools and condenses. Hence, the greater the distance along which an aerosol must travel, the greater chance the aerosol has to cool and condense. The condensate may also be deposited on surfaces it encounters as it travels, e.g., such as surfaces of the receptacle 25 in the example of Figure 5. There is much greater chance of deposition the greater the distance the aerosol travels, in part due to the increased chance of encountering a surface and also due to the increase in particle size as the aerosol travels and cools. In Figure 5, it can be seen that D1 is much greater than D2, and as such there is a greater chance that the aerosol generated at heating element 24a by portion 44a has a decreased aerosol amount / volume when it exits the outlet 28 of device 2 as compared to aerosol generated at heating element 24f by portion 44f, for example. Equally, aerosol generated at heating elements 24c and 24d by portions 44c and 44d may have a greater chance of a decreased amount of aerosol exiting the outlet as compared to aerosol generated at heating elements 24e and 24f by portions 44e and 44f, but an a greater chance of an increased amount of aerosol exiting the outlet 28 as compared to aerosol generated at heating elements 24a and 24b by portions 44a and 44b. This effect may be much more prominent when the number of heating elements increases (e.g., to a two by six array).

[0152] The distances D1 and D2 may be assessed with respect to a common point located in the outlet 28. For example, the common point may be the centre of the cross-sectional area defined by the outlet 28.

[0153] As such the inventors have proposed a device 2 for generating aerosol from an article 4 comprising portions of aerosol generating material 44, the device comprising a receptacle 25 for receiving the article 4, an outlet 28 fluidly coupled to the receptacle 25, at least one aerosol generating component 24 configured to perform an aerosolisation process (i.e., a process by which aerosol may be generated from the aerosol generating material, e.g., heating) on one or more of the portions of aerosol generating material 44 when the article 4 is received in the receptacle, and control circuitry for controlling the aerosol generating component 44. Additionally, the control circuitry 23 is configured to cause the at least one aerosol generating component 24 to generate an amount of aerosol from a respective portion of aerosol generating material 44 based on the distance of the respective portion of aerosol generating material 44 from the outlet 28.

[0154] In this way, the amount of aerosol generated from a respective portion of aerosol generating material 44 can be set so as to compensate for the loss of aerosol due to condensation as the aerosol travels to the outlet 28.

[0155] In other words, the aerosol generating component 24 is configured to generate an amount of aerosol from the respective portion of aerosol generating material 44 such that, regardless of distance of the respective portion of aerosol generating material 44 from the outlet 28, a substantially constant amount of aerosol passes through the outlet 28. Accordingly, the user can be provided with a more consistent inhalation experience.

[0156] In this regard, it should be appreciated here that by the expression "a more consistent inhalation experience" is not necessarily meant to suggest that each puff in a session is the same in taste or the proportion of constituents that are delivered, although this is not excluded.

[0157] On the one hand, the article 4 may comprise portions of aerosol generating material which have the same formulation / composition and may be aerosolised in accordance with the "sequential mode" of activation. In this case, in accordance with the principles of the present disclosure, each portion of aerosol generating material 44 is aerosolised by an amount depending on the distance from the outlet 28 such that the amount of aerosol exiting the outlet 28 is substantially the same when measured using a simulated standard inhalation (e.g., in accordance with the Coresta Recommended Method 81, CRM 81). In this case, each sequential activation provides substantially the same amount of aerosol exiting the outlet 28.

[0158] On the other hand, if the article 4 comprises portions of different aerosol generating material, such that the aerosol may be customisable as described above, then the principles of the present disclosure are applied with respect to the aerosol generating material portions of the same type. In other words, for a given type of aerosol generating material (e.g., a nicotine rich amorphous solid), then the device 2 is configured to output a consistent amount of aerosol generated from that portion regardless of the distance of that portion from the outlet 28. In these implementations, the total aerosol quantity may vary (e.g., because other portions of aerosol generating materials are simultaneously heated). In other words, the amount of aerosol that contributes to the total aerosol that exits the outlet 28 is the substantially the same, and hence the delivery from that particular portion is consistent.

[0159] The amount of aerosol generated based on the distance of the portion of aerosol generating material from the outlet is likely to depend on the magnitude of the distances involved, the type of material, and the target aerosol to output. However, in some implementations, the increase in aerosol amount to be output may be no greater than 50%, no greater than 40%, no greater than 30%, no greater than 20% or no greater than 10% of the target aerosol amount to be output.

[0160] With reference to Figure 5, the control circuitry 23 is configured to cause the aerosol generating component 24 to generate an increasing amount of aerosol from the respective portion of aerosol generating material 44 the further away the respective portion of aerosol generating material 44 is located from the outlet 28. Accordingly, by generating more aerosol from a portion of aerosol generating material that is further away from the outlet 28, there is a greater chance that relatively more of the aerosol being transported will arrive at the outlet 28. In other words, more aerosol is generated to compensate for the loss in aerosol as the aerosol travels to the outlet.

[0161] Additionally, depending on the specifics of the system 1, only some of the portions of aerosol generating material may be aerosolised based on the distance from the outlet 28. For example, it may be found empirically that for a given system 1 the greatest effect of the distance from the outlet 28 is for the portions of aerosol generating that are furthest from the outlet 28, i.e., portions 44a and 44b (corresponding to heating elements 24a and 24b). That is, for example, the portions 44c to 44f when aerosolised produce a similar amount of aerosol when exiting the outlet 28 despite being at different distances from the outlet 28, whereas the portions 44a and 44b are aerosolised the amount of aerosol generated may decrease by say 20% as compared to portions 44c to 44f. Accordingly, the control circuitry 23 may be arranged to cause aerosolisation of some portions of aerosol generating material according to a common aerosolisation / heating profile, while the aerosolisation / heating profiles of the remaining portions of aerosol generating material are set according to the distance of the portion from the outlet 28.

[0162] While it has been discussed that the portions further from the outlet 28 are arranged to be aerosolised or heated more to generate more aerosol, it should equally be appreciated that the control circuitry 23 may be arranged to generate relatively less aerosol from portions of aerosol generating material that are closer to the outlet 28.

[0163] It should be appreciated that the amount of additional aerosol generated may not be exactly the same as the amount of aerosol lost. For example, suppose 4 mg of aerosol is generated from a portion of aerosol generating material and 1 mg of the aerosol is lost as the aerosol travels to the outlet 28. Controlling the aerosol generating component to generating 5 mg of aerosol from the same portion 44 may not necessarily lead to 4 mg of aerosol being output at the outlet 28. In practical terms, it is likely that the losses incurred will be proportional to the amount of aerosol generated. Taking the above example, of the 4 mg generated, 25% is lost when the aerosol is transported to the outlet 28. Hence, when increasing the amount of aerosol generated to 5 mg, the losses may still be 25% which leads to 3.75 mg arriving at the outlet 28.

[0164] More generally speaking, the control circuitry 23 is configured to cause the aerosol generating component 24 to generate an amount of aerosol from the portion of aerosol generating material 44 based on a function of the distance of the portion of the aerosol generating material 44 from the outlet 28.

[0165] The function may be found empirically by testing a number of portions of aerosol generating material 44 to determine how the aerosol loss varies with the distance from the outlet. It should be appreciated that the function may also be dependent on the geometry of the receptacle and/or the air flow path in general. To a first approximation, the relationship between aerosol generated and distance may be linear. For example, the amount of additional aerosol to be generated per mm increase in distance may be set to e.g., 0.01 mg/mm.

[0166] In the implementations described above, the aerosol generating components are heating elements 24 arranged to heat the portions of aerosol generating material. When looking to adjust the amount of aerosol generated from a portion of aerosol generating material using a heating element 24, one can adjust the temperature to which the heating element 24 is to be raised and/or one can adjust the time for which the aerosol generating material is heated for.

[0167] That is, in some implementations, the control circuitry 23 is configured to set the operational temperature for the at least one heating element 24 based on the distance of the respective portion of aerosol generating material from the outlet 28. The operational temperature may be defined as the target temperature to which the heating element 24 is controlled to reach. In other words, a power supplied to the heating element 24 is set such that the power is sufficient to cause the heating element 24 to reach the target temperature. Increasing the target temperature essentially increases the amount of energy that is transferred to the aerosol generating material. However, in most implementations, an upper limit to the target operational temperature is imposed, as heating the material above the upper limit may cause the aerosol generating material 44 to char or burn.

[0168] Additionally, or alternatively, in some implementations, control circuitry 23 is configured to set the heating duration for the at least one heating element 24 based on the distance of the respective portion of aerosol generating material from the outlet 28. The heating duration (i.e., the time the heating element is active for) may also be set to alter the amount of aerosol that is generated, whereby a longer heating duration generally leads to relatively more aerosol being generated. As described above, the heating elements 24 may be switched off either when the signalling from one or both of the inhalation sensor 30 or touch sensitive panel 29 stops or when a predetermined time from receiving the signalling elapses. However, in accordance with the above implementations, the control unit 23 may cause the heating element 24 to activate for a longer period of time, e.g., by causing the heating element to heat beyond the predetermined threshold (or alternatively, by increasing the threshold), or to continue to heat beyond the signalling stopping. This technique may also be combined with an adjustment in operational temperature, as described above.

[0169] With reference to Figure 5, the heating elements 24 of the described implementation are arranged in an array, in this case a 2 x 3 array. Accordingly, as can be derived from Figure 5, while there are six heating elements, it can be seen that relative to the single outlet 28 (which is arranged coaxially with the longitudinal axis of the receptacle 25), there are three different path lengths between the heating elements 24 (and hence aerosol generating portions 44) and the outlet 28. Two are shown by arrows D1 and D2, while the third is the distance between heating element 24c (or heating element 24d) and the outlet 28.

[0170] Hence, in this implementation, there may be three different amounts of aerosol that can be generated by the aerosol generating material for a given amount of aerosol to be output at the outlet 28. Accordingly, in this implementation, the control circuitry 23 is configured to cause the heating elements 24 to activate to generate one of three different levels of aerosol. More specifically, heating elements 24a and 24b may be set at a first level to output a first amount of aerosol; heating elements 24c and 24d may be set at a second level to output a second amount of aerosol (lower than the first amount of aerosol); and heating elements 24e and 24f may be set at a third level to output a third amount of aerosol (lower than the second amount).

[0171] More generally, the heating elements and/or portions of aerosol generating material may arranged in an N x M array with respect to the single outlet 28, where N signifies the number of rows and M signifies the number of columns (when viewing the array as in Figure 5). The control circuitry 23 is configured to cause the heating elements 24 to generate X different amounts of aerosol (i.e., to operate at one of X different power levels and/or to operate for one of X different heater durations), where X is determined according to the following equation:

$$X = \frac{2N+1+(-1)^{N+1}}{4} \times M.$$

[0172] In addition, while it has been discussed above that the operation of the heating elements 24 may be adjusted to account for the distance of the portions 44 from the outlet, the portions of aerosol generating material may themselves also be altered. For example, in some implementations, the thickness and/or areal extent may be altered. The thickness may be increased for portions that are further from the outlet, such that when the portion is heated to a higher temperature or for a longer period, more starting material which is to be aerosolised is present. Equally, the areal extent of the portion of aerosol generating material (and potentially the areal extent of the eating element) may also be increased for similar reasons. Accordingly, the increased temperature and increased heating duration may lead to relatively more aerosol being output.

[0173] Hence, above is described a device 2 which is able to compensate for aerosol lost during transport from the site of aerosol generation (i.e., at or above the aerosol generating portion 44) by adjusting the degree of aerosolisation that is provided by the aerosol generating component on a portion of aerosol generating material based on the distance from the outlet 28.

[0174] The above assumes that there is one common outlet through which the aerosol is directed when a user inhales on the device 2. However, the principles of the present disclosure are equally applicable to devices having multiple outlets. While in this situation the method is more complex, the principles are nevertheless the same. In most devices, the user will inhale on one mouthpiece end 26 / one outlet 28 at any given time. The control unit may be configured to determine which outlet is currently in use and adjust the degree of aerosolisation accordingly.

[0175] Additionally, while it has been described above that the mouthpiece 26 forms a part of the outer housing 21 and/or is coupled to the outer housing 21, it should be appreciated that in some implementations the mouthpiece 26 may form a part of the article 4. This may particularly be the case when the article 4 comprises a chamber through which air and/or aerosol may pass, where the chamber includes the aerosol generating material. In these implementations, the article 4 is placed into the receptacle 25 and protrudes from the receptacle 25 such that the mouthpiece of the article extends from the aerosol provision device 2. In these instances, the receptacle 25 comprises an opening through which the mouthpiece 26 protrudes. The opening in these implementations may be referred to as the outlet 28 of the device 2, and hence the control circuitry 23 can be configured to adjust the heating profile of a portion of aerosol generating material on the basis of the distance from the outlet 28 of the device 2 as described above.

[0176] Figure 6 is a cross-sectional view through a schematic representation of an aerosol provision system 200 in accordance with another embodiment of the disclosure. The aerosol provision system 200 includes components that are broadly similar to those described in relation to Figure 1; however, the reference numbers have been increased by 200. For efficiency, the components having similar reference numbers should be understood to be broadly the same as their counterparts in Figures 1 and 2A to 2C unless otherwise stated.

[0177] The aerosol provision device 202 comprises an outer housing 221, a power source 222, control circuitry 223, induction work coils 224a, a receptacle 225, a mouthpiece end 226, an air inlet 227, an air outlet 228, a touch-sensitive panel 229, an inhalation sensor 230, and an end of use indicator 231.

[0178] The aerosol generating article 204 comprises a carrier component 242, aerosol generating material 244, and susceptor elements 244b, as shown in more detail in Figures 7A to 7C. Figure 7A is a top-down view of the article 4, Figure 7B is an end-on view along the longitudinal (length) axis of the article 204, and Figure 7C is a side-on view along the width axis of the article 204.

[0179] Figures 6 and 7 represent an aerosol provision system 200 which uses induction to heat the aerosol generating material 244 to generate an aerosol for inhalation.

[0180] In the described implementation, the aerosol generating component 224 is formed of two parts; namely, induction work coils 224a which are located in the aerosol provision device 202 and susceptors 224b which are located in the aerosol generating article 204. Accordingly, in this described implementation, each aerosol generating component 224 comprises elements that are distributed between the aerosol generating article 204 and the aerosol provision device 202.

[0181] Induction heating is a process in which an electrically-conductive object, referred to as a susceptor, is heated by penetrating the object with a varying magnetic field. The process is described by Faraday's law of induction and Ohm's law. An induction heater may comprise an electromagnet and a device for passing a varying electrical current, such as an alternating current, through the electromagnet. When the electromagnet and the object to be heated are suitably relatively positioned so that the resultant varying magnetic field produced by the electromagnet penetrates the object, one or more eddy currents are generated inside the object. The object has a resistance to the flow of electrical currents. Therefore, when such eddy currents are generated in the object, their flow against the electrical resistance of the object causes the object to be heated. This process is called Joule, ohmic, or resistive heating.

[0182] A susceptor is material that is heatable by penetration with a varying magnetic field, such as an alternating magnetic field. The heating material may be an electrically-conductive material, so that penetration thereof with a varying magnetic field causes induction heating of the heating material. The heating material may be magnetic material, so that penetration thereof with a varying magnetic field causes magnetic hysteresis heating of the heating material. The heating material may be both electrically-conductive and magnetic, so that the heating material is heatable by both heating mechanisms.

[0183] Magnetic hysteresis heating is a process in which an object made of a magnetic material is heated by penetrating the object with a varying magnetic field. A magnetic material can be considered to comprise many atomic-scale magnets, or magnetic dipoles. When a magnetic field penetrates such material, the magnetic dipoles align with the magnetic field. Therefore, when a varying magnetic field, such as an alternating magnetic field, for example as produced by an electromagnet, penetrates the magnetic material, the orientation of the magnetic dipoles changes with the varying applied magnetic field. Such magnetic dipole reorientation causes heat to be generated in the magnetic material.

[0184] When an object is both electrically-conductive and magnetic, penetrating the object with a varying magnetic field can cause both Joule heating and magnetic hysteresis heating in the object. Moreover, the use of magnetic material can strengthen the magnetic field, which can intensify the Joule heating.

[0185] In the described implementation, the susceptors 224b are formed from an aluminium foil, although it should be appreciated that other metallic and/or electrically conductive materials may be used in other implementations. As seen in Figure 7, the carrier component 242 comprises a number of susceptors 224b which correspond in size and location to the discrete portions of aerosol generating material 244 disposed on the surface of the carrier component 242. That is, the susceptors 224b have a similar width and length to the discrete portions of aerosol generating material 244.

[0186] The susceptors are shown embedded in the carrier component 242. However, in other implementations, the susceptors 224b may be placed on the surface of the carrier component 242.

[0187] The aerosol provision device 202 comprises a plurality of induction work coils 224a shown schematically in Figure 6. The work coils 224a are shown adjacent the receptacle 225, and are generally flat coils arranged such that the rotational axis about which a given coil is wound extends into the receptacle 225 and is broadly perpendicular to the plane of the carrier component 242 of the article 204. The exact windings are not shown in Figure 6 and it should be appreciated that any suitable induction coil may be used.

[0188] The control circuitry 223 comprises a mechanism to generate an alternating current which is passed to any one or more of the induction coils 224a. The alternating current generates an alternating magnetic field, as described above, which in turn causes the corresponding susceptor(s) 224b to heat up. The heat generated by the susceptor(s) 224b is transferred to the portions of aerosol generating material 244 accordingly.

[0189] As described above in relation to Figures 1 and 2A to 2C, the control circuitry 223 is configured to supply current to the work coils 224a in response to receiving signalling from the touch sensitive panel 229 and/or the inhalation sensor 230. Any of the techniques for selecting which heating elements 24 are heated by control circuitry 23 as described previously may analogously be applied to selecting which work coils 224a are energised (and thus which portions of aerosol generating material 244 are subsequently heated) in response to receiving signalling from the touch sensitive panel 229 and/or the inhalation sensor 230 by control circuitry 223 to generate an aerosol for user inhalation.

[0190] Although the above has described an induction heating aerosol provision system where the work coils 224a and susceptors 224b are distributed between the article 204 and device 202, an induction heating aerosol provision system may be provided where the work coils 224a and susceptors 224b are located solely within the device 202. For example, with reference to Figure 6, the susceptors 224b may be provided above the induction work coils 224a and arranged such that the susceptors 224b contact the lower surface of the carrier component 242 (in an analogous way to the aerosol provision system 1 shown in Figure 1).

[0191] Thus, Figure 6 describes a more concrete implementation where induction heating may be used in an aerosol provision device 202 to generate aerosol for user inhalation to which the techniques described in the present disclosure may be applied.

[0192] Although the above has described a system in which an array of aerosol generating components 24 (e.g., heater elements) are provided to energise the discrete portions of aerosol generating material, in other implementations, the article 4 and/or an aerosol generating component 24 may be configured to move relative to one another. That is, there may be fewer aerosol generating components 24 than discrete portions of aerosol generating material 44 provided on the carrier component 42 of the article 4, such that relative movement of the article 4 and aerosol generating components 24 is required in order to be able to individually energise each of the discrete portions of aerosol generating material 44. For example, a movable heating element 24 may be provided within the receptacle 25 such that the heating element 24 may move relative to the receptacle 25. In this way, the movable heating element 24 can be translated (e.g., in the width and length directions of the carrier component 42) such that the heating element 24 can be aligned with respective ones of the discrete portions of aerosol generating material 44. This approach may reduce the number of aerosol generating components 42 required while still offering a similar user experience.

[0193] Although the above has described implementations where discrete, spatially distinct portions of aerosol generating material 44 are deposited on a carrier component 42, it should be appreciated that in other implementations the aerosol generating material may not be provided in discrete, spatially distinct portions but instead be provided as a continuous sheet of aerosol generating material 44. In these implementations, certain regions of the sheet of aerosol generating material 44 may be selectively heated to generate aerosol in broadly the same manner as described above. However, regardless of whether or not the portions are spatially distinct, the present disclosure described heating (or otherwise aerosolising) portions of aerosol generating material 44. In particular, a region (corresponding to a portion of aerosol generating material) may be defined on the continuous sheet of aerosol generating material based on the dimensions of the heating element 24 (or more specifically a surface of the heating element 24 designed to increase in temperature). In this regard, the corresponding area of the heating element 24 when projected onto the sheet of aerosol generating material may be considered to define a region or portion of aerosol generating material. In accordance with the present disclosure, each region or portion of aerosol generating material may have a mass no greater than 20 mg, however the total continuous sheet may have a mass which is greater than 20 mg.

[0194] Although the above has described implementations where the device 2 can be configured or operated using the touch-sensitive panel 29 mounted on the device 2, the device 2 may instead be configured or controlled remotely. For example, the control circuitry 23 may be provided with a corresponding communication circuitry (e.g., Bluetooth) which enables the control circuitry 23 to communicate with a remote device such as a smartphone. Accordingly, the touch-sensitive panel 29 may, in effect, be implemented using an App or the like running on the smartphone. The smartphone may then transmit user inputs or configurations to the control circuitry 23, and the control circuitry 23 may be configured to operate on the basis of the received inputs or configurations.

[0195] Although the above has described implementations in which an aerosol is generated by energising (e.g., heating) aerosol generating material 44 which is subsequently inhaled by a user, it should be appreciated in some implementations that the generated aerosol may be passed through or over an aerosol modifying component to modify one or more properties of the aerosol before being inhaled by a user. For example, the aerosol provision device 2, 202 may comprise an air permeable insert (not shown) which is inserted in the airflow path downstream of the aerosol generating material 44 (for example, the insert may be positioned in the outlet 28). The insert may include a material which alters any one or more of the flavour, temperature, particle size, nicotine concentration, etc. of the aerosol as it passes through the insert before entering the user's mouth. For example, the insert may include tobacco or treated tobacco. Such systems may be referred to as hybrid systems. The insert may include any suitable aerosol modifying material, which may encompass the aerosol generating materials described above.

[0196] Although it has been described above that the heating elements 24 are arranged to provide heat to aerosol generating material (or portions thereof) at an operational temperature at which aerosol is generated from the portion of aerosol generating material, in some implementations, the heating elements 24 are arranged to pre-heat portions of the aerosol generating material to a pre-heat temperature (which is lower than the operational temperature). At the pre-heat temperature, a lower amount or no aerosol is generated when the portion is heated at the pre-heat temperature. In particular, in some implementations, the control circuity is configured to supply power / energy prior to the first predetermined period starting (i.e., prior to receiving the signalling signifying a user's intention to inhale aerosol, as in step S1 above). However, a lower amount of energy is required to raise the temperature of the aerosol generating material from the pre-heat temperature to the operational temperature, thus increasing the responsiveness of the system but at an increased total energy consumption. This may be particular suitable for relatively thicker portions of aerosol generating material, e.g., having thicknesses above 400 μm, which require relatively larger amounts of energy to be supplied in order to reach the operational temperature. In such implementations, the energy consumption (e.g., from the power source 22) may be comparably higher, however.

[0197] Although the above has described implementations in which the aerosol provision device 2 comprises an end of use indicator 31, it should be appreciated that the end of use indicator 31 may be provided by another device remote from the aerosol provision device 2. For example, in some implementations, the control circuitry 23 of the aerosol provision device 2 may comprise a communication mechanism which allows data transfer between the aerosol provision device 2 and a remote device such as a smartphone or smartwatch, for example. In these implementations, when the control circuitry 23 determines that the article 4 has reached its end of use, the control circuitry 23 is configured to transmit a signal to the remote device, and the remote device is configured to generate the alert signal (e.g., using the display of a smartphone). Other remote devices and other mechanisms for generating the alert signal may be used as described above.

[0198] In addition, when the portions of aerosol generating material are provided on a carrier component 42, the portions may, in some implementations, include weakened regions, e.g., through holes or areas of relatively thinner aerosol generating material, in a direction approximately perpendicular to the plane of the carrier component 42. This may be the case when the hottest part of the aerosol generating material is the area directly contacting the carrier component (in other words, in scenarios where the heat is applied primarily to the surface of the aerosol generating material that contacts the carrier component 42). Accordingly, the through holes may provide channels for the generated aerosol to escape and be released to the environment / the air flow through the device 2 rather than causing a potential build-up of aerosol between the carrier component 42 and the aerosol generating material 44. Such build-up of aerosol can reduce the heating efficiency of the system as the build-up of aerosol can, in some implementations, cause a lifting of the aerosol generating material from the carrier component 42 thus decreasing the efficiency of the heat transfer to the aerosol generating material. Each portion of aerosol generating material may be provided with one of more weakened regions as appropriate.

[0199] In some implementations, the article 4 may comprise an identifier, such as a readable bar code or an RFID tag or the like, and the aerosol provision device 2 comprises a corresponding reader. When the article is inserted into the receptacle 25 of the device 2, the device 2 may be configured to read the identifier on the article 4. The control circuitry 23 may be configured to either recognise the presence of the article 4 (and thus permit heating and/or reset an end of life indicator) or identify the type and/or the location of the portions of the aerosol generating material relative to the article 4. This may affect which portions the control circuitry 23 aerosolises and/or the way in which the portions are aerosolised, e.g., via adjusting the aerosol generation temperature and/or heating duration. Any suitable technique for recognising the article 4 may be employed.

[0200] Thus, there has been described an aerosol provision device for generating aerosol from an article comprising portions of aerosol generating material. The device comprises a receptacle for receiving the article comprising portions of aerosol generating material, and an outlet fluidly coupled to the receptacle. The at least one aerosol generating component is configured to perform an aerosolisation process on one or more of the portions of aerosol generating material when the article is received in the receptacle. The device further comprises control circuitry for controlling the aerosol generating component. The control circuitry is configured to cause the at least one aerosol generating component to generate an amount of aerosol from a respective portion of aerosol generating material based on the distance of the respective portion of aerosol generating material from the outlet. Accordingly the device can be enable to account for loss of the aerosol during transition to the user in dependence on the relative location of the aerosol generation. Also described is an aerosol provision system and a method for generating aerosol.

[0201] While the above described embodiments have in some respects focussed on some specific example aerosol provision systems, it will be appreciated the same principles can be applied for aerosol provision systems using other technologies. That is to say, the specific manner in which various aspects of the aerosol provision system function are not directly relevant to the principles underlying the examples described herein.

[0202] In order to address various issues and advance the art, this disclosure shows by way of illustration various embodiments in which the claimed invention(s) may be practiced. 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 to teach the claimed invention(s). 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 and that other embodiments may be utilised and modifications may be made without departing from the scope of the claims. Various embodiments may suitably comprise, consist of, or consist essentially of, various combinations of the disclosed elements, components, features, parts, steps, means, etc. other than those specifically described herein, and it will thus be appreciated that features of the dependent claims may be combined with features of the independent claims in combinations other than those explicitly set out in the claims.

Claims

1. An aerosol provision device (2, 202) for generating aerosol from an article (4, 204) comprising portions of aerosol generating material (44, 244), the device comprising:

   a receptacle (25, 225) for receiving the article comprising portions of aerosol generating material;
   an outlet (28, 228) fluidly coupled to the receptacle;
   at least one aerosol generating component (24, 224) configured to perform an aerosolisation process on one or more of the portions of aerosol generating material when the article is received in the receptacle; and
   control circuitry (23, 223) for controlling the aerosol generating component;

   characterised in that:

   the control circuitry is configured to cause the at least one aerosol generating component to generate an amount of aerosol from a respective portion of aerosol generating material based on the distance of the respective portion of aerosol generating material from the outlet; and
   the control circuitry is configured to cause the aerosol generating component to generate an increasing amount of aerosol from the respective portion of aerosol generating material the further away the respective portion is located from the outlet.

2. The aerosol provision device of claim 1, wherein the control circuitry is configured to generate an amount of aerosol from the respective portion of aerosol generating material such that, regardless of distance of the respective portion of aerosol generating material from the outlet, a substantially constant amount of aerosol passes through the outlet.

3. The aerosol provision device of any preceding claim, wherein the control circuitry is configured to cause the aerosol generating component to generate an amount of aerosol from the portion of aerosol generating material based on a function of the distance of the portion of the aerosol generating material from the outlet.

4. The aerosol provision device of any preceding claim, wherein the at least one aerosol generating component is at least one heating element (24) arranged to heat the portions of aerosol generating material.

5. The aerosol provision device of claim 4, wherein the control circuitry is configured to set the operational temperature for the at least one heating element based on the distance of the respective portion of aerosol generating material from the outlet.

6. The aerosol provision device of claim 5, wherein the control circuitry is configured to set the operational temperature of the heating elements closer to the outlet to be lower than the operational temperature of the heating elements further from the outlet.

7. The aerosol provision device of any one of claims 4, 5 or 6, wherein the control circuitry is configured to set the heating duration for the at least one heating element based on the distance of the respective portion of aerosol generating material from the outlet.

8. The aerosol provision device of any preceding claim, wherein the portions of aerosol generating material are arranged in an N x M array with respect to the outlet when received in the receptacle, having M portions arranged along a first axis extending away from the outlet and M portions arranged along a second axis perpendicular to the first axis, and wherein the control circuitry is configured to cause the aerosol generating component to generate X different amounts of aerosol, where X is determined according to:

$$X = \frac{2N+1+(-1)^{N+1}}{4} \text{ x } M.$$

9. The aerosol provision device of any preceding claim, wherein the at least one aerosol generating components comprises a plurality of aerosol generating components arranged in an N x M array, having M portions arranged along a first axis extending away from the outlet and M portions arranged along a second axis perpendicular to the first axis, and wherein the control circuitry is configured to cause the each of the plurality of aerosol generating components to operate at one of X different power levels, where X is determined according to:

$$X = \frac{2N+1+(-1)^{N+1}}{4} \text{ x } M.$$

10. An aerosol provision system (1, 200), the system comprising the aerosol provision device according to any of claims 1 to 9 and further comprising an article comprising portions of aerosol generating material.

11. The aerosol provision system of claim 10, wherein each portion of aerosol generating material is substantially the same.

12. The aerosol provision system of claim 10, wherein the properties of the aerosol generating material differ based on the distance from the outlet when the aerosol generating material is received in the receptacle.

13. The aerosol provision system of any of claims 10, 11 or 12, wherein the aerosol generating material is an amorphous solid.

14. A method of generating aerosol using an aerosol generating device (2, 202), the method comprising:

determining the distance between a portion of aerosol generating material (44, 244) and an outlet (28, 228) on the device through which generated aerosol can be inhaled by a user;
the method **characterised by**:

setting an amount of aerosol to be generated from the portion of the aerosol generating material based on the determined distance, wherein the amount of aerosol to be generated is set such that the amount of aerosol generated from the portion increases with the distance of the portion from the outlet; and
generating an aerosol from the portion of aerosol generating material.

Patentansprüche

1. Aerosolbereitstellungsvorrichtung (2, 202) zum Erzeugen von Aerosol aus einem Artikel (4, 204), der Abschnitte eines Aerosol-erzeugenden Materials (44, 244) umfasst, wobei die Vorrichtung umfasst:

einen Behälter (25, 225) zum Aufnehmen des Artikels, der Abschnitte von Aerosolerzeugendem Material umfasst;
einen Auslass (28, 228), der mit dem Behälter fluidgekoppelt ist;

mindestens eine Aerosol-erzeugende Komponente (24, 224), die so konfiguriert ist, dass sie einen Aerosolisierungsprozess an einem oder mehreren Abschnitten des Aerosol-erzeugenden Materials durchführt, wenn der Artikel in dem Behälter aufgenommen wird; und
einen Steuerschaltkreis (23, 223) zum Steuern der Aerosol-erzeugenden Komponente; **dadurch gekennzeichnet, dass**:

der Steuerschaltkreis so konfiguriert ist, dass er die mindestens eine Aerosol-erzeugende Komponente veranlasst, basierend auf der Entfernung des jeweiligen Abschnitts des Aerosol-erzeugenden Materials vom Auslass, eine Menge an Aerosol aus einem jeweiligen Abschnitt des Aerosol-erzeugenden Materials zu erzeugen; und
der Steuerschaltkreis so konfiguriert ist, dass er die Aerosol-erzeugende Komponente veranlasst, aus dem jeweiligen Abschnitt des Aerosol-erzeugenden Materials eine zunehmende Menge an Aerosol zu erzeugen, je weiter der jeweilige Abschnitt vom Auslass entfernt ist.

2. Aerosolbereitstellungsvorrichtung nach Anspruch 1, wobei der Steuerschaltkreis so konfiguriert ist, dass er aus dem jeweiligen Abschnitt des Aerosol-erzeugenden Materials eine Menge an Aerosol erzeugt, sodass ungeachtet der Entfernung des jeweiligen Abschnitts des Aerosol-erzeugenden Materials vom Auslass eine im Wesentlichen konstante Menge an Aerosol durch den Auslass verläuft.

3. Aerosolbereitstellungsvorrichtung nach einem vorstehenden Anspruch, wobei der Steuerschaltkreis so konfiguriert ist, dass er die Aerosol-erzeugende Komponente veranlasst, aus dem Abschnitt des Aerosol-erzeugenden Materials eine Menge an Aerosol basierend auf einer Funktion der Entfernung des Abschnitts des Aerosol-erzeugenden Materials vom Auslass zu erzeugen.

4. Aerosolbereitstellungsvorrichtung nach einem vorstehenden Anspruch, wobei die mindestens eine Aerosol-erzeugende Komponente mindestens ein Heizelement (24) ist, das angeordnet ist, um die Abschnitte des Aerosol-erzeugenden Materials zu erhitzen.

5. Aerosolbereitstellungsvorrichtung nach Anspruch 4, wobei der Steuerschaltkreis so konfiguriert ist, dass er die Betriebstemperatur für das mindestens eine Heizelement basierend auf der Entfernung des jeweiligen Abschnitts des Aerosol-erzeugenden Materials vom Auslass einstellt.

6. Aerosolbereitstellungsvorrichtung nach Anspruch 5, wobei der Steuerschaltkreis so konfiguriert ist, dass er die Betriebstemperatur der Heizelemente, die näher am Auslass sind, niedriger einstellt als die Betriebstemperatur der Heizelemente, die weiter vom Auslass entfernt sind.

7. Aerosolbereitstellungsvorrichtung nach einem der Ansprüche 4, 5 oder 6, wobei der Steuerschaltkreis so konfiguriert ist, dass er die Heizdauer für das mindestens eine Heizelement basierend auf der Entfernung des jeweiligen Abschnitts des Aerosol-erzeugenden Materials vom Auslass einstellt.

8. Aerosolbereitstellungsvorrichtung nach einem vorstehenden Anspruch, wobei die Abschnitte des Aerosol-erzeugenden Materials in einer N x M-Anordnung in Bezug auf den Auslass angeordnet sind, wenn sie in dem Behälter aufgenommen sind, wobei M Abschnitte entlang einer ersten Achse angeordnet sind, die sich vom Auslass weg erstreckt, und M Abschnitte entlang einer zweiten Achse angeordnet sind, die senkrecht zur ersten Achse verläuft, und wobei der Steuerschaltkreis so konfiguriert ist, dass er die Aerosol-erzeugende Komponente veranlasst, X unterschiedliche Mengen an Aerosol zu erzeugen, wobei X bestimmt wird gemäß:

$$X = \frac{2N + 1 + (-1)^{N+1}}{4} \times M.$$

9. Aerosolbereitstellungsvorrichtung nach einem vorstehenden Anspruch, wobei die mindestens eine Aerosol-erzeugende Komponente eine Vielzahl von Aerosol-erzeugenden Komponenten umfasst, die in einer N x M-Anordnung angeordnet sind, wobei M Abschnitte entlang einer ersten Achse angeordnet sind, die sich vom Auslass weg erstreckt, und M Abschnitte entlang einer zweiten Achse angeordnet sind, die senkrecht zur ersten Achse verläuft, und wobei der Steuerschaltkreis so konfiguriert ist, dass er jede der Vielzahl von Aerosol-erzeugenden Komponenten veranlasst, auf einer von X verschiedenen Leistungsstufen zu arbeiten, wobei X bestimmt wird gemäß:

$$X = \frac{2N + 1 + (-1)^{N+1}}{4} \times M.$$

10. Aerosolbereitstellungssystem (1, 200), wobei das System die Aerosolbereitstellungsvorrichtung nach einem der Ansprüche 1 bis 9 umfasst und weiter einen Artikel umfasst, der Abschnitte eines Aerosol-erzeugenden Materials umfasst.

11. Aerosolbereitstellungssystem nach Anspruch 10,

wobei jeder Abschnitt des Aerosol-erzeugenden Materials im Wesentlichen gleich ist.

12. Aerosolbereitstellungssystem nach Anspruch 10, wobei sich die Eigenschaften des Aerosol-erzeugenden Materials je nach Entfernung vom Auslass unterscheiden, wenn das Aerosol-erzeugende Material in dem Behälter aufgenommen ist.

13. Aerosolbereitstellungssystem nach einem der Ansprüche 10, 11 oder 12, wobei das Aerosol-erzeugende Material ein amorpher Feststoff ist.

14. Verfahren zum Erzeugen von Aerosol unter Verwendung einer Aerosolerzeugungsvorrichtung (2, 202), wobei das Verfahren umfasst:

Bestimmen der Entfernung zwischen einem Abschnitt des Aerosol-erzeugenden Materials (44, 244) und einem Auslass (28, 228) an der Vorrichtung, durch den erzeugtes Aerosol von einem Benutzer inhaliert werden kann;
wobei das Verfahren **gekennzeichnet ist durch**:

Einstellen einer Menge an Aerosol, die von dem Abschnitt des Aerosol-erzeugenden Materials zu erzeugen ist, basierend auf der bestimmten Entfernung, wobei die Menge an Aerosol, die zu erzeugen ist, eingestellt wird, sodass die Menge an Aerosol, die von dem Abschnitt erzeugt wird, mit der Entfernung des Abschnitts vom Auslass zunimmt; und
Erzeugen von Aerosol von dem Abschnitt des Aerosol erzeugenden Materials.

Revendications

1. Dispositif de fourniture d'aérosol (2, 202) pour générer un aérosol à partir d'un article (4, 204) comprenant des parties de matériau générateur d'aérosol (44, 244), le dispositif comprenant :

un réceptacle (25, 225) destiné à recevoir l'article comprenant des parties de matériau générateur d'aérosol ;
une sortie (28, 228) couplée fluidiquement au réceptacle ;
au moins un composant générateur d'aérosol (24, 224) configuré pour effectuer un processus d'aérosolisation sur une ou plusieurs des parties du matériau générateur d'aérosol lorsque l'article est reçu dans le réceptacle ; et
un ensemble de circuits de commande (23, 223) pour commander le composant générateur d'aérosol ; **caractérisé en ce que** :

l'ensemble de circuits de commande est configuré pour amener le au moins un composant générateur d'aérosol à générer une quantité d'aérosol à partir d'une partie respective du matériau générateur d'aérosol en fonction de la distance de la partie respective du matériau générateur d'aérosol par rapport à la sortie ; et
l'ensemble de circuits de commande est configuré pour amener le composant générateur d'aérosol à générer une quantité croissante d'aérosol à partir de la partie respective du matériau générateur d'aérosol à mesure que la partie respective est éloignée de la sortie.

2. Dispositif de fourniture d'aérosol selon la revendication 1, dans lequel l'ensemble de circuits de commande est configuré pour générer une quantité d'aérosol à partir de la partie respective du matériau générateur d'aérosol de telle sorte que, quelle que soit la distance de la partie respective du matériau générateur d'aérosol par rapport à la sortie, une quantité sensiblement constante d'aérosol passe à travers la sortie.

3. Dispositif de fourniture d'aérosol selon une quelconque revendication précédente, dans lequel l'ensemble de circuits de commande est configuré pour amener le composant générateur d'aérosol à générer une quantité d'aérosol à partir de la partie de matériau générateur d'aérosol sur la base d'une fonction de la distance de la partie du matériau générateur d'aérosol par rapport à la sortie.

4. Dispositif de fourniture d'aérosol selon une quelconque revendication précédente, dans lequel le au moins un composant générateur d'aérosol est au moins un élément chauffant (24) conçu pour chauffer les parties de matériau générateur d'aérosol.

5. Dispositif de fourniture d'aérosol selon la revendication 4, dans lequel l'ensemble de circuits de commande est configuré pour régler la température de fonctionnement pour le au moins un élément chauffant en fonction de la distance de la partie respective du matériau générateur d'aérosol par rapport à la sortie.

6. Dispositif de fourniture d'aérosol selon la revendication 5, dans lequel l'ensemble de circuits de commande est configuré pour régler la température de fonctionnement des éléments chauffants plus proches de la sortie de manière à ce qu'elle soit inférieure à la température de fonctionnement des éléments chauffants plus éloignés de la sortie.

7. Dispositif de fourniture d'aérosol selon l'une quelconque des revendications 4, 5 ou 6, dans lequel l'ensemble de circuits de commande est configuré pour régler la durée de chauffage pour le au moins un élément chauffant en fonction de la distance de la partie respective du matériau générateur d'aérosol par rapport à la sortie.

8. Dispositif de fourniture d'aérosol selon une quelconque revendication précédente, dans lequel les parties de matériau générateur d'aérosol sont agencées en un réseau N x M par rapport à la sortie lorsqu'elles sont reçues dans le réceptacle, présentant M parties agencées le long d'un premier axe s'éloignant de la sortie et M parties agencées le long d'un second axe perpendiculaire au premier axe, et dans lequel l'ensemble de circuits de commande est configuré pour amener le composant générateur d'aérosol à générer X quantités différentes d'aérosol, X étant déterminé selon :

$$X = \frac{2N + 1 + (-1)^{N+1}}{4} \text{ x M.}$$

9. Dispositif de fourniture d'aérosol selon une quelconque revendication précédente, dans lequel le au moins un composant générateur d'aérosol comprend une pluralité de composants générateurs d'aérosol agencés en un réseau N x M, présentant M parties agencées le long d'un premier axe s'éloignant de la sortie et M parties agencées le long d'un second axe perpendiculaire au premier axe, et dans lequel l'ensemble de circuits de commande est configuré pour amener chacun de la pluralité de composants générateurs d'aérosol à fonctionner à l'un des X niveaux de puissance différents, X étant déterminé selon :

$$X = \frac{2N + 1 + (-1)^{N+1}}{4} \text{ x M.}$$

10. Système de fourniture d'aérosol (1, 200), le système comprenant le dispositif de fourniture d'aérosol selon l'une quelconque des revendications 1 à 9 et comprenant en outre un article comprenant des parties de matériau générateur d'aérosol.

11. Système de fourniture d'aérosol selon la revendication 10, dans lequel chaque partie de matériau générateur d'aérosol est sensiblement la même.

12. Système de fourniture d'aérosol selon la revendication 10, dans lequel les propriétés du matériau générateur d'aérosol diffèrent en fonction de la distance par rapport à la sortie lorsque le matériau générateur d'aérosol est reçu dans le réceptacle.

13. Système de fourniture d'aérosol selon l'une quelconque des revendications 10, 11 ou 12, dans lequel le matériau générateur d'aérosol est un solide amorphe.

14. Procédé de génération d'aérosol à l'aide d'un dispositif de génération d'aérosol (2, 202), le procédé comprenant :

la détermination de la distance entre une partie du matériau générateur d'aérosol (44, 244) et une sortie (28, 228) sur le dispositif à travers laquelle l'aérosol généré peut être inhalé par un utilisateur ;
le procédé étant **caractérisé par** :

l'obtention d'une quantité d'aérosol à générer par la partie du matériau générateur d'aérosol en fonction de la distance déterminée, dans lequel la quantité d'aérosol à générer est réglée de telle sorte que la quantité d'aérosol générée à partir de la partie augmente avec la distance de la partie par rapport à la sortie ; et
la génération d'un aérosol à partir de la partie du matériau générateur d'aérosol.

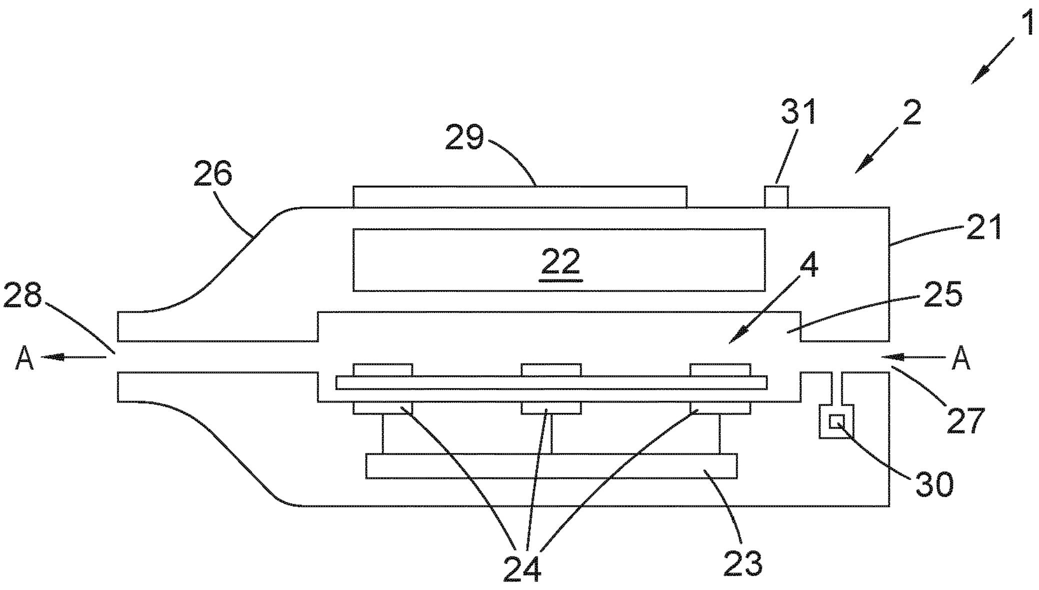


Fig. 1

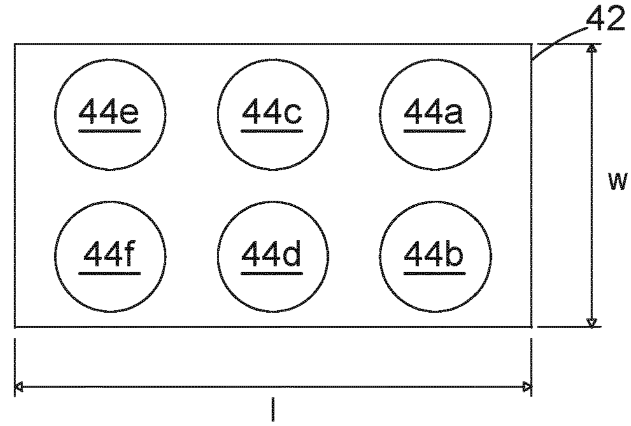


Fig. 2A

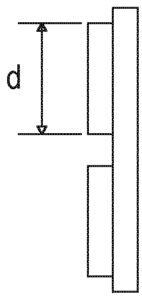


Fig. 2B

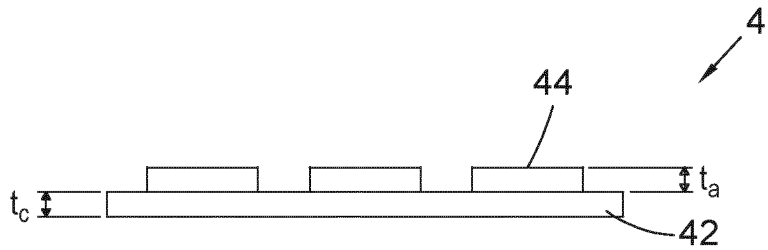
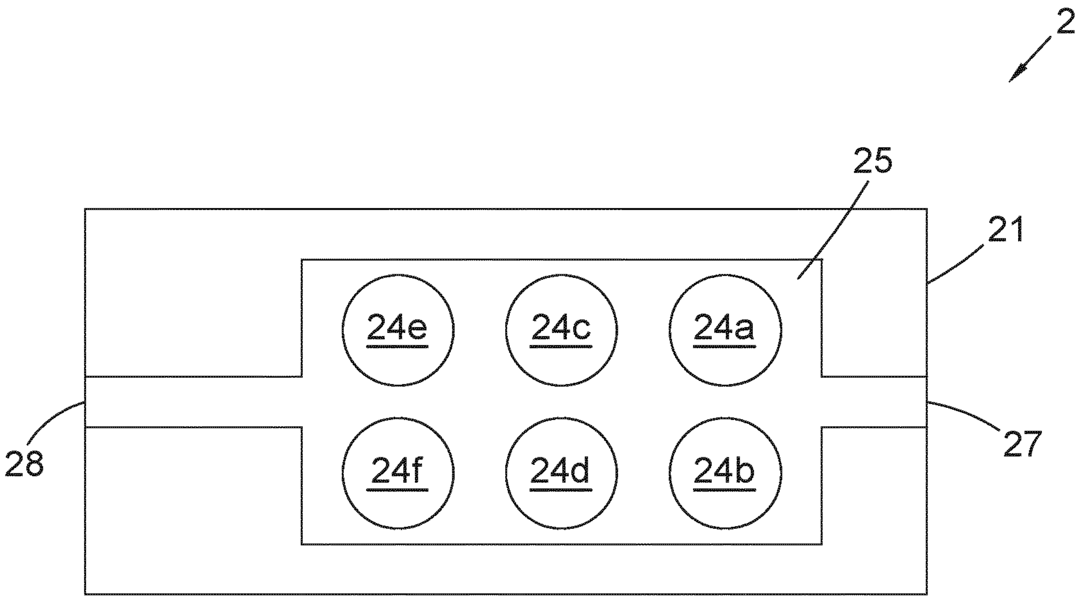


Fig. 2C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24c
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27
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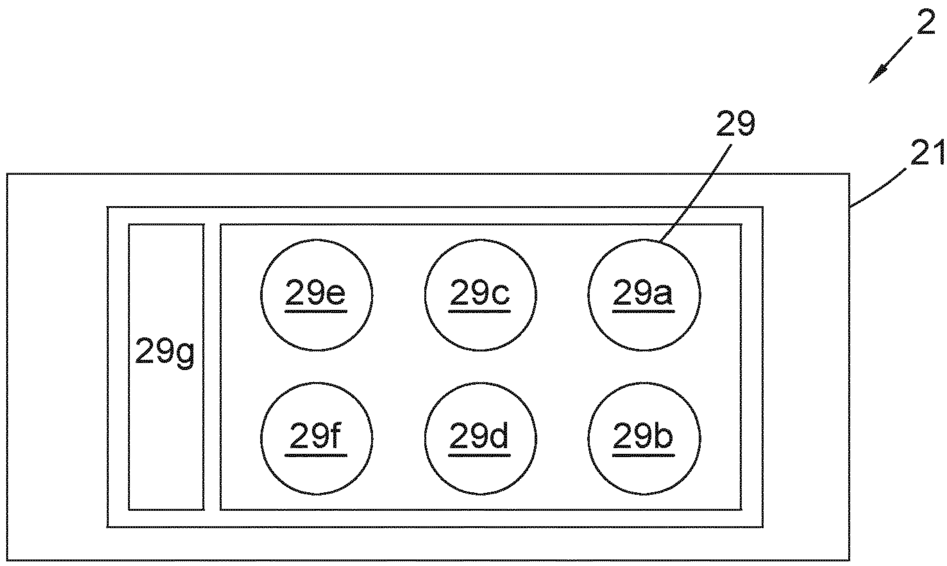
24d
24b

Fig. 3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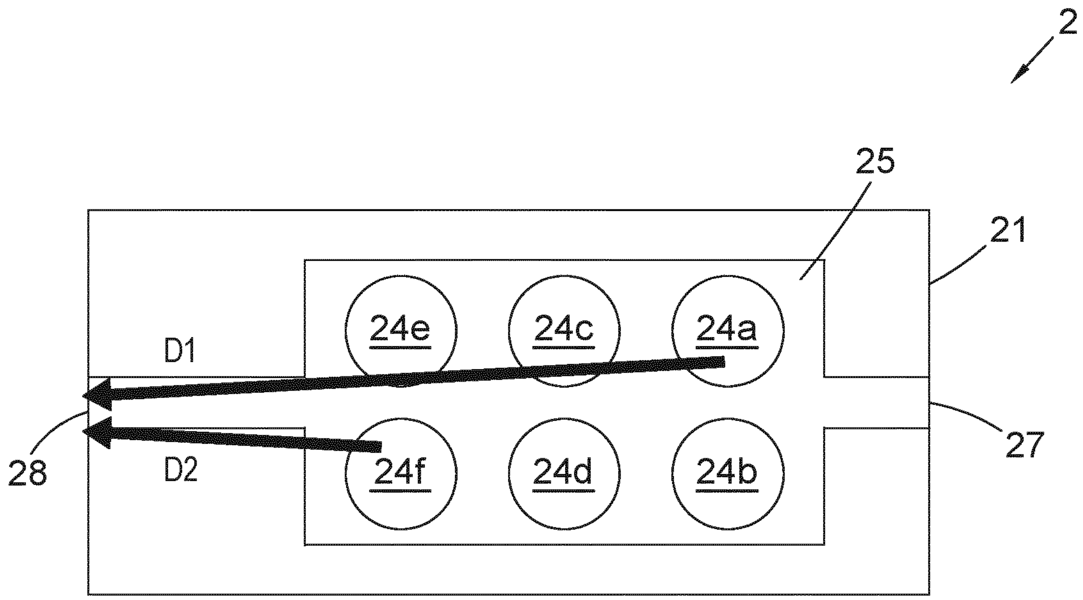
21
29e
29c
29a
29g
29f
29d
29b

Fig. 4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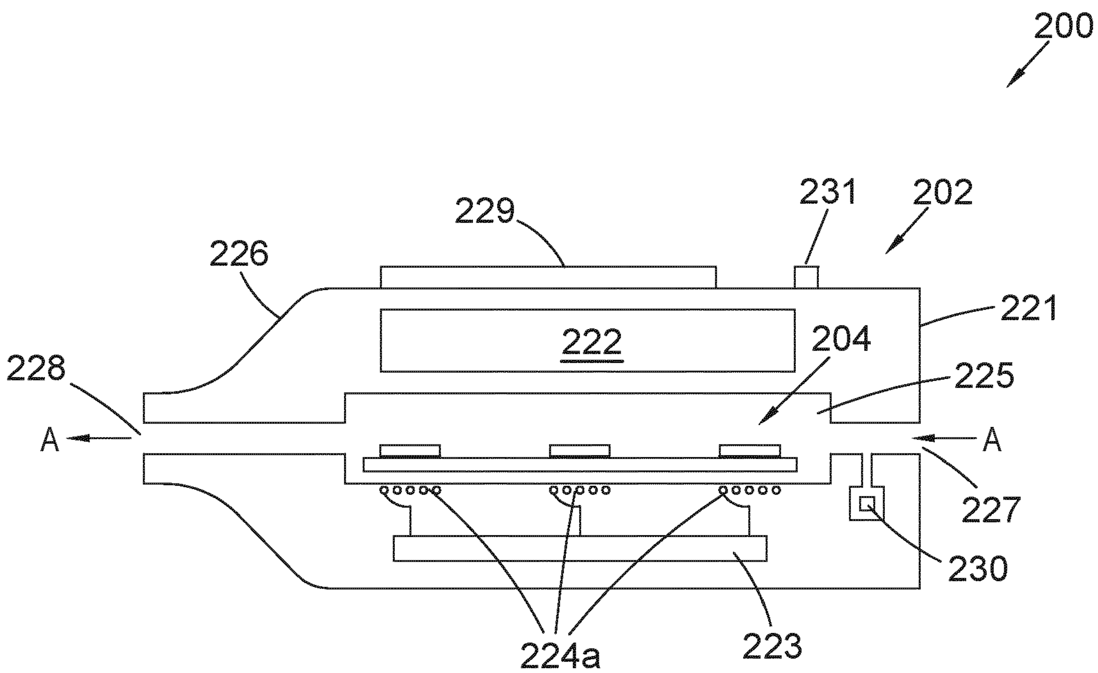
24f
24d
24b

Fig. 5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224a
223

Fig. 6

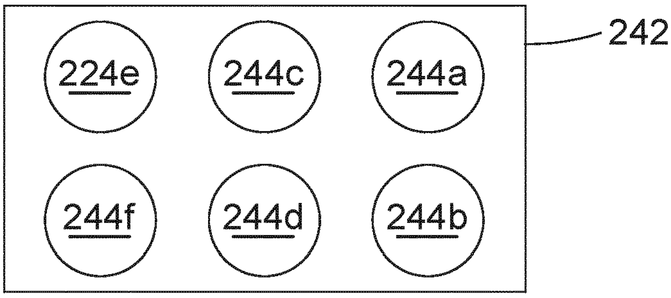

Fig. 7A

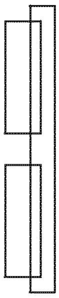

Fig. 7B

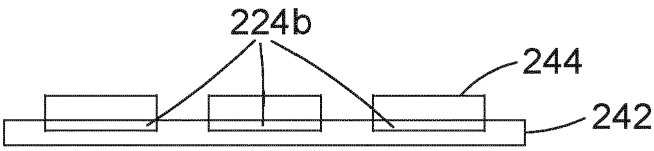

Fig. 7C

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2016120344 A **[0005]**
- US 20190001087 A **[0006]**
- US 20160022930 A **[0007]**
- WO 2019215213 A **[0008]**