

(19)



(11)

EP 4 681 565 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
21.01.2026 Bulletin 2026/04

(51) International Patent Classification (IPC):
A24F 40/485^(2020.01)

(21) Application number: **24188565.6**

(52) Cooperative Patent Classification (CPC):
A24F 40/485; A24F 40/10

(22) Date of filing: **15.07.2024**

(84) Designated Contracting States:
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC ME MK MT NL
NO PL PT RO RS SE SI SK SM TR**

Designated Extension States:

BA

Designated Validation States:

GE KH MA MD TN

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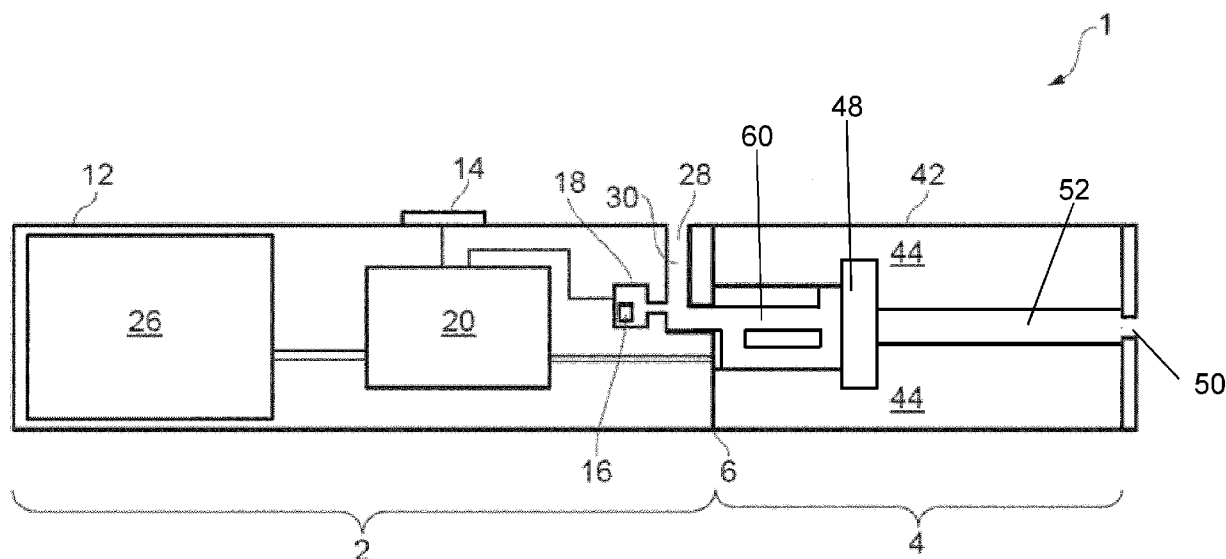
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(54) AEROSOL PROVISION SYSTEM AND METHOD

(57) Described is an aerosol provision system for generating aerosol from aerosol-generating material, the aerosol provision system including an aerosol-generating material storage portion for storing an aerosol-generating material; an aerosol generator for generating aerosol from aerosol-generating material from the aerosol-generating material storage portion; an air path extending from an air inlet to an outlet, wherein the aerosol generator is arranged at least partly in the air path; and an air path direction adjustor configured to selectively adjust

the direction along which air flows in the vicinity of the aerosol generator. The air path direction adjustor is configured to switch between a first configuration in which air in the vicinity of the aerosol generator flows in a first direction relative to the aerosol generator and a second configuration in which air in the vicinity of the aerosol generator flows in a second direction relative to the aerosol generator, the first direction being different to the second direction. Also described is an article and a method.

**FIG. 1**

Description

Field

[0001] The present disclosure relates to electronic aerosol provision systems such as nicotine delivery systems (e.g. electronic cigarettes and the like).

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 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] Typically, such aerosol provision systems deliver aerosols having certain characteristics that may be a function of different aspects of the aerosol provision system itself and/or of the user's inhalation on the aerosol provision system. However, such characteristics may be inherent to the aerosol provision system, and thus not capable of being changed in order to meet a particular user's demands or preferences. Alternatively, some characteristics may vary depending on the user's inhalation of the aerosol provision system, and therefore although variable, are not necessarily variable in a reliable or consistent manner.

[0004] Various approaches are described which seek to help address some of these issues.

Summary

[0005] According to a first aspect of certain embodiments there is provided an aerosol provision system for generating aerosol from aerosol-generating material, the aerosol provision system including an aerosol-generating material storage portion for storing an aerosol-generating material; an aerosol generator for generating aerosol from aerosol-generating material from the aero-

sol-generating material storage portion; an air path extending from an air inlet to an outlet, wherein the aerosol generator is arranged at least partly in the air path; and an air path direction adjustor configured to selectively adjust the direction along which air flows in the vicinity of the aerosol generator. The air path direction adjustor is configured to switch between a first configuration in which air in the vicinity of the aerosol generator flows in a first direction relative to the aerosol generator and a second configuration in which air in the vicinity of the aerosol generator flows in a second direction relative to the aerosol generator, the first direction being different to the second direction.

[0006] In some examples, the first and second configurations are set such that aerosol generated and delivered to the user when the air path direction adjustor is in the first configuration has a different average particle size to aerosol generated and delivered to the user when the air path direction adjustor is in the second configuration.

[0007] In some examples, the first direction is a direction that is at, or substantially at, 90° to the second direction.

[0008] In some examples, the first direction is a direction that is perpendicular, or substantially perpendicular, to a plane of the aerosol generator that, in use, is configured to generate aerosol such that the air flow along the first direction is perpendicular to, or substantially perpendicular, to the plane of the aerosol generator.

[0009] In some examples, when the air path direction adjustor is in the first configuration, the air path is arranged such that the flow of air along the air path impinges upon the plane of the aerosol generator that, in use, is configured to generate aerosol.

[0010] In some examples, the second direction is a direction that is parallel, or substantially parallel, to a plane of the aerosol generator that, in use, is configured to generate aerosol such that the air flow along the second direction is parallel, or substantially parallel, to the plane of the aerosol generator.

[0011] In some examples, the air path direction adjustor is, or comprises, a component that is moveably mounted with respect to a housing of the aerosol provision system, and wherein the air path direction adjustor is in the first configuration when the air path direction adjustor is moved to a first position and is in the second configuration when the air path direction adjustor is moved to a second position.

[0012] In some examples, the air path direction adjustor comprises a first subsection of the air path and a second subsection of the air path, wherein the air path direction adjustor is configured to select between fluidly coupling the first subsection of the air path to the air path and fluidly coupling the second subsection of the air path to the air path, wherein the first and second subsections of the air path are different from one another.

[0013] In some examples, the air path direction adjustor comprises the first and second subsections of the air path such that, in use, air flows through the air path

direction adjustor along either of the first or second sub-sections of the air path.

[0014] In some examples, the air path direction adjustor is, or comprises, a rotatable component, and wherein the rotatable component is capable of being rotated about an axis of the rotatable component to the first and second positions.

[0015] In some examples, the rotatable component is a cylinder, and wherein the cylinder comprises a baffle extending from one side of the cylinder, wherein the baffle is arranged such that the baffle guides the flow of air in the air path in either of the first configuration or the second configuration such that the flow of air is substantially along the first direction or second direction.

[0016] In some examples, the air path direction adjustor comprises or is coupled to an actuator capable of moving the air path direction adjustor between the first and second positions.

[0017] In some examples, the aerosol provision system comprises a cartridge and an aerosol provision device, wherein the cartridge and the aerosol provision device are releasably engaged with one another, wherein the cartridge comprises the aerosol-generating material storage portion, the aerosol generator, and the air path direction adjustor, wherein the air path direction adjustor is accessible to a user when the cartridge is disengaged with the aerosol provision device.

[0018] In some examples, the air path direction adjustor is configured to be capable of switching to a third configuration between the first configuration and the second configuration, in which air in the vicinity of the aerosol generator is able to flow in the first direction relative to the aerosol generator and in the second direction relative to the aerosol generator.

[0019] In some examples, the air path direction adjustor is capable of varying the proportion of air flowing along the first direction and the second direction in the vicinity of the aerosol generator in order to adjust the average particle size of the aerosol generated.

[0020] According to a second aspect of certain embodiments there is provided an article for use with an aerosol provision device, wherein the article is adapted to releasably couple to the aerosol provision device to form an aerosol provision system for generating aerosol from aerosol-generating material, the article including an aerosol-generating material storage portion for storing an aerosol-generating material; an aerosol generator for generating aerosol from aerosol-generating material from the aerosol-generating material storage portion; an air path extending from an air inlet to an outlet, wherein the aerosol generator is arranged at least partly in the air path; and an air path direction adjustor configured to selectively adjust the direction along which air flows in the vicinity of the aerosol generator. The air path direction adjustor is configured to switch between a first configuration in which air in the vicinity of the aerosol generator flows in a first direction relative to the aerosol generator and a second configuration in which air in the vicinity of

the aerosol generator flows in a second direction relative to the aerosol generator, the first direction being different to the second direction.

[0021] According to a third aspect of certain embodiments there is provided a method for adjusting the configuration of an air path direction adjustor of an aerosol provision system, the aerosol provision system comprising an aerosol-generating material storage portion for storing an aerosol-generating material, an aerosol generator for generating aerosol from aerosol-generating material from the aerosol-generating material storage portion, and an air path extending from an air inlet to an outlet, wherein the aerosol generator is arranged at least partly in the air path, wherein the method including adjusting the direction along which air flows in the vicinity of the aerosol generator using the air path direction adjustor by switching between a first configuration of the air path direction adjustor in which air in the vicinity of the aerosol generator flows in a first direction relative to the aerosol generator and a second configuration of the air path direction adjustor in which air in the vicinity of the aerosol generator flows in a second direction relative to the aerosol generator, the first direction being different to the second direction.

[0022] 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

[0023] 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 schematic cross-sectional view of an aerosol provision system comprised of an aerosol provision device and a cartridge in accordance with aspects of the present disclosure, wherein the aerosol provision system comprises an air path direction adjustor according to a first aspect of the present disclosure;

Figure 2 is a schematic cross-sectional view of the aerosol provision system of Figure 1 showing the air path direction adjustor in more detail, and in particular, where the air path direction adjustor is provided in a first configuration in which the air flow in the vicinity of the aerosol generator is along a first direction;

Figure 3 is a schematic cross-sectional view of the aerosol provision system of Figure 1 showing the air path direction adjustor in more detail, and in particular, where the air path direction adjustor is pro-

vided in a second configuration in which the air flow in the vicinity of the aerosol generator is along a second direction, different to the first direction;

Figure 4 schematically shows the air path direction adjustor of Figures 2 and 3, where the air path direction adjustor is in a further configuration that is part way between the first and second configurations of Figures 2 and 3;

Figure 5 is a perspective, exploded view of a cartridge of an aerosol provision system in accordance with aspects of the present disclosure, wherein the cartridge comprises an air path direction adjustor according to a second aspect of the present disclosure;

Figure 6 is a schematic perspective view of the cartridge of Figure 5 showing the air path direction adjustor in more detail, and in particular, where the air path direction adjustor is provided in a first configuration in which the air flow in the vicinity of the aerosol generator is along a first direction;

Figure 7 is a schematic perspective view of the cartridge of Figure 5 showing the air path direction adjustor in more detail, and in particular, where the air path direction adjustor is provided in a second configuration in which the air flow in the vicinity of the aerosol generator is along a second direction, different to the first direction;

Figure 8 is an example graph showing the average particle sizes of generated aerosol obtained using an aerosol provision system implementing a similar cartridge design to

Figures 5 to 7, wherein the graph of Figure 8 show the average particle sizes of the aerosol obtained when the air path direction adjustor is in the first configuration and when the air path direction adjustor is in the second configuration;

Figure 9 is a perspective view of a modification to the air path direction adjustor of Figures 5 to 7, wherein the air path direction adjustor comprises a baffle to help facilitate the flow of air along a common direction in the second configuration; and

Figure 10 is an example method for adjusting the configuration of the air path direction adjustor according to aspects of the present disclosure.

Detailed Description

[0024] Aspects and features of certain examples and embodiments are discussed / described herein. Some aspects and features of certain examples and embodi-

ments 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.

[0025] As used herein, the term "delivery system" is intended to encompass systems that deliver at least one substance to a user, and includes:

non-combustible aerosol provision systems that release compounds from an aerosol-generating material without combusting the aerosol-generating material, such as electronic cigarettes, tobacco heating products, and hybrid systems to generate aerosol using a combination of aerosol-generating materials.

[0026] According to the present disclosure, a "non-combustible" aerosol provision system is one where a constituent aerosol-generating material of the aerosol provision system (or component thereof) is not combusted or burned in order to facilitate delivery of at least one substance to a user.

[0027] In some embodiments, the non-combustible aerosol provision system is a powered non-combustible aerosol provision system.

[0028] In some embodiments, the non-combustible aerosol provision system is an electronic cigarette, also known as a vaping device, electronic cigarette or electronic nicotine delivery system (END), although it is noted that the presence of nicotine in the aerosol-generating material is not a requirement. Throughout the following description the term "e-cigarette" is sometimes used but this term may be used interchangeably with aerosol (vapour) provision system.

[0029] In some embodiments, the non-combustible aerosol provision system is an aerosol-generating material heating system, also known as a heat-not-burn system. An example of such a system is a tobacco heating system.

[0030] In some embodiments, the non-combustible aerosol provision system is a hybrid system to generate aerosol using a combination of aerosol-generating materials, one or a plurality of which may be heated. Each of the aerosol-generating materials may be, for example, in the form of a solid, liquid or gel and may or may not contain nicotine. In some embodiments, the hybrid system comprises a liquid or gel aerosol-generating material and a solid aerosol-generating material. The solid aerosol-generating material may comprise, for example, tobacco or a non-tobacco product.

[0031] Aerosol-generating material is a material that is capable of generating aerosol, for example when heated, irradiated or energized in any other way. Aerosol-generating material may, for example, be in the form of a solid, liquid or gel which may or may not contain an active substance and/or flavourants.

[0032] The aerosol-generating material may comprise one or more active substances and/or flavours, one or

more aerosol-former materials, and optionally one or more other functional material.

[0033] The aerosol-generating material may comprise a binder, such as a gelling agent, and an aerosol former. Optionally, a substance to be delivered and/or filler may also be present. Optionally, a solvent, such as water, is also present and one or more other components of the aerosol-generating material may or may not be soluble in the solvent. In some embodiments, the aerosol-generating material is substantially free from botanical material. In particular, in some embodiments, the aerosol-generating material is substantially tobacco free.

[0034] The aerosol-generating material may comprise or be in the form of an aerosol-generating film. The aerosol-generating film may comprise a binder, such as a gelling agent, and an aerosol former. Optionally, a substance to be delivered and/or filler may also be present. The aerosol-generating film may be substantially free from botanical material. In particular, in some embodiments, the aerosol-generating material is substantially tobacco free.

[0035] The aerosol-generating film may have a thickness of about 0.015 mm to about 1 mm. For example, the thickness may be in the range of about 0.05 mm, 0.1 mm or 0.15 mm to about 0.5 mm or 0.3 mm.

[0036] The aerosol-generating film may be continuous. For example, the film may comprise or be a continuous sheet of material. The sheet may be in the form of a wrapper, it may be gathered to form a gathered sheet or it may be shredded to form a shredded sheet. The shredded sheet may comprise one or more strands or strips of aerosol-generating material.

[0037] The aerosol-generating film may be discontinuous. For example, the aerosol-generating film may comprise one or more discrete portions or regions of aerosol-generating material, such as dots, stripes or lines, which may be supported on a support. In such embodiments, the support may be planar or non-planar.

[0038] The aerosol-generating film may be formed by combining a binder, such as a gelling agent, with a solvent, such as water, an aerosol-former and one or more other components, such as one or more substances to be delivered, to form a slurry and then heating the slurry to volatilise at least some of the solvent to form the aerosol-generating film.

[0039] The slurry may be heated to remove at least about 60 wt%, 70 wt%, 80 wt%, 85 wt% or 90 wt% of the solvent.

[0040] The aerosol-generating material may comprise or be an "amorphous solid". In some embodiments, the aerosol-generating material comprises an aerosol-generating film that is an amorphous solid. The amorphous solid may be a "monolithic solid". The amorphous solid may be substantially non-fibrous. In some embodiments, 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 embodiments, the amorphous solid may, for example, comprise from about 50wt%,

60wt% or 70wt% of amorphous solid, to about 90wt%, 95wt% or 100wt% of amorphous solid.

[0041] The amorphous solid may be substantially free from botanical material. The amorphous solid may be substantially tobacco free.

[0042] In some embodiments, the substance to be delivered comprises an active substance.

[0043] The active substance as used herein may be a physiologically active material, which is a material intended to achieve or enhance a physiological response. The active substance may for example be selected from nutraceuticals, nootropics, psychoactives. The active substance may be naturally occurring or synthetically obtained. The active substance 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 substance may comprise one or more constituents, derivatives or extracts of tobacco, cannabis or another botanical.

[0044] In one embodiment the active substance is a legally permissible recreational drug.

[0045] In some implementations, the active substance comprises nicotine. In some implementations, the active substance comprises caffeine, melatonin or vitamin B12.

[0046] As noted herein, the active substance may comprise one or more constituents, derivatives or extracts of cannabis, such as one or more cannabinoids or terpenes.

[0047] The active substance may be CBD or a derivative thereof.

[0048] As noted herein, the active substance 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, cassia, 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 Arvensis*, *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*.

[0049] In some embodiments, the active substance comprises or is derived from one or more botanicals or constituents, derivatives or extracts thereof and the botanical is tobacco.

[0050] In some embodiments, the active substance comprises or is derived from one or more botanicals or constituents, derivatives or extracts thereof and the botanical is selected from eucalyptus, star anise, cocoa and hemp.

[0051] In some embodiments, the active substance comprises or derived from one or more botanicals or constituents, derivatives or extracts thereof and the botanical is selected from rooibos and fennel.

[0052] As used herein, the terms "flavour" and "flavourant" refer to materials which, where local regulations permit, may be used to create a desired taste or aroma 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, cascarrilla, 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 there-

of. They may be in any suitable form, for example, liquid such as an oil, solid such as a powder, or gas.

[0053] 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.

[0054] 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 eucalyptol, WS-3.

[0055] The aerosol-former material may comprise one or more constituents capable of forming an aerosol. In some embodiments, the aerosol-former material 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.

[0056] The one or more other functional materials may comprise one or more of pH regulators, colouring agents, preservatives, binders, fillers, stabilizers, and/or antioxidants.

[0057] An aerosol-modifying agent is a substance, typically located downstream of the aerosol generation area, that is configured to modify the aerosol generated, for example by changing the taste, flavour, acidity or another characteristic of the aerosol. The aerosol-modifying agent may be provided in an aerosol-modifying agent release component, that is operable to selectively release the aerosol-modifying agent.

[0058] The aerosol-modifying agent may, for example, be an additive or a sorbent. The aerosol-modifying agent may, for example, comprise one or more of a flavourant, a colourant, water, and a carbon adsorbent. The aerosol-modifying agent may, for example, be a solid, a liquid, or a gel. The aerosol-modifying agent may be in powder, thread or granule form. The aerosol-modifying agent may be free from filtration material.

[0059] In some implementations, the aerosol provision systems comprise a modular assembly including an aerosol provision device (sometimes referred to as a reusable part) and an article comprising aerosol-generating material (sometimes referred to as a consumable or a replaceable part). However, in other implementations, the aerosol provision systems may comprise a one-piece

arrangement where the article and aerosol provision device are integrally formed.

[0060] Typically, the non-combustible aerosol provision system may comprise a non-combustible aerosol provision device and a consumable for use with the non-combustible aerosol provision device. In some embodiments, the disclosure relates to consumables comprising aerosol-generating material and configured to be used with non-combustible aerosol provision devices. These consumables are sometimes referred to as articles throughout the disclosure.

[0061] In some embodiments, the non-combustible aerosol provision system, such as a non-combustible aerosol provision device thereof, may comprise a power source and a controller. The power source may, for example, be an electric power source or an exothermic power source. In some embodiments, the exothermic power source comprises a carbon substrate which may be energised so as to distribute power in the form of heat to an aerosol-generating material or to a heat transfer material in proximity to the exothermic power source.

[0062] In some embodiments, the non-combustible aerosol provision system may comprise an area for receiving the consumable, an aerosol generator, an aerosol generation area, a housing, a mouthpiece, a filter and/or an aerosol-modifying agent.

[0063] In some embodiments, the consumable for use with the non-combustible aerosol provision device may comprise aerosol-generating material, an aerosol-generating material storage area, an aerosol-generating material transfer component, an aerosol generator, an aerosol generation area, a housing, a wrapper, a filter, a mouthpiece, and/or an aerosol-modifying agent.

[0064] A consumable is an article comprising or consisting of aerosol-generating material, part or all of which is intended to be consumed during use by a user. A consumable may comprise one or more other components, such as an aerosol-generating material storage area (or storage portion), an aerosol-generating material transfer component, an aerosol generation area, a housing, a wrapper, a filter, a mouthpiece, and/or an aerosol-modifying agent. A consumable may also comprise an aerosol generator, such as a heater, that emits heat to cause the aerosol-generating material to generate aerosol in use. The heater may, for example, comprise combustible material, a material heatable by electrical conduction, or a susceptor.

[0065] A susceptor is a material that is heatable by penetration with a varying magnetic field, such as an alternating magnetic field. The susceptor 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 susceptor may be both electrically-conductive and magnetic, so that the suscep-

tor is heatable by both heating mechanisms. The device that is configured to generate the varying magnetic field is referred to as a magnetic field generator, herein.

[0066] An aerosol generator is an apparatus configured to cause aerosol to be generated from the aerosol-generating material. In some implementations, the aerosol generator is a heater configured to subject the aerosol-generating material to heat energy, so as to release one or more volatiles from the aerosol-generating material to form an aerosol. In some implementations, the aerosol generator is configured to cause an aerosol to be generated from the aerosol-generating material without heating. For example, the aerosol generator may be configured to subject the aerosol-generating material to one or more of vibration, increased pressure, or electrostatic energy.

[0067] The following description will focus on embodiments in which the aerosol provision system is one in which a source liquid as the aerosol-generating material is vaporised to generate an aerosol for user inhalation. In such embodiments, the article is more commonly referred to as a cartridge. The cartridge mechanically engages with the aerosol provision device as described above. However, it should be appreciated that the principles of the present disclosure are applicable to aerosol provision systems capable of vaporising different aerosol-generating materials, such as solids or gels, as described above. More generally, the principles of the present disclosure apply to aerosol provision systems for use with any suitable aerosol-generating materials.

[0068] Figure 1 is a cross-sectional view through an aerosol provision system 1 provided in accordance with certain aspects of the disclosure.

[0069] The aerosol provision system 1 shown in Figure 1 comprises two main components, namely an aerosol provision device 2 and a replaceable / disposable cartridge 4 (which is an example of a consumable or article). The aerosol provision system 1 of Figure 1 is an example of a modular construction of an aerosol provision system 1. In this regard, the aerosol provision device 2 and the cartridge 4 are able to engage with or disengage from one another at an interface 6. However, as mentioned above, the principles of the present disclosure also apply to other constructions of the aerosol provision system 1, such as one-part or unitary constructions where the device 2 and cartridge 4 may be integrally formed (or in other words, the aerosol provision device 1 is provided with an integrally formed aerosol-generating material storage area or portion).

[0070] The aerosol provision system 1 is generally elongate and cylindrical in shape. The aerosol provision system 1 may be sized so as to approximate a cigarette. However, it should be understood that the general size and shape of the aerosol provision system 1 is not significant to the principles of the present disclosure. In some other implementations, the aerosol provision system 1 may conform to different overall shapes; for example, the aerosol provision device 2 may be based on

so-called box-mod high performance devices that typically have a more box-like shape.

[0071] The device 2 comprises components that are generally intended to have a longer lifetime than the cartridge 4. In other words, the device 2 is intended to be used, sequentially, with multiple cartridges 4. The cartridge 4 comprises components (such as aerosol-generating material) that are consumed when forming an aerosol for delivery to the user during use of the aerosol provision system 1.

[0072] In the example modular configuration of Figure 1, the device 2 and the cartridge 4 are releasably coupled together at the first interface 6. When the aerosol-generating material in the cartridge 4 is exhausted or the user simply wishes to switch to a different cartridge 4 (e.g., containing a different aerosol-generating material), the cartridge 4 may be removed from the device 2 and a replacement cartridge 4 attached to the device 2 in its place. The interface 6 provides a structural connection between the device 2 and cartridge 4 and may be established in accordance with suitable techniques, for example based around a screw thread, latch mechanism, bayonet fixing or magnetic coupling. In some implementations, the interface 6 may also provide an electrical coupling between the device 2 and the cartridge 4 using suitable electrical contacts. The electrical coupling may allow for power and / or data to be supplied to / from the cartridge 4.

[0073] It should also be understood that in some implementations, the cartridge 4 may be refillable. That is, the cartridge 4 may be refilled with aerosol-generating material when the cartridge 4 is depleted, using an appropriate mechanism such as a one-way refilling valve or the like. The cartridge 4 may be removed from the device 2 in order to be refilled. In other examples, the cartridge 4 may be configured so as to be refilled while attached to the device 2.

[0074] In implementations where the aerosol provision system 1 is a one-part or unitary system, the aerosol provision system 1 may be provided with a suitable mechanism, such as a one-way valve or the like, to enable the integrated cartridge 4 (or integrated aerosol-generating material storage area) to be refilled with aerosol-generating material.

[0075] In Figure 1, the cartridge part 4 comprises a cartridge housing 42, an aerosol-generating material storage area 44, an aerosol generator 48, an aerosol-generating material transport component 46, an outlet or opening 50, an air path 52 and an air path direction adjustor 60.

[0076] The cartridge housing 42 supports other components of the cartridge 4 and provides the mechanical interface 6 with the device 2. The cartridge housing 42 is formed from a suitable material, such as a plastics material or a metal material. In the described implementation, the cartridge housing 42 is generally circularly symmetric about a longitudinal axis along which the cartridge 4 couples to the device 2. In this example the cartridge 4

has a length of around 4 cm and a diameter of around 1.5 cm. However, it will be appreciated the specific geometry, and more generally the overall shapes, may be different in different implementations. The cartridge 4 comprises a first end, broadly defined by the interface 6, and a second end which is opposite the first end and includes the opening 50. The second end including the opening is intended to be received in / by a user's mouth and may be referred to as a mouthpiece end of the cartridge 4.

[0077] Within the cartridge housing 42 is an aerosol-generating material storage area 44, which may be referred to herein as a reservoir 44. The cartridge 4 of Figure 1 is configured to store a liquid aerosol-generating material, which may be referred to herein as a source liquid, e-liquid or liquid. The source liquid may contain nicotine and / or other active ingredients, and / or one or more flavours, as described above. In some implementations, the source liquid may contain no nicotine. The reservoir 44 is suitably configured to hold or retain liquid therein.

[0078] The reservoir 44 in this example has an annular shape with an outer wall defined by the cartridge housing 42 and an inner wall that defines an air path 52 through the cartridge 4. The reservoir 44 is closed at each end with end walls to contain the liquid. The reservoir 44 may be formed in accordance with suitable techniques, for example it may comprise a plastics material and be integrally moulded with the cartridge housing 42.

[0079] The cartridge 4 further comprises an aerosol generator 48. The aerosol generator 48 is an apparatus configured to cause aerosol to be generated from the aerosol-generating material (e.g., the source liquid). The aerosol generator 48 is shown highly schematically in Figure 1. The aerosol generator 48 may also be provided adjacent an aerosol-generating material transport component (not shown), which is configured to transport the aerosol-generating material from the aerosol-generating material storage area 44 (e.g., reservoir 44) to the aerosol generator 48. In some implementations, the aerosol-generating material transport component may be integrated with the aerosol generator 48 to form a combined aerosol generator and aerosol-generating material transport component.

[0080] The aerosol generator 48 is configured to cause aerosol to be generated from the aerosol-generating material. In some implementations, the aerosol generator 48 is a heater 48. The heater 48 is configured to subject the aerosol-generating material to heat energy, so as to release one or more volatiles from the aerosol-generating material to form an aerosol. By way of example, the heater 48 may take the form of an electrically resistive wire or trace intended to have electrical current passed between ends thereof, or a susceptor element which is intended to generate heat upon exposure to an alternating magnetic field.

[0081] In the described implementation of Figure 1, the aerosol generator 48 is a combined heater and aerosol-generating material transport element. The heater may

take the form of an electrically conductive trace, such as a nickel chrome alloy (Cr20Ni80) trace. The aerosol-generating material transport element is a porous substrate, such as a porous ceramic, where the electrically conductive trace disposed on a surface of the porous ceramic (to thereby act as the heater). In other implementations, the heater and porous substrate may be formed from a single component, e.g., a plurality of sintered steel fibres forming a planar structure. The porous substrate is configured to transport aerosol-generating material from the aerosol-generating material storage area 44 (reservoir 44) to the heater.

[0082] The aerosol generator 48 is arranged in the cartridge air path 52 such that a region of the cartridge air path 52 around the aerosol generator 48 in effect defines a vaporisation region for the cartridge 4. This vaporisation region (or aerosol generation region) is the region of the cartridge 4 where vapour is initially generated and aerosol initially formed. In use, electrical power may be supplied to the aerosol generator 48 to vaporise an amount of liquid provided to the aerosol generator 48 from the reservoir 44.

[0083] Aerosol is delivered to the user via the outlet 50 provided at the mouthpiece end of the cartridge 4. During use, the user may place their lips on or around the mouthpiece end of the cartridge 4 and draw air / aerosol through the outlet 50. More specifically, air is drawn into and along the air path 52, past the aerosol generator 48 where aerosol is entrained into the air, and the combined aerosol / air is then inhaled by the user through the opening 50. Although Figure 1 shows the mouthpiece end of the cartridge 4 as being an integral part of the cartridge 4, a separate mouthpiece component may be provided which releasably couples to the end of the cartridge 4.

[0084] The device 2 comprises an outer housing 12, an optional indicator 14, an inhalation sensor 16 located within a chamber 18, a controller or control circuitry 20, a power source 26, an air inlet 28 and an air path 30.

[0085] The device part 2 comprises an outer housing 12 with an opening that defines an air inlet 28 for the aerosol provision system 1, a power source 26 for providing operating power for the aerosol provision system 1, a controller or control circuitry 20 for controlling and monitoring the operation of the aerosol provision system 1, and an inhalation sensor (puff detector) 16 located in a chamber 18. The device 2 further comprises an optional indicator 14.

[0086] The outer housing 12 may be formed, for example, from a plastics or metallic material and in this example has a circular cross-section generally conforming to the shape and size of the cartridge 4 so as to provide a smooth transition between the two parts at the interface 6. In this example, the device 2 has a length of around 8 cm so the overall length of the aerosol provision system 1 when the cartridge 4 and device 2 are coupled together is around 12 cm. However, and as already noted, it will be appreciated that the overall shape

and scale of an aerosol provision system 1 implementing the present disclosure is not significant to the principles described herein.

[0087] The outer housing 12 further comprises an air inlet 28 which connects to an air path 30 provided through the device 2. The device air path 30 in turn connects to the cartridge air path 52 across the interface 6 when the device 2 and cartridge 4 are connected together. In this regard, the interface 6 is also arranged to provide a connection of the respective air paths 30 and 52, such that air and/or aerosol is able to pass along the coupled air paths 30, 52. In other implementations, the device 2 does not comprise an air path 30 and instead the cartridge 4 comprises the air path 52 and a suitable air inlet which permits air to enter into the air path 52 when the cartridge 4 and device 2 are coupled.

[0088] The power source 26 in this implementation is a battery 26. The battery 26 is rechargeable and may be, for example of the kind normally used in aerosol provision systems and other applications requiring provision of relatively high currents over relatively short periods. The battery 26 may be, for example, a lithium ion battery. The battery 26 may be recharged through a suitable charging connector provided at or in the outer housing 12, for example a USB connector. Additionally or alternatively, the device 2 may comprise suitable circuitry to facilitate wireless charging of the battery 26.

[0089] The control circuitry 20 is suitably configured / programmed to control the operation of the aerosol provision system 1. The control circuitry 20 may be considered to logically comprise various sub-units / circuitry elements associated with different aspects of the aerosol provision system's operation and may be implemented by provision of a (micro)controller, processor, ASIC or similar form of control chip. The control circuitry 20 may be arranged to control any functionality associated with the system 1. By way of non-limiting examples only, the functionality may include the charging or re-charging of the battery 26, the discharging of the battery 26 (e.g., for providing power to the aerosol generator 48), in addition to other functionality such as controlling visual indicators (e.g., LEDs) / displays, communication functionality for communicating with external devices, etc. The control circuitry 20 may be mounted to a printed circuit board (PCB). Note also that the functionality provided by the control circuitry 20 may be split across multiple circuit boards and / or across components which are not mounted to a PCB, and these additional components and / or PCBs can be located as appropriate within the aerosol provision device. For example, functionality of the control circuit 20 for controlling the (re)charging functionality of the battery 26 may be provided separately (e.g. on a different PCB) from the functionality for controlling the discharge of the battery 26.

[0090] As noted above, when the device 2 and the cartridge 4 are coupled together at interface 6, the interface 6 provides an electrical connection between the device 2 and the cartridge 4. More particularly, electrical

contacts on the device 2, which are coupled to the power source 26, are electrically coupled to electrical contacts on the cartridge, which are coupled to the aerosol generator 48. Accordingly, under suitable control by the control circuitry 20, electrical power from the power source 26 is able to be supplied from the power source 26 to the aerosol generator 48, thereby allowing the aerosol generator 48 to vaporise liquid.

[0091] In the example of Figure 1, the aerosol provision device 2 comprises a chamber 18 containing the inhalation sensor 16, which in this example is a pressure sensor 16. However, the inhalation sensor 16 may be any suitable sensor, such as an air flow sensor, for sensing when a user inhales on the mouthpiece end of the cartridge 4 and subsequently draws air along the air paths 30, 52. Accordingly, the presence of the chamber 18 is optional and its presence may depend on the characteristics of the selected inhalation sensor 16.

[0092] The pressure sensor 16 is in fluid communication with the air path 30 in the device 2 (e.g. the chamber 18 branches off from the air path 30 in the device 2). Thus, when a user inhales on the opening 50, there is a drop in pressure in the chamber 18, which if sufficient, is detected by the pressure sensor 16. The aerosol provision system 1 is controlled to generate aerosol in response to detecting an inhalation by a user. That is, when the pressure sensor 16 detects a drop in pressure in the pressure sensor chamber 18, the control circuitry 20 responds by causing electrical power to be supplied from the battery 26 to the aerosol generator 48 sufficient to cause vaporisation of the liquid held within the wick 46. This is an example of an aerosol provision system which is said to be "puff actuated". The pressure sensor 16 may be used to start and / or end the power supply to the aerosol generator 48 (e.g., when the pressure sensor detects the absence of an inhalation).

[0093] In other implementations, the aerosol provision system 1 includes a button or other user actuatable mechanism. When the button or other user actuatable mechanism is actuated by the user, the control circuitry 20 caused power to be supplied to the aerosol generator 48 as described above. This is an example of an aerosol provision system which is said to be "button actuated". The button may be used to start and / or end power supply to the aerosol generator 48 (e.g., when the button is released by the user). In some implementations, both a button (or other user actuatable mechanism) and an inhalation sensor 16 may be used to control the delivery of power to the heater 48, e.g., by requiring both the button press and a pressure drop indicative of an inhalation to be present before supplying power to the aerosol generator 48.

[0094] As noted above, the power source 26 in the aerosol provision device 2 is a rechargeable battery 26. As the aerosol provision device 2 is intended to be used with multiple cartridges (or multiple refills of an integrally formed reservoir 44), by providing a rechargeable battery 26 capable of being recharged, the lifetime of the aerosol

provision device 2 is able to be extended and thus the aerosol provision device 2 is capable of being used with more cartridges 4 than would otherwise be possible with a non-rechargeable battery of a similar size or capacity. In addition or alternatively, by virtue of the fact the battery 26 is rechargeable, the physical size of the battery 26 may be reduced thereby allowing for smaller scale aerosol provision devices 2 without compromising on an overall lifetime usage of the aerosol provision system 1.

[0095] In accordance with the present disclosure, the aerosol provision system 1 (and in the described implementation, the cartridge 4) is provided with an air path direction adjustor 60. The air path direction adjustor 60 is configured to selectively adjust the direction along which air flows in the vicinity of the aerosol generator 48. In particular, the air path direction adjustor 60 is configured to switch between a first configuration in which air in the vicinity of the aerosol generator 48 flows in a first direction relative to the aerosol generator 48 and a second configuration in which air in the vicinity of the aerosol generator 48 flows in a second direction relative to the aerosol generator 48, where the first direction is different to the second direction.

[0096] As used herein, the term "air in the vicinity of the aerosol generator 48" refers to air in a region that is adjacent or next to the aerosol generator 48 and is typically the region into which the vapour/aerosol passes into initially when the aerosol-generating material is vaporised by the aerosol generator 48. Put another way, this references the air that is within the vaporisation region of the aerosol generator 48.

[0097] The term "flows in a first/second direction relative to the aerosol generator 48" refers to the direction along which all, or substantially all, of the air within the vaporisation region / region adjacent the aerosol generator 48 flows relative to a reference point of the aerosol generator 48. "Substantially all" is intended to encompass scenarios where the majority, but not necessarily all of the air flow is along the particular (i.e., first/second) direction. In this regard, when considering a volume of air or a volumetric flow rate of air through the aerosol provision system 1, substantially all may encompass 80% or greater, 90% or greater, 95% or greater, or 99% or greater of the total air / air flow into the aerosol provision system 1 following the particular (i.e., first or second) directions in the vicinity of the aerosol generator 48. The reference point is, in some implementations, the surface of the aerosol generator 48 that is primarily responsible for generating aerosol (for example, the surface of the aerosol generator comprising the heater / electrical trace). Primarily is used here because in some implementations it may be that aerosol is generated at other locations on or within the aerosol generator 48, for example due to thermal conduction from the surface that primarily produces aerosol. A surface of the aerosol generator 48 that is primarily responsible for generating aerosol may therefore be considered a surface of the aerosol generator 48 that generates greater than 50% of the total vaporised

aerosol-generating material delivered.

[0098] The air path direction adjustor 60 may be implemented in any desired manner that allows for the direction of the air flow along the air path 52 in the vicinity of the aerosol generator 48 to be adjusted. In the example of Figure 1, the air path direction adjustor 60 is a separate component that is installed between the air inlet of the cartridge 4 and the aerosol generator 48. However, in other implementations, the air path direction adjustor 60 may be integrated with the cartridge 4 and/or the aerosol provision device 2.

[0099] The air path direction adjustor 60 of Figure 1 comprises a plurality of channels, where the plurality of channels can broadly be considered to fall into one of two categories; a first category in which air that exits the channels is broadly directed along a first direction relative to the aerosol generator 48, and a second category in which air that exits the channels is broadly directed along a second direction relative to the aerosol generator 48. The air path direction adjustor 60 is configured to selectively couple either of the first category of channels or the second category of channels to the air path 52. That is to say, the first category of channels of the air path direction adjustor 60, when selected, form a part of the air path 52 from the inlet of the cartridge 4 to the mouthpiece outlet 50. Conversely, the second category of channels of the air path direction adjustor 60, when selected, also form a part of the air path 52 from the inlet of the cartridge 4 to the mouthpiece outlet 50, but now in place of the first category of channels. Accordingly, the air path direction adjustor 60 may be described as being adjustable between a first configuration in which the first category of channels is coupled to the air path 52 (and the second category of channels are not coupled to the air path 52) and a second configuration in which the second category of channels is coupled to the air path 52 (and the first category of channels are not coupled to the air path 52).

[0100] The air path direction adjustor 60 is arranged to adjust the direction of the air flow in the vicinity of the aerosol generator 48. In particular, the air path direction adjustor 60 is configured to selectively adjust whether the air flow in the vicinity of the aerosol generator 48 is in (or substantially in) a first direction relative to the aerosol generator 48 or whether the air flow in the vicinity of the aerosol generator 48 is in (or substantially in) a second direction relative to the aerosol generator 48. It has been found that the direction along which air flows relative to the aerosol generator 48 can impact the properties of the aerosol that is delivered to the user at the mouthpiece opening 50, and in particular, a property that is impacted is the average particle size of the aerosol.

[0101] Figures 2 and 3 schematically show the air path direction adjustor 60 of Figure 1 in more detail, and hence will be understood from Figure 1. Certain details have been omitted from Figures 2 and 3 as compared to Figure 1, for the purposes of explaining the principles of the present disclosure more clearly. Figure 2 shows the air path direction adjustor 60 in a first configuration, while

Figure 3 shows the air path direction adjustor 60 in a second configuration.

[0102] Figures 2 and 3 show the air path direction adjustor 60, aerosol generator 48 and the air path 52 downstream of the aerosol generator 48. As described above, the air path direction adjustor 60 comprises a first category of channels, which in Figures 2 and 3 is a first channel 64, and a second category of channels, which in Figures 2 and 3 is a second channel 66. The air path direction adjustor 60 also comprises a moveable flap 62, which is sized so as to block one of the first or second channels 64, 66 depending upon the position of the moveable flap 62.

[0103] Figure 2 shows the air path direction adjustor 60 in a first configuration in which the first channel 64 is fluidly coupled to the air path 52 (and hence forms a first subsection of the air path 52) and in which the moveable flap 62 is positioned so as to block air flow along the second channel 66. Hence, in the first configuration, when a user inhales on the aerosol provision system 1, e.g., at the mouthpiece opening 50, air is drawn into the aerosol provision system 1 through air inlet 28, along air path 30, into the cartridge 4 through an inlet at interface 6, along the first channel 64 of the air path direction adjustor 60 and along the remaining part of the air path 52 downstream of the aerosol generator 60.

[0104] As is schematically shown in Figure 2 by the black arrow, when air flows along the first channel 64, the air flow exits the air path direction adjustor 60 along a first direction, and in particular, a direction that is perpendicular to the aerosol generator 48. As described above, the aerosol generator 48 in some implementations is a porous substrate having an electrically conductive trace disposed on one surface thereof. The porous substrate may have a broadly cube or cuboid shape, with the surface having the electrically conductive trace disposed facing towards the air inlet of the cartridge 4. Therefore, during use, air that flows out of the air path direction adjustor 60 is directed towards the face or plane of the aerosol generator that is primarily responsible for generating aerosol (i.e., the surface comprising the electrically conductive trace). The air impinges on (or impacts / strikes against) the aerosol generator 48, and in particular, the plane of the aerosol generator 48 comprising the electrically conductive trace). In this implementation, once the air impinges on the aerosol generator 48, the air then proceeds to flow around the aerosol generator 48 and along the remaining part of the air path 52. It should be appreciated that, in some implementations, while the majority of the air flow is directed towards the aerosol generator 48, it may be that not all of the air impinges on the aerosol generator 48 (for example, some of the air flow may pass by the edges of the aerosol generator 48).

[0105] Figure 3 shows the air path direction adjustor 60 in a second configuration in which the second channel 66 is fluidly coupled to the air path 52 (and hence forms a second subsection of the air path 52) and in which the moveable flap 62 is positioned so as to block air flow

along the first channel 64. Hence, in the second configuration, when a user inhales on the aerosol provision system 1, e.g., at the mouthpiece opening 50, air is drawn into the aerosol provision system 1 through air inlet 28, along air path 30, into the cartridge 4 through an inlet at interface 6, along the second channel 66 of the air path direction adjustor 60 and along the remaining part of the air path 52 downstream of the aerosol generator 60.

[0106] As is schematically shown in Figure 3 by the black arrow, when air flows along the second channel 66, the air flow exits the air path direction adjustor 60 and flows along a second direction, and in particular, a direction that is parallel to a surface of the aerosol generator 48 that is primarily responsible for generating aerosol (i.e., the surface comprising the electrically conductive trace). In the second configuration, the air now flows parallel to the surface of the aerosol generator 48 (as opposed to impinging on the aerosol generator 48, as in the first configuration). In this implementation, the air may still flow around the aerosol generator 48 and along the remaining part of the air path 52, but does so after passing parallel to the surface of the aerosol generator 48 as described above.

[0107] Therefore, it should be appreciated that the air flow in the vicinity of the aerosol generator 48 is different depending on the configuration of the air path direction adjustor 60. In particular, in the first configuration, as shown in Figure 2, the air flow is directed perpendicular to the surface of the aerosol generator 48 that is primarily responsible for generating aerosol, whereas in the second configuration, as shown in Figure 3, the air flow is directed parallel to the surface of the aerosol generator 48 that is primarily responsible for generating aerosol. It has been found that the aerosol generated and delivered by aerosol provision system 1 when the air path direction adjustor 60 is in the first configuration, i.e. the air flow is perpendicular to the aerosol generator 48, typically has a much smaller average particle or droplet diameter. Conversely, it has been found that the aerosol generated and delivered by aerosol provision system 1 when the air path direction adjustor 60 is in the second configuration, i.e. the air flow is parallel to the aerosol generator 48, typically has a much larger average particle or droplet diameter. Without wishing to be bound by theory, it is thought that the rate of cooling of the air in the vicinity of the aerosol generator 48 (and hence also of the vapour entrained in the air flow) leads to differences in the average particle or droplet size of the aerosol generated. In the first configuration, i.e., the air flow perpendicular to the aerosol generator 48, it is thought that there is a greater (i.e., faster) rate of cooling, whereas in the second configuration, i.e., the air flow parallel to the aerosol generator 48, there is a smaller (i.e. slower) rate of cooling.

[0108] Accordingly, by changing the direction of the air flow in the vicinity of the aerosol generator 48, the properties of the aerosol, namely the average particle or droplet size, can be altered. This can subsequently impact the user's perception of the aerosol. For instance, a larger

average particle size (for instance of 1.2 to 2 μm) has been found to increase the impact (e.g., mouth feel) and irritation (e.g., throat hit) while reducing the amount of visible vapour in the aerosol delivered, as compared to smaller average particle sizes (for instance of 0.5 to 1 μm). Therefore, by switching the configuration of the air path direction adjustor 60, the user is able to customise the user's experience of the aerosol that is delivered by adjusting the average particle size of the particles / droplets forming the aerosol.

[0109] In the described example, the first configuration of the air path direction adjustor 60 is arranged such that the air flow in the vicinity of the aerosol generator 48 is perpendicular to a surface of the aerosol generator 48, while the second configuration of the air path direction adjustor 60 is arranged such that the air flow in the vicinity of the aerosol generator 48 is parallel to a surface of the aerosol generator 48. However, it should be appreciated that the air path direction adjustor 60 may be configured differently, such that the direction of the air flow in the vicinity of the aerosol generator 48 in either of the first or second configurations is not perpendicular or parallel to the aerosol generator 48. The direction of the air flow relative to the aerosol generator 48 may be set to be along any direction (or angle) relative to the aerosol generator 48 (e.g., along a line at 10°, 20°, 30°, 40°, 50°, etc. to the plane of the aerosol generator 48). It should be appreciated that the average particle size may be tailored based on the angle the air flows relative to the aerosol generator 48. That is, the average particle size for a generated aerosol may be relatively smaller for air flow that is along a direction that is at a 50° angle to the plane of the aerosol generator 48 as opposed to air flow that is along a direction that is at a 0° (i.e., parallel) or 10° angle to the plane of the aerosol generator 48.

[0110] However, in some implementations, it should be appreciated that the difference between the first and second configurations of the air path direction adjustor 60 should be set so as to provide a noticeable difference in the properties of the aerosols that are delivered in the first and second configurations. For example, in some instances, a difference of greater than 10° to 15° between the first and second configurations in respect of the air path direction relative to the aerosol generator 48, may provide a perceivable difference in the aerosol delivered in the first or second configuration, although this value may be dependent on the specific implementation at hand. However, it should be appreciated that when the first configuration and the second configuration provide air flow directions in the vicinity of the aerosol generator 48 that are 90° apart (or substantially 90°, e.g., within $\pm 5^\circ$), this typically provides the greatest difference in the properties of the aerosol that is delivered when either of the first and second configurations are used. One way of implementing this, as described above, is to provide a first configuration of the air path direction adjustor 60 in which the first direction is a direction that is perpendicular, or substantially perpendicular, to a plane of the aerosol

generator 48 that, in use, is configured to generate aerosol such that the air flow along the first direction is perpendicular to, or substantially perpendicular, to the plane of the aerosol generator 48, and a second configuration of the air path direction adjustor 60 in which the second direction is a direction that is parallel, or substantially parallel, to a plane of the aerosol generator that, in use, is configured to generate aerosol such that the air flow along the second direction is parallel, or substantially parallel, to the plane of the aerosol generator 48.

[0111] In addition, it should be appreciated that the air path direction adjustor 60 as shown in Figures 2 and 3 represents one example of the air path direction adjustor 60. In this example, the first and second channels 64, 66 follow substantially straight lines extending from one side of the air path direction adjustor 60 to the other, with the second channel 66 is being configured off-centre from the longitudinal axis of the air path direction adjustor 60. However, the air path direction adjustor 60 and the first and second channels 64, 66 thereof may be configured in any suitable manner to allow the direction of the air flow relative to the aerosol generator 48 to follow a particular direction. For instance, the channels 64, 66 may follow a non-straight path in some implementations, or be provided at, or have sections that are provided at, an inclined angle relative to the longitudinal axis of the aerosol provision system 1 / air path direction adjustor 60. In other implementations, the channels (such as the second channel 66) may be formed in conjunction with the housing 42 of the cartridge 4.

[0112] In the described example, the air path direction adjustor 60 comprises the moveable flap 62, however it should be appreciated that this is just an example of a component that is capable of selectively blocking one of the channels 64, 66, and other components may be utilised in other implementations. For example, one or more closable valves may be implemented in place of the moveable flap 62 in other implementations. The moveable flap 62 (or valves) may be coupled to an actuator which is capable of causing the moveable flap 62 (or valves) to open or close the respective channel 64, 66. The actuator may be physically accessible to a user, and therefore the user manually actuates the moveable flap 62 (or valves) to place the air path direction adjustor 60 into the first or second configurations, or alternatively, the actuator may be electronically actuated, e.g., via an electrically powered motor or the like, which may be responsive to a user input (such as a button press or other signal from a user input mechanism on the aerosol provision device 2). In some examples, the actuator is accessible to the user only when the cartridge 4 is decoupled from the aerosol provision device 2. That is, the cartridge 4 and the aerosol provision device 2 are releasably engaged with one another, and the air path direction adjustor 60 and/or the actuator coupled thereto, are accessible to a user when the cartridge 4 is disengaged with the aerosol provision device 2. For instance, the air path direction adjustor 60 and/or the actuator coupled

thereto, may be exposed at the interface 6 and hence when the cartridge 4 is coupled to the aerosol provision device 2 at the interface 6, the air path direction adjustor 60 and/or the actuator coupled thereto are not accessible to a user. To change the configuration of the air path direction adjustor 60, the user must first remove the cartridge 4 to expose the air path direction adjustor 60 and/or the actuator coupled thereto.

[0113] Furthermore, it should be appreciated that although the air path direction adjustor 60 is shown in Figures 1 to 3 as comprising a plurality of selectable air flow paths, in the form of first and second channels 64, 66, in yet further implementations, more complex configurations of the air path direction adjustor 60 may be realised. For instance, in some implementations, a single air channel may be provided whereby the direction of the single air channel is capable of being manipulated, e.g., bent or angled, to provide the first and second configurations. Various ways of implementing the present disclosure will be apparent to the skilled person.

[0114] Although the above has described an air path direction adjustor 60 that is configured to be in either of a first configuration or a second configuration, it should be appreciated that in other implementations, the air path direction adjustor 60 can be modified to comprise more than two configurations, such that the air path direction adjustor 60 is capable of being selectively switched between the first, second, and third (and / or fourth, fifth, sixth, etc.) configurations. For example, the air path direction adjustor 60 may be configured with a plurality (e.g., three) paths or channels through the air path direction adjustor 60 and the moveable flap (or valves) 62 may be configured to selectively couple any of the plurality of paths or channels to the main flow path 52. In such implementations, each configuration is arranged such that air flow in the vicinity of the aerosol generator 48 is capable of flowing, substantially, along a corresponding direction. For example, the first and second configurations may be described as above (i.e., providing air flow at 90° (perpendicular) and 0° (parallel) to the plane of the aerosol generator 48) while the third configuration may be arranged such that air flow that exits the air path direction adjustor 60 is at 45° to the plane of the aerosol generator 48. Accordingly, the average particle size of aerosol generated when the air path direction adjustor 60 is in the third configuration may be somewhere between the average particle size of the aerosol generated when the air path direction adjustor 60 is in the first configuration and when the air path direction adjustor 60 is in the second configuration.

[0115] In principle, the air flow direction adjustor 60 may be provided such that it is capable of being in any number of configurations. In some implementations, the air flow direction adjustor 60 may be configured such that it is capable of selecting between discrete configurations. Alternatively, the configurations may be considered continuous, in that the air flow direction adjustor 60 can be configured to be in any one of a continuous number of

configurations between two limits (e.g., such as in implementations where a single channel is able to be manipulated, e.g., bent). Increasing the number of available discrete configurations or providing a plurality of configurations selectable from a continuous range affords more control and flexibility to a user in terms of customising the delivery of the aerosol (e.g., average particle size) according to the specific user's preferences. Above has been described a system in which the air flow in the vicinity of the aerosol generator 48 is either along a first direction (if the air path direction adjustor 60 is in a first configuration) or a second direction (if the air path direction adjustor 60 is in a second configuration). In such implementations, the majority (if not all) of the inhaled air that passes along the air path 52 passes along the first or second direction depending on whether the air path direction adjustor 60 is in the first or second configuration.

[0116] However, in some other implementations, the air path direction adjustor 60 is configured to be capable of switching to a configuration that is between the first configuration and the second configuration. In particular, in such a configuration, air in the vicinity of the aerosol 48 generator is able to flow both in the first direction and in the second direction.

[0117] Figure 4 schematically shows the air path direction adjustor 60 of Figures 2 and 3, where the air path direction adjustor 60 is in a further configuration that is part way between the first and second configurations of Figures 2 and 3. Figure 4 will broadly be understood from Figures 2 and 3, where like components are shown with the same reference signs and a description thereof is omitted for conciseness.

[0118] In the configuration of Figure 4, the moveable flap 62 is provided at a position that is part way between the first configuration (i.e., fully blocking the second channel 66) and the second configuration (i.e., fully blocking the first channel 64). Accordingly, it can be seen that the moveable flap 62 does not fully block either of the first channel 64 or second channel 66, such that air is capable of flowing along both of the first channel 64 and the second channel 66. Figure 4 schematically shows this via the two black arrows that are directed along the first and second channels 64, 66.

[0119] In such implementations, in the vicinity of the aerosol generator 48, in use, the flow of air is subsequently mixed - some of the air flows along the first direction while some of the air flows along the second direction. As described above, it is thought that the rate of cooling has an impact on the average particle size of the aerosol generated. By providing a proportion of the air flow that is perpendicular to the plane of the aerosol generator 48 (e.g., along the first channel 64 / in the first configuration), the degree of cooling at the aerosol generator 48 can be increased relative to the degree of cooling when the air flow is parallel to the aerosol generator 48 (e.g., along the second channel 66 / in the second configuration). Consequently, the average particle size of any aerosol generated can be relatively in-

creased as compared to the aerosol generated in the second configuration (i.e., where the majority or all the air flow is parallel to the aerosol generator 48).

[0120] In this way, control of the average particle size of the generated aerosol can be implemented by changing the proportion of the air flow that, in use, flows along the first direction and the second direction in the vicinity of the aerosol generator 48. The moveable flap 62 can be arranged so as to adopt any position between a position that fully closes the second channel 66 (where 100% of the inhaled air flows along the first channel 64) and a position that fully closes the first channel 64 (where 100% of the inhaled air flows along the second channel 66). In the example of Figure 4, the moveable flap 62 is arranged to move through a 90° angle between the first configuration and the second configuration, and thus the moveable flap 62 may be configured to adopt an angular position between 0° and 90° to thereby vary the proportion of air that flows in the first direction and second direction. For example, if the moveable flap 62 is positioned at 45°, this may result in 50% of the inhaled air flowing through the first channel 64 and 50% of the inhaled air flowing through the second channel 66, whereas if the moveable flap 62 is positioned at 22.5°, this may result in 75% of the inhaled air flowing through the first channel 64 and 25% of the inhaled air flowing through the second channel 66. It should be appreciated that, similar to the above, the air path direction adjustor 60 may be configured such that the moveable flap 62 is only able to adopt a discrete number of positions (e.g., 0°, 45°, 90°) or the moveable flap 62 may be able to adopt any position between the limits of 0° and 90°.

[0121] Figure 5 schematically represents a cartridge 4 implementing the principles of the present disclosure according to a second implementation in exploded view. The cartridge 4 of Figure 5 will be broadly understood from Figures 1 to 3, and like components are labelled with the same reference signs. A description of these components is not repeated herein for conciseness.

[0122] Broadly speaking, the cartridge 4 of Figure 5 comprises a cartridge housing 42, including a mouth-piece opening 50 at one end thereof, and a not shown reservoir 44 and channel that forms a part of the air path 52.

[0123] The cartridge housing 42 is provided with a separate lower cap 42a that attaches to the main body of the cartridge housing 42 (e.g., via lugs or protrusions, as schematically shown in Figure 5). When attached, the lower cap 42a completes the cartridge housing 42. In the implementation of Figure 5, the aerosol generator 48 is provided in an aerosol generator support 48a, which is a separate component that is inserted into the cartridge housing 42, and retained in place via the lower cap 42a. The aerosol generator support 48a is configured to hold the aerosol generator 48 within the cartridge 4 as well as provide a fluid pathway from the reservoir 44 to the aerosol generator 48 such that aerosol-generating material in the reservoir 44 is capable of being provided to

the aerosol generator 48 for vaporisation. When the aerosol generator support 48a is inserted into the cartridge housing 42, the aerosol generator support 48a may complete the reservoir 44 (e.g., by sealing an open end thereof). The aerosol generator support 48a additionally also comprises a receptacle for receiving the air path direction adjustor 60, which in this implementation is embodied as a cylinder that is received in a corresponding cylindrical recess of the aerosol generator support 48a. The aerosol generator support 48a additionally comprises an empty region around the aerosol generator 48 and between the aerosol generator 48 and the air path direction adjustor 60 (seen best in Figures 6 and 7) which acts, at least in part, as the vaporisation region and in which air is able to flow to the aerosol generator 48. Further details of the cartridge housing 42, aerosol generator support 48a, and lower cap 42a are not significant for the purposes of the present disclosure (and indeed these components may be configured differently in differently implementations).

[0124] In the example of Figure 5, the air path direction adjustor 60 is provided at a position located between (or incorporating) an air inlet of the cartridge 4 and the aerosol generator 48. In a similar manner to that described above, the air path direction adjustor 60 is capable of being in a first configuration, in which the air flow in the vicinity of the aerosol generator is along a first (perpendicular) direction relative to the plane of the aerosol generator 48, and a second configuration, in which the air flow in the vicinity of the aerosol generator is along a second (parallel) direction relative to the plane of the aerosol generator 48. In this example, the air path direction adjustor 60 comprises a hollow cylindrical main body 60a comprising a plurality of outlets or openings 61a, 61b and a moveable air path selector 62' that fits inside the hollow cylindrical main body 60a and is rotatable with respect to the main body 60a. The moveable air path selector 62' may be considered similar, in function, to the moveable flap 62 of Figures 1 to 3, and is arranged so as to selectively couple respective outlets of the 61a, 61b of the main body 60a of the air path direction adjustor 60 to one or more channels (such as the first and second channels 64, 66) running through the moveable air path selector 62'. The operation of the air path direction adjustor 60 of this implementation will be described in more detail below. However, it should be appreciated that the air path direction adjustor 60 may be retained in the cartridge 4 via any suitable mechanism, and in the present example, the combination of the lower cap 42a and an actuator arm 62a retains the air path direction adjustor 60 in the cartridge 4.

[0125] The explanation of the air path direction adjustor 60 according to this implementation is described below with reference to Figures 6 and 7. Figures 6 and 7 schematically show the position of the air path direction adjustor 60 when located in the aerosol generator support 48a with the cartridge housing 42 (including lower cap 42a) removed for clarity.

[0126] Figure 6 shows the air path direction adjustor 60 in a first configuration. The first configuration is similar to the first configuration of the air path direction adjustor 60 as described with respect to Figures 1 to 3 in that the air exiting the air path direction adjustor 60 is directed along a first direction that is perpendicular to the plane of the aerosol generator 48 primarily responsible for generating aerosol in use.

[0127] In particular, in the first configuration, the moveable air path selector 62' is rotated to a first position relative to the main body 60a of the air path direction adjustor 60 such that a channel (not shown, but for example, the first channel 64) extending through the moveable air path selector 62' aligns with the one or more outlets 61b provided on an upper (flat) surface of the main body 60a of the air path direction adjustor 60. Accordingly, when the air path direction adjustor 60 is in this configuration, air that enters the cartridge 4 via an inlet is capable of flowing along the one or more channels of the moveable air path selector 62' and through the openings 61b of the main body 60a where the air flow is directed, perpendicularly, towards the aerosol generator 48. Note that in this implementation, the openings 61b are provided such that the normal of the openings 61b is parallel to the normal of the surface of the aerosol generator 48 comprising the electrically conductive trace. This is one way in which the air path direction adjustor 60 may be configured to provide the perpendicular air flow arrangement as described above. The air flow in the first configuration is shown by the arrows in Figure 6.

[0128] Hence, by setting the (rotational) position of the air path selector 62' of the air path direction adjustor 60 accordingly, the air path direction adjustor 60 is capable of directing air along a first direction relative to the aerosol generator 48. Consequently, the aerosol that is delivered via mouthpiece opening 50 has characteristics (such as average particle size) of a first value (or values).

[0129] Figure 7 shows the air path direction adjustor 60 in a second configuration. The second configuration is similar to the second configuration of the air path direction adjustor 60 as described with respect to Figures 1 to 3 in that the air exiting the air path direction adjustor 60 is directed along a second direction that is parallel to the plane of the aerosol generator 48 primarily responsible for generating aerosol in use.

[0130] In particular, in the second configuration, the moveable air path selector 62' is rotated to a second position relative to the main body 60a of the air path direction adjustor 60 such that a channel (not shown, but for example, the second channel 66) extending through the moveable air path selector 62' aligns with the one or more outlets 61a provided on a side (curved) surface of the main body 60a of the air path direction adjustor 60. The air path selector 62' may be moved (rotated) using an actuator, which in this example is an actuator arm 62a that protrudes radially outward from the cylindrical air path selector 62'. The position of the actuator arm 62a is accordingly different in each of the first

and second configurations, as seen in Figures 6 and 7 respectively. The actuator arm 62a may be configured such that a user is able to manually actuate the actuator arm 62a in order to change the (rotational) position of the moveable air path selector 62' relative to the main body 60a of the air path direction adjustor 60.

[0131] Accordingly, when the air path direction adjustor 60 is in the second configuration, air that enters the cartridge 4 via an inlet is capable of flowing along the one or more channels of the moveable air path selector 62' and through the openings 61a of the main body 60a where the air flow, in the vicinity of the aerosol generator 48, is directed parallel to the surface of the aerosol generator 48. In particular, in this configuration, it can be seen that the air exits through the side of the main body 60a and consequently flows along the side surfaces of the main body 60a and then through the gap between the flat surface of the main body 60a (comprising openings 61b) and the surface of the aerosol generator 48 comprising the electrically conductive trace (i.e., in a direction parallel to the aerosol generator 48) before being directed along the air path 52 towards the mouthpiece opening 50. Accordingly, the side surfaces of the main body 60a of the air path direction adjustor 60 act to guide the air flow into the vaporisation region where the air flow may be substantially parallel to the surface of the aerosol generator 48. Note that in this implementation, the openings 61a are provided such that the normal of the openings 61a is perpendicular to the normal of the surface of the aerosol generator 48 comprising the electrically conductive trace. This is one way in which the air path direction adjustor 60 may be configured to provide the parallel air flow arrangement as described above. The air flow in the second configuration is shown by the arrows in Figure 7.

[0132] Hence, by setting the (rotational) position of the air path selector 62' of the air path direction adjustor 60 accordingly, the air path direction adjustor 60 is capable of directing air along a second direction relative to the aerosol generator 48. Consequently, the aerosol that is delivered via mouthpiece opening 50 has characteristics (such as average particle size) of a second value (or values).

[0133] Figure 8 represents a graph showing results in average particle sizes of aerosol from a cartridge 4, similar to that shown in Figures 5 to 7, when the cartridge 4 is placed in the first configuration (vertical dashed columns) and in the second configuration (diagonal line columns). The graph was obtained when subjecting the cartridge to an air flow rate of 18.3 ml/s. The graph of Figure 8 shows three different parameters; the DX (10 Average), the DX (50 Average) and the DX (90 Average). DX (10 Average) is a parameter indicating that 10% of the analysed sample, in this case aerosol, comprises particles having a particle size (or diameter) smaller than this value. A DX (10 Average) of say 1 μm means that 10% of the particles of the delivered aerosol have a particle size of 1 μm or less. Correspondingly, DX (50 Average) and DX (90 Average) are parameters indicating that 50% and

90% of the analysed sample, in this case aerosol, comprises particles having a particle size (or diameter) smaller than these values respectively. The DX (10 Average), DX (50 Average), and DX (90 Average) may be alternatively referred to as D10, D50 and D90 in other literature.

[0134] As can be seen from Figure 8, when the air path direction adjustor 60 is in the first configuration (air flow perpendicular to the aerosol generator 48), the DX (10 Average), DX (50 Average), and DX (90 Average) are approximately 0.23, 0.42, and 0.78 μm , respectively. Conversely, when the air path direction adjustor 60 is in the second configuration (air flow parallel to the aerosol generator 48), the DX (10 Average), DX (50 Average), and DX (90 Average) are significantly larger than the corresponding values in the first configuration at approximately 0.97, 1.3, and 1.73 μm , respectively. This means that by altering the direction of the air flow in the vicinity of the aerosol generator 48, the average particle sizes of the aerosol delivered to the user can be changed. This has been found to alter the user's experience in terms of at least impact, irritation and visible vapour, and thus these (and other properties of the delivered aerosol, where applicable) can be altered and customised accordingly by adjusting the direction of the air flow in the vicinity of the aerosol generator 48.

[0135] In the example cartridge 4 of Figures 5 to 7, the air path direction adjustor 60 is a component formed of two cylindrical parts (the main body 60a adapted to receive, coaxially, the moveable air path selector 62'). However, it should be appreciated that the air path direction adjustor 60 may be configured differently from that shown, for example in terms of shape, size, etc.

[0136] In a similar manner to as described above in respect of the implementation of Figures 1 to 3, the air path direction adjustor 60 is, or comprises, a component that is moveably mounted with respect to a housing of the aerosol provision system 1. The air path direction adjustor 60 is in the first configuration when the air path direction adjustor 60 is moved to a first position and is in the second configuration when the air path direction adjustor 60 is moved to a second position. The air path direction adjustor 60, in effect, comprises a first subsection of the air path 52 (which may be formed from a first channel passing through the moveable air path selector 62' and the outlets 61b) and a second subsection of the air path 52 (which may be formed from a second channel passing through the moveable air path selector 62' and the outlet 61a). When the air path direction adjustor 60 is in the first configuration, the first subsection of the air path (i.e., a first channel passing through the moveable air path selector 62' and the outlets 61b) is fluidly coupled to, and forms, the air path 52. When the air path direction adjustor 60 is in the second configuration, the second subsection of the air path (i.e., a second channel passing through the moveable air path selector 62' and the outlet 61a) is fluidly coupled to, and forms, the air path 52. In order to provide the adjustment in the direction of the air flow in the vicinity of the aerosol generator 48, the first

subsection and the second subsection are different from one another.

[0137] In the example cartridge 4 of Figures 5 to 7, the air path direction adjustor 60 is a cylinder having two air outlets 61b on the flat face of the main body 60a, and a single air outlet on the curved surface of the main body 60a. However, it should be appreciated that the number and/or positions of the outlets 61a, 61b on the main body 60a of the air path direction adjustor 60 may be different from that shown. For example, only a single opening 61b may be provided on the flat surface of the main body 60a, while in other implementations, more than two openings 61b may be provided. In addition, in some implementations, a plurality of openings 61a may be provided at different radial and/or axial positions of the main body 60a on the curved surface thereof. It should also be appreciated that moveable air path selector 62' may be correspondingly configured so as to couple the corresponding number of outlets in each of the first and second configurations.

[0138] When considering a parallel air flow in the vicinity of the aerosol generator 48, it has been found that channelling the air flow along a single direction (or at least substantially along a single direction) can provide the desired effect of slower cooling and larger particle size. In the examples of Figures 1 to 3 and in Figures 5 to 7, the air path direction adjustor 60 comprises a single outlet (such as outlet 61a) such that when the air flow exits the air path direction adjustor 60, the air is provided to one side of the air path direction adjustor 60 and substantially flows along a common direction toward the central axis of the cartridge 4 as it passes parallel to the surface of the aerosol generator 48 (before then passing along the remaining parts of the air path 52 towards the mouth-piece opening 50). However, as noted above, in the example of Figures 5 to 7, there exists a volume in which the main body 60a of the air path direction adjustor 60 is located and around which air is capable of flowing in during use.

[0139] In such implementations where the air flow is not particularly restricted, the air path direction adjustor 60 may be provided with a baffle 69 (or other guiding element) that may be arranged so as to guide or restrict the flow of the air in a particular direction (i.e., the second direction). Figure 9 schematically represents a modified air path direction adjustor 60' which includes a baffle 69. Figure 9 will broadly be understood from Figures 6 and 7, and like components are shown with like reference signs. Only the differences are described herein.

[0140] Figure 9 shows the air path direction adjustor 60' in the second configuration. As described above, when air exits the outlet 61a (not shown specifically in Figure 9), the air flows out of the outlet 61a, along the side of the main body 60a of the air path direction adjustor 60' and then along the flat surface of the main body 60a along a direction that is parallel to the aerosol generator 48 (not shown in Figure 9). This air flow as described previously is shown highly schematically in Figure 9 with the dashed

arrows A.

[0141] However, when the user inhales, air that is located in the vaporisation region and/or any of the air that exits the main body 60a through the outlet 61a that does not follow the air flow indicated by dashed arrows A may subsequently follow a different path to join the flow path 52 downstream of the aerosol generator 48. In Figure 9, for the purposes of explanation, it is possible to consider air flow to the right of the air path direction adjustor 60' (e.g., air that exits the outlet 61a and flows along the air path A) and air flow to the left of the air path direction adjustor 60' (e.g., air on the opposite side). Considering the air to the left of the air path direction adjustor 60', in the absence of the baffle 69, when the user inhales, the air may pass along the left side of the main body 60a of the air path direction adjustor 60' and along the flat surface of the main body 60a. In other words, the air flow path may be similar, but opposite, to the air path A. What this means is that, relative to the flat surface of the main body 60a, the air on the right side of the air path direction adjustor 60' and the air on the left side of the air path direction adjustor 60' flow in opposite directions towards one another. As a result, the degree of cooling when these two opposite air streams collide increases relative to the scenario where air flows only along a single direction relative to the flat surface of the main body 60a. In other words, although the air path direction adjustor 60' may be in the second configuration, because of these opposing air flows, the cooling effect may be similar to the cooling effect experienced when the air path direction adjustor 60' is in the first configuration, and therefore the difference in the characteristics of the aerosol delivered when the air path direction adjustor 60' is in the first configuration and when the air path direction adjustor 60' is in the second configuration is reduced (and potentially to such an extent as to no longer be perceivable to a user).

[0142] The above situation is also present, and in some instances increased, when a plurality of air outlets 61a are located on the main body 60a of the air path direction adjustor 60' (for example, if two air outlets 61a are provided at opposite radial positions of the main body 60a of the air path direction adjustor 60').

[0143] In order to help reduce this effect, and subsequently provide air flow that is substantially along a single direction, the air path direction adjustor 60' is provided with a baffle 69 that extends from the end of the cylindrical main body 60a (in the direction of the longitudinal axis of the main body 60a). The baffle 69 is arranged such that the baffle 69 acts to guide the flow of air in the aerosol provision system 1 such that the flow of air is substantially along the second (i.e. parallel) direction. In particular, when considering the example of the air to the left of the air path direction adjustor 60', the baffle acts to prevent the flow of air in a direction opposite the second direction (i.e., parallel to the surface of the aerosol generator 48), and instead the air is guided around the baffle 69, as schematically represented by the solid arrow B in Figure

9. That is to say, the baffle 69 acts as an obstruction to the air flow, and as such, the air flow must flow around the baffle 69 in order to subsequently pass to the aerosol generator 48 / flow path 52 downstream of the aerosol generator 48. When the baffle 69 is suitably configured, by virtue of flowing around the baffle 69, the air flow is capable of joining with the air flow along the second direction. Put another way, the air flow as shown by arrow B flows around the baffle 69 and then flows in the same direction as the air flow as shown by arrow A.

[0144] Accordingly, in implementations where the air path direction adjustor 60' is arranged such that, in any given configuration, there may be multiple directions for the air to flow relative to the surface of the aerosol generator 48 that primarily generates aerosol in use, the air path direction adjustor 60' may be provided with one or more baffles 69 (or guiding elements) that, in effect, reduces the number of directions that the air may flow relative to the surface of the aerosol generator 48 that primarily generates aerosol in use.

[0145] It should be appreciated that such guides or baffles 69 may not be necessary in respect of the air flow in the perpendicular direction (i.e., the first configuration) owing to the fact that the first direction is parallel to the general direction along which air flows under suction from the user. In other words, the suction force may be sufficient to draw the air along the first direction without any significant deviation therefrom. However, in other configurations, and in particular where the first direction is not parallel with the direction of the air flow along the air path 52 to the mouthpiece opening 50, baffles 69 and/or guiding elements may be used in order to provide air flow in a more uniform manner along the first direction.

[0146] Hence, in accordance with the principles of the present disclosure, an aerosol provision system 1 is provided with an air path direction adjustor 60, 60' configured to selectively adjust the direction along which air flows in the vicinity of the aerosol generator 48. By adjusting the direction along which air flows in the vicinity of the aerosol generator 48, the properties of the aerosol generated, and in particular the average particle size, can be changed, thereby leading to different user experiences when using the aerosol provision system 1 when the air path direction adjustor 60, 60' is in a first configuration in which air in the vicinity of the aerosol generator 48 flows in a first direction relative to the aerosol generator 48 as compared to when the air path direction adjustor 60, 60' is in a second configuration in which air in the vicinity of the aerosol generator 48 flows in a second, different direction relative to the aerosol generator 48.

[0147] Figure 10 represents an example method for adjusting the configuration of an air path direction adjustor 60, 60' of an aerosol provision system 1 in accordance with the present disclosure.

[0148] The method starts at step S1 where the air path direction adjustor 60, 60' is provided in a first configuration. The air path direction adjustor 60, 60' may be provided in the first configuration as a default, for exam-

ple, when the aerosol provision system 1 and/or cartridge 4 is manufactured and sold.

[0149] The method proceeds to step S2 when the air path direction adjustor 60, 60' is actuated to the second configuration. As should be appreciated from the above, by actuating the air path direction adjustor 60, 60' to the second configuration, the direction along which air flows in the vicinity of the aerosol generator is subsequently altered. That is, when the air path direction adjustor 60, 60' is in the first configuration, air in the vicinity of the aerosol generator 48 flows in a first direction relative to the aerosol generator 48 when a user inhales on the aerosol provision system 1, while when the air path direction adjustor 60, 60' is in the second configuration, air in the vicinity of the aerosol generator 48 when a user inhales on the aerosol provision system 1 flows in a second, different direction relative to the aerosol generator 48.

[0150] In order to actuate the air path direction adjustor 60, 60', the user may be required to remove or decouple the cartridge 4 (containing the air path direction adjustor 60, 60') from the aerosol provision device 2 in order to manually actuate the actuator or otherwise adjust the configuration of the air path direction adjustor 60, 60'. In some implementations, the actuator is located at a position of the cartridge 4 that is inaccessible to a user when the cartridge 4 and aerosol provision device 2 are coupled together. For example, the actuator may be located at the interface 6. In the example of Figures 5 to 7, the cartridge 4 is configured to be inserted into a receptacle of the aerosol provision device 2, which thereby obscures a part of the cartridge 4 which contains the actuator arm 62a. However, it should be appreciated that in other implementations, the actuator or air path direction adjustor 60, 60' may be accessible even when the cartridge 4 is coupled to the aerosol provision device 2 and/or in implementations when the cartridge 4 and aerosol provision device 2 are integrally formed as a single, unitary system. In other implementations, the air path direction adjustor 60, 60' may be actuated electronically, e.g., through a motor or the like as described above.

[0151] After step S2, the aerosol provision system 1 may be used, i.e., inhaled on, by a user to generate and deliver aerosol to a user, with the air path direction adjustor 60, 60' in the second configuration.

[0152] Thus, there has been described an aerosol provision system for generating aerosol from aerosol-generating material, the aerosol provision system including an aerosol-generating material storage portion for storing an aerosol-generating material; an aerosol generator for generating aerosol from aerosol-generating material from the aerosol-generating material storage portion; an air path extending from an air inlet to an outlet, wherein the aerosol generator is arranged at least partly in the air path; and an air path direction adjustor configured to selectively adjust the direction along which air flows in the vicinity of the aerosol generator, wherein the

air path direction adjustor is configured to switch between a first configuration in which air in the vicinity of the aerosol generator flows in a first direction relative to the aerosol generator and a second configuration in which air in the vicinity of the aerosol generator flows in a second direction relative to the aerosol generator, the first direction being different to the second direction. Also described is an article and method.

[0153] 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.

[0154] 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 or limitations on equivalents to 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. The disclosure may include other inventions not presently claimed, but which may be claimed in future.

Claims

1. An aerosol provision system for generating aerosol from aerosol-generating material, the aerosol provision system comprising:

an aerosol -generating material storage portion for storing an aerosol-generating material;
 an aerosol generator for generating aerosol from aerosol-generating material from the aerosol-generating material storage portion;
 an air path extending from an air inlet to an outlet, wherein the aerosol generator is arranged at least partly in the air path; and
 an air path direction adjustor configured to selectively adjust the direction along which air

flows in the vicinity of the aerosol generator, wherein the air path direction adjustor is configured to switch between a first configuration in which air in the vicinity of the aerosol generator flows in a first direction relative to the aerosol generator and a second configuration in which air in the vicinity of the aerosol generator flows in a second direction relative to the aerosol generator, the first direction being different to the second direction.

2. The aerosol provision system of claim 1, wherein the first and second configurations are set such that aerosol generated and delivered to the user when the air path direction adjustor is in the first configuration has a different average particle size to aerosol generated and delivered to the user when the air path direction adjustor is in the second configuration.
3. The aerosol provision system of claim 1 or 2, wherein the first direction is a direction that is at, or substantially at, 90° to the second direction.
4. The aerosol provision system of any of the preceding claims, wherein the first direction is a direction that is perpendicular, or substantially perpendicular, to a plane of the aerosol generator that, in use, is configured to generate aerosol such that the air flow along the first direction is perpendicular to, or substantially perpendicular, to the plane of the aerosol generator, wherein, optionally, when the air path direction adjustor is in the first configuration, the air path is arranged such that the flow of air along the air path impinges upon the plane of the aerosol generator that, in use, is configured to generate aerosol.
5. The aerosol provision system of any of the preceding claims, wherein the second direction is a direction that is parallel, or substantially parallel, to a plane of the aerosol generator that, in use, is configured to generate aerosol such that the air flow along the second direction is parallel, or substantially parallel, to the plane of the aerosol generator.
6. The aerosol provision system of any of the preceding claims, wherein the air path direction adjustor is, or comprises, a component that is moveably mounted with respect to a housing of the aerosol provision system, and wherein the air path direction adjustor is in the first configuration when the air path direction adjustor is moved to a first position and is in the second configuration when the air path direction adjustor is moved to a second position.
7. The aerosol provision system of claim 6, wherein the air path direction adjustor comprises a first subsection of the air path and a second subsection of the air

path, wherein the air path direction adjustor is configured to select between fluidly coupling the first subsection of the air path to the air path and fluidly coupling the second subsection of the air path to the air path, wherein the first and second subsections of the air path are different from one another, wherein optionally, the air path direction adjustor comprises the first and second subsections of the air path such that, in use, air flows through the air path direction adjustor along either of the first or second subsections of the air path.

8. The aerosol provision system of any of claims 6 to 7, wherein the air path direction adjustor is, or comprises, a rotatable component, and wherein the rotatable component is capable of being rotated about an axis of the rotatable component to the first and second positions.
9. The aerosol provision system of claim 8, wherein the rotatable component is a cylinder, and wherein the cylinder comprises a baffle extending from one side of the cylinder, wherein the baffle is arranged such that the baffle guides the flow of air in the air path in either of the first configuration or the second configuration such that the flow of air is substantially along the first direction or second direction.
10. The aerosol provision system of any of claims 6 to 9, wherein the air path direction adjustor comprises or is coupled to an actuator capable of moving the air path direction adjustor between the first and second positions.
11. The aerosol provision system of any of claims 6 to 10, wherein the aerosol provision system comprises a cartridge and an aerosol provision device, wherein the cartridge and the aerosol provision device are releasably engaged with one another, wherein the cartridge comprises the aerosol-generating material storage portion, the aerosol generator, and the air path direction adjustor, wherein the air path direction adjustor is accessible to a user when the cartridge is disengaged with the aerosol provision device.
12. The aerosol provision system of any of the preceding claims, wherein the air path direction adjustor is configured to be capable of switching to a third configuration between the first configuration and the second configuration, in which air in the vicinity of the aerosol generator is able to flow in the first direction relative to the aerosol generator and in the second direction relative to the aerosol generator.
13. The aerosol provision system of claim 12, wherein the air path direction adjustor is capable of varying the proportion of air flowing along the first direction

and the second direction in the vicinity of the aerosol generator in order to adjust the average particle size of the aerosol generated.

14. An article for use with an aerosol provision device, wherein the article is adapted to releasably couple to the aerosol provision device to form an aerosol provision system for generating aerosol from aerosol-generating material, the article comprising:
an aerosol-generating material storage portion for storing an aerosol-generating material;
an aerosol generator for generating aerosol from aerosol-generating material from the aerosol-generating material storage portion;
an air path extending from an air inlet to an outlet, wherein the aerosol generator is arranged at least partly in the air path; and
an air path direction adjustor configured to selectively adjust the direction along which air flows in the vicinity of the aerosol generator, wherein the air path direction adjustor is configured to switch between a first configuration in which air in the vicinity of the aerosol generator flows in a first direction relative to the aerosol generator and a second configuration in which air in the vicinity of the aerosol generator flows in a second direction relative to the aerosol generator, the first direction being different to the second direction.
15. A method for adjusting the configuration of an air path direction adjustor of an aerosol provision system, the aerosol provision system comprising an aerosol-generating material storage portion for storing an aerosol-generating material, an aerosol generator for generating aerosol from aerosol-generating material from the aerosol-generating material storage portion, and an air path extending from an air inlet to an outlet, wherein the aerosol generator is arranged at least partly in the air path, wherein the method comprises:
adjusting the direction along which air flows in the vicinity of the aerosol generator using the air path direction adjustor by switching between a first configuration of the air path direction adjustor in which air in the vicinity of the aerosol generator flows in a first direction relative to the aerosol generator and a second configuration of the air path direction adjustor in which air in the vicinity of the aerosol generator flows in a second direction relative to the aerosol generator, the first direction being different to the second direction.

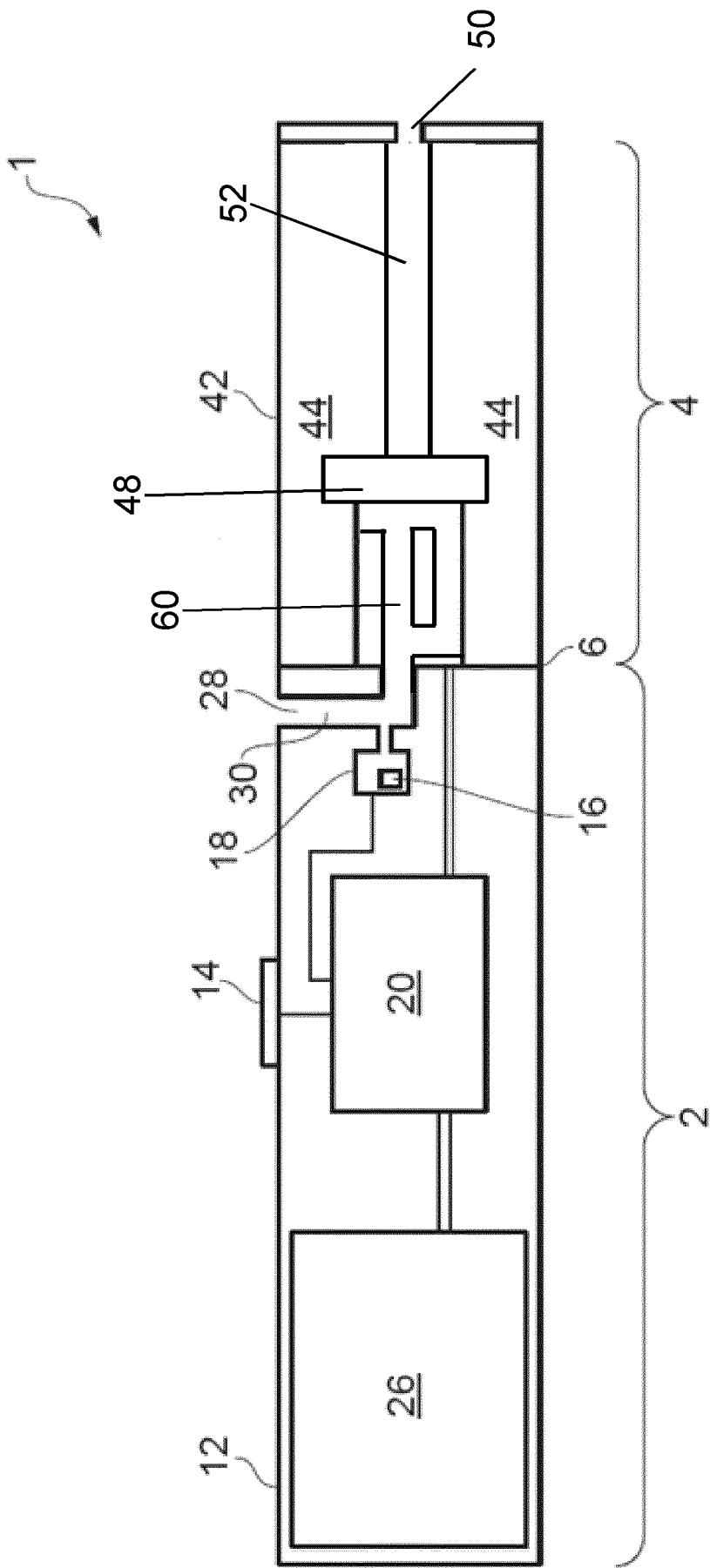


FIG. 1

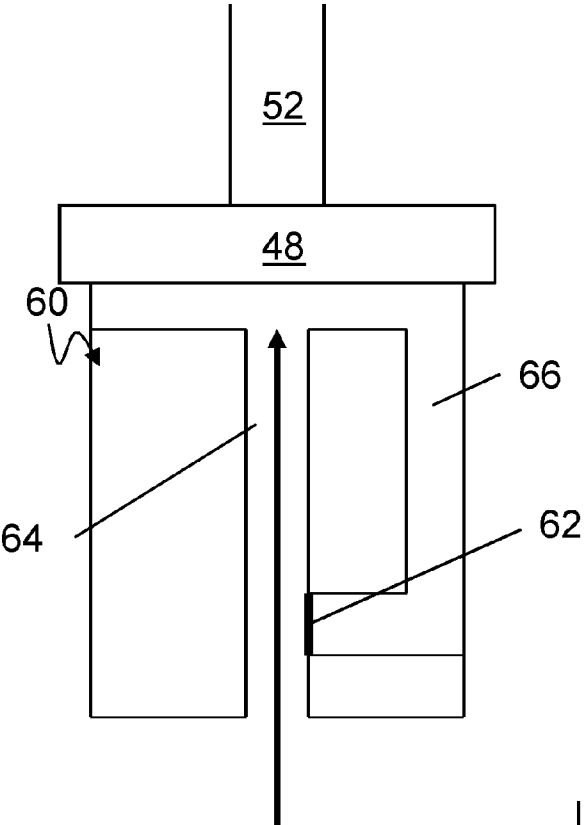


FIG. 2

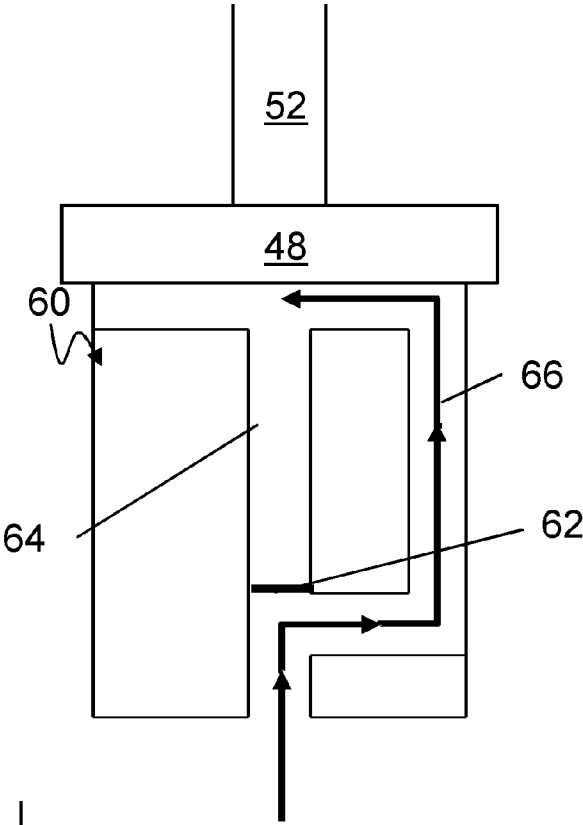


FIG. 3

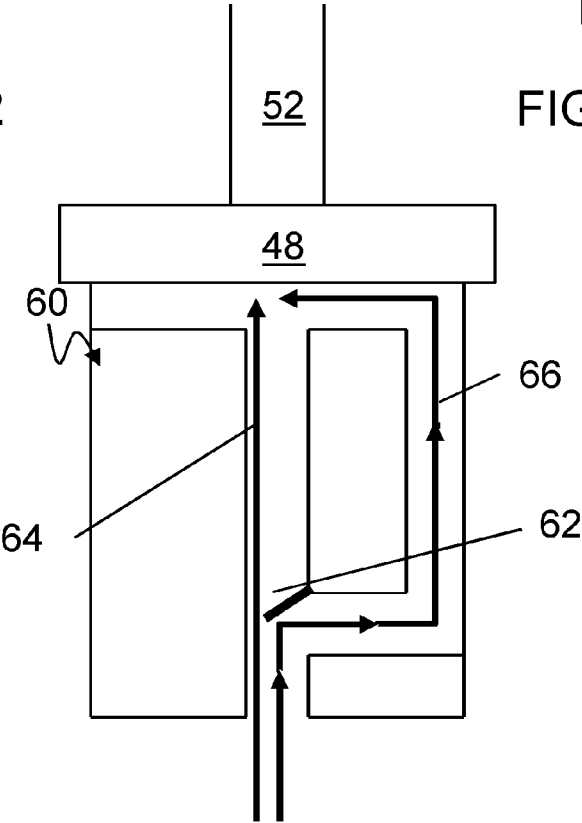


FIG. 4

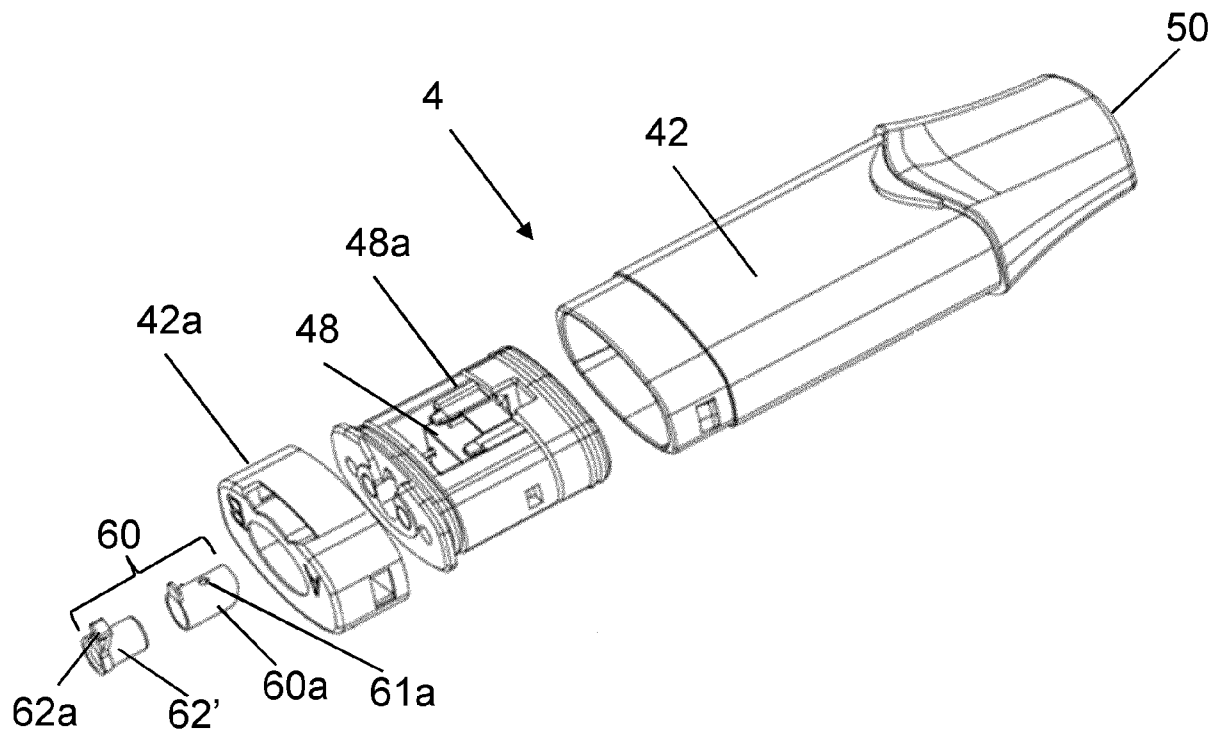


FIG. 5

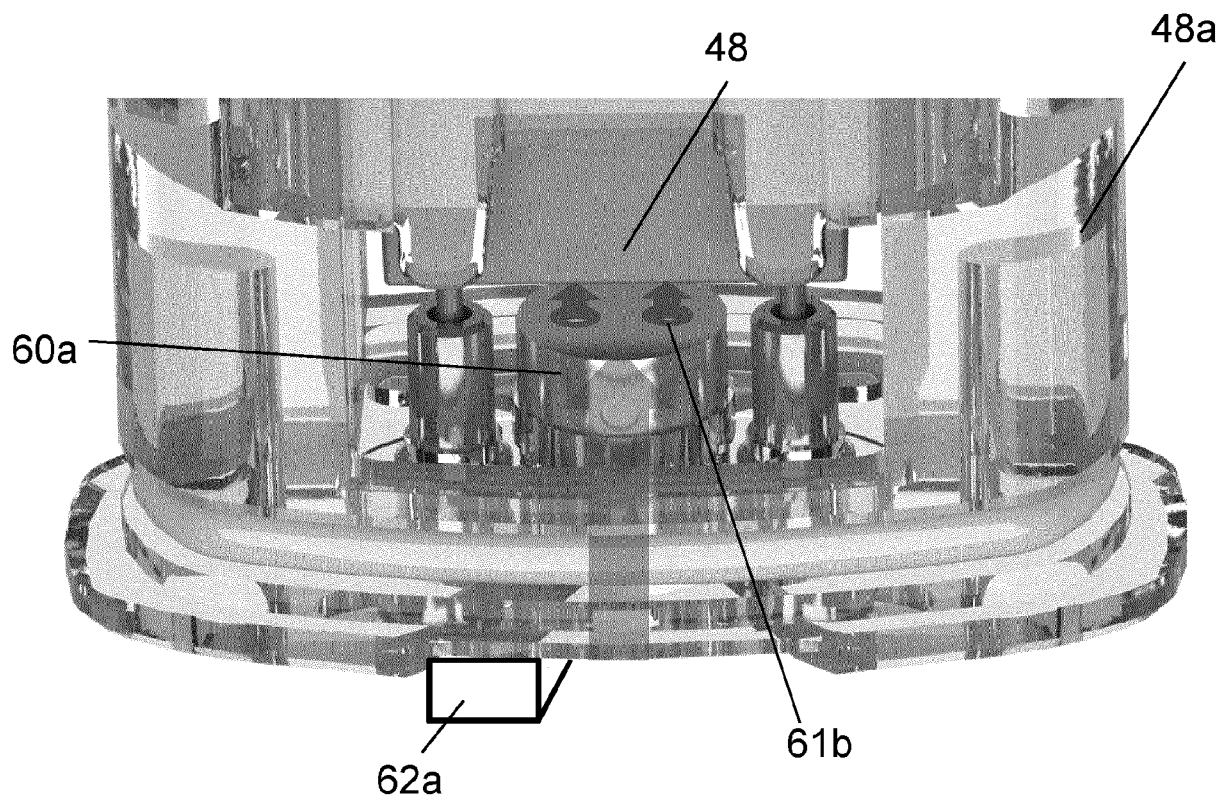


FIG. 6

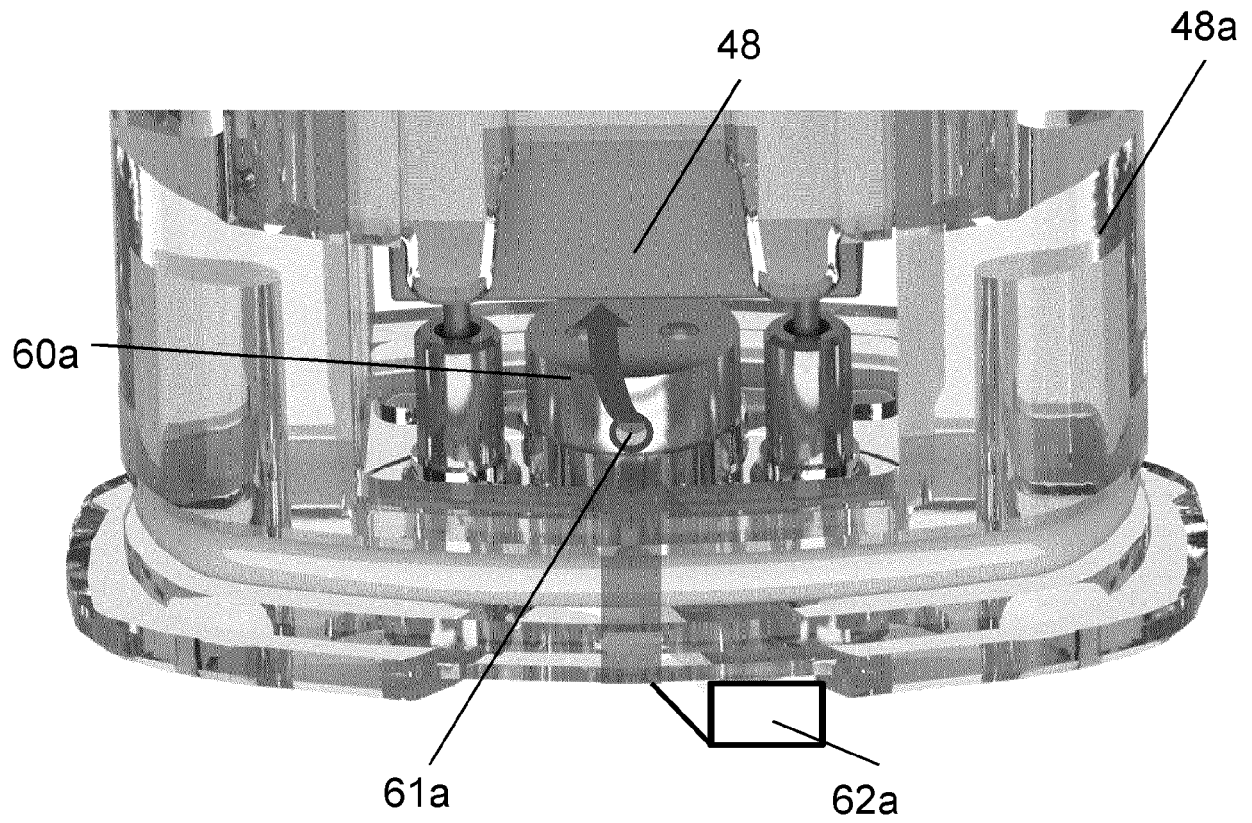


FIG. 7

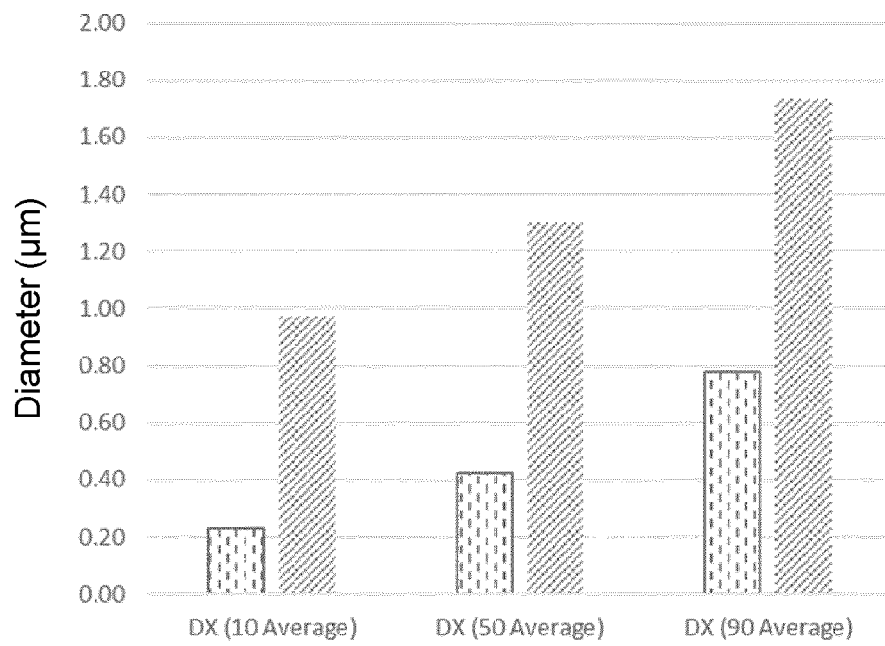


FIG. 8

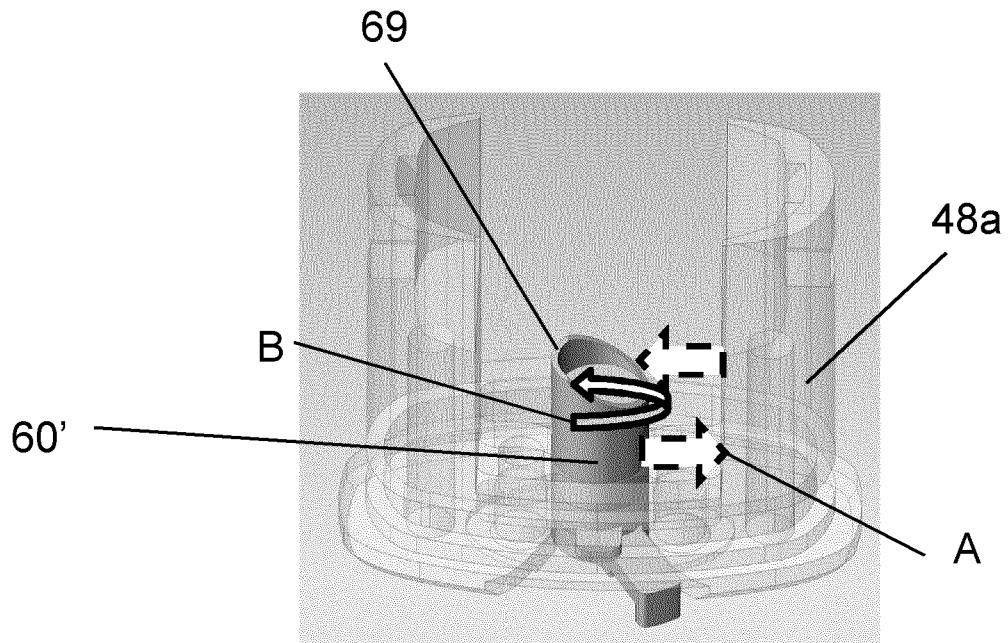


FIG. 9

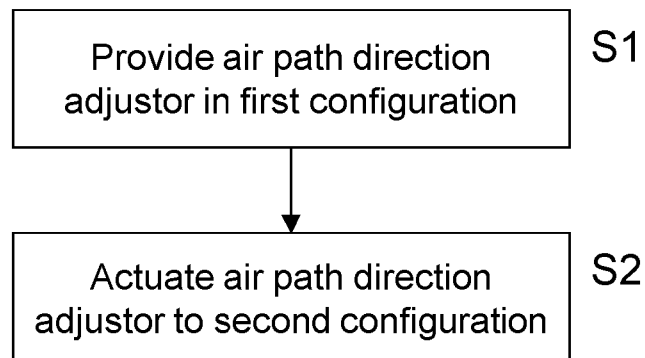


FIG. 10



EUROPEAN SEARCH REPORT

Application Number

EP 24 18 8565

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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	* abstract; figures 3,8 * * air flow channel, movable member; page 2 * * page 6, line 15 - page 6, line 19 * * example 4; page 12, line 9 *	3,4,9, 12,13	
A	US 2024/074513 A1 (ALLER JARED [US] ET AL) 7 March 2024 (2024-03-07) * abstract; figure 1a * * paragraph [0044] *	1-15	
A	RU 2 685 847 C1 (NICOVENTURES HOLDINGS LTD [GB]) 23 April 2019 (2019-04-23) * abstract; figures 1,2 * * page 14, line 25 - line 39 *	1-15	
A	CN 117 678 812 A (SHENZHEN INNOKIN TECH CO LTD) 12 March 2024 (2024-03-12) * abstract; figure 1 * * paragraph [0025] * * air adjustment; paragraph [0093] *	1-15	TECHNICAL FIELDS SEARCHED (IPC) A24F
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 9 December 2024	Examiner Schnitzhofer, Markus
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09-12-2024

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