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(54) **MOUTHPIECE WITH CONDENSATION MANAGEMENT FEATURE**

(71) Applicant: **PHILIP MORRIS PRODUCTS S.A.**, Neuchatel (CH)

(72) Inventors: **Rui Nuno Batista**, Morges (CH); **Eva Saade Latorre**, Colombier (CH)

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(57) **ABSTRACT**

The invention relates to a mouthpiece for an aerosol-generating system comprising an airflow path of the mouthpiece and a cone-shaped guiding member. The cone-shaped guiding member is arranged in the airflow path of the mouthpiece. The cone-shaped guiding member is configured to guide condensed liquid components in a direction towards an upstream end of the airflow path of the mouthpiece. The invention further relates to an aerosol-generating system.

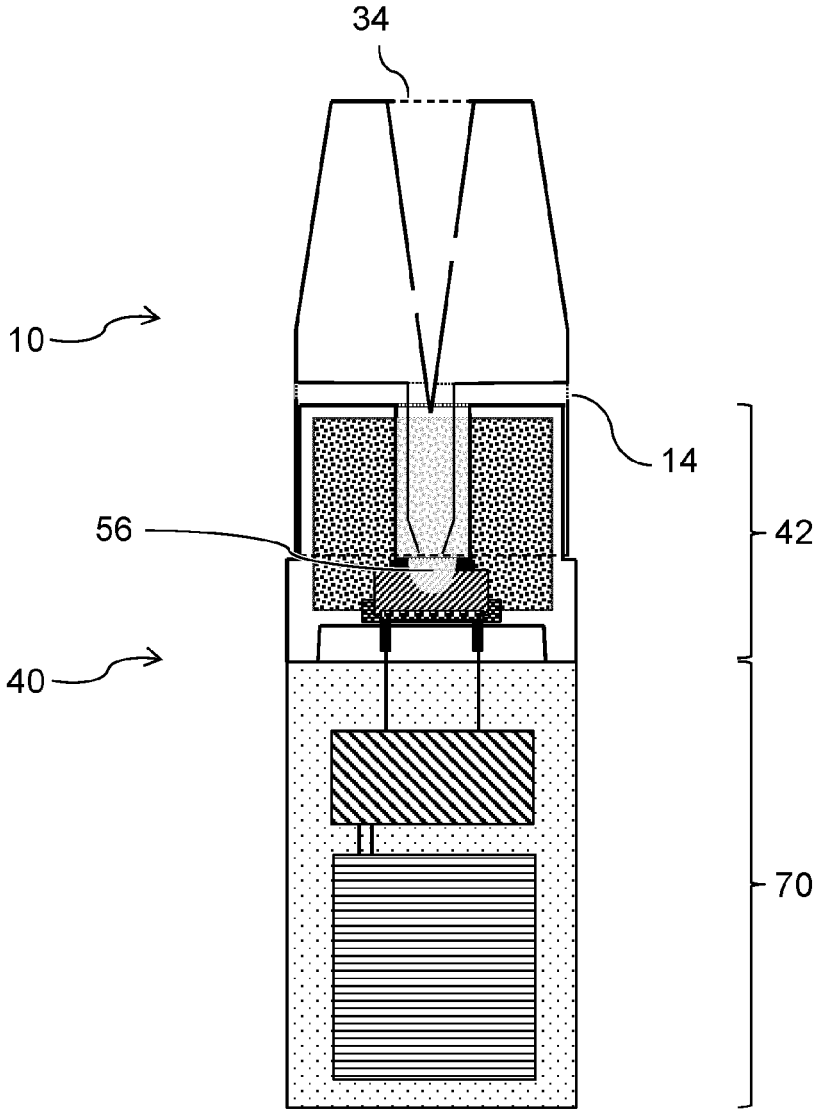


Fig. 1

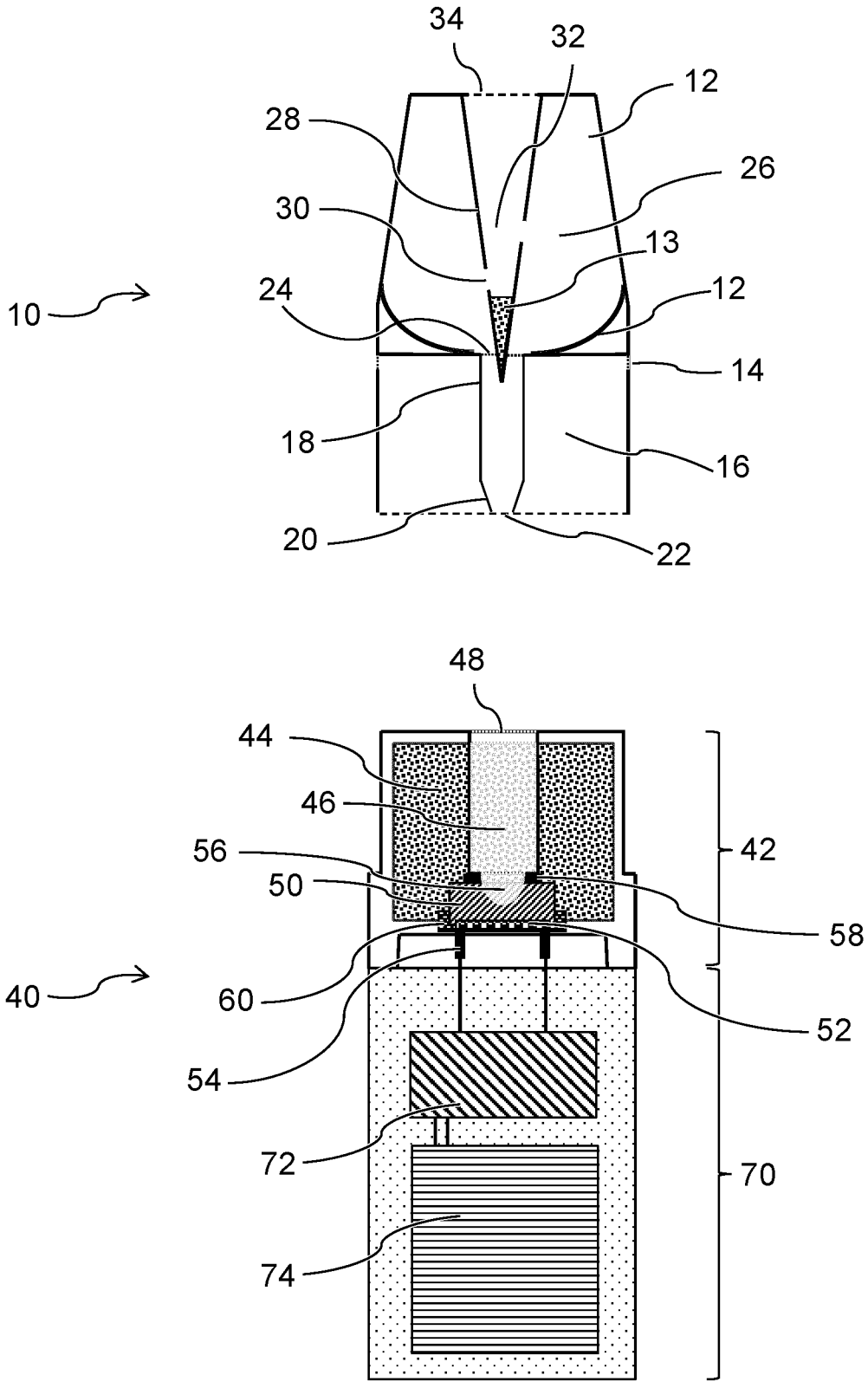

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Fig. 2

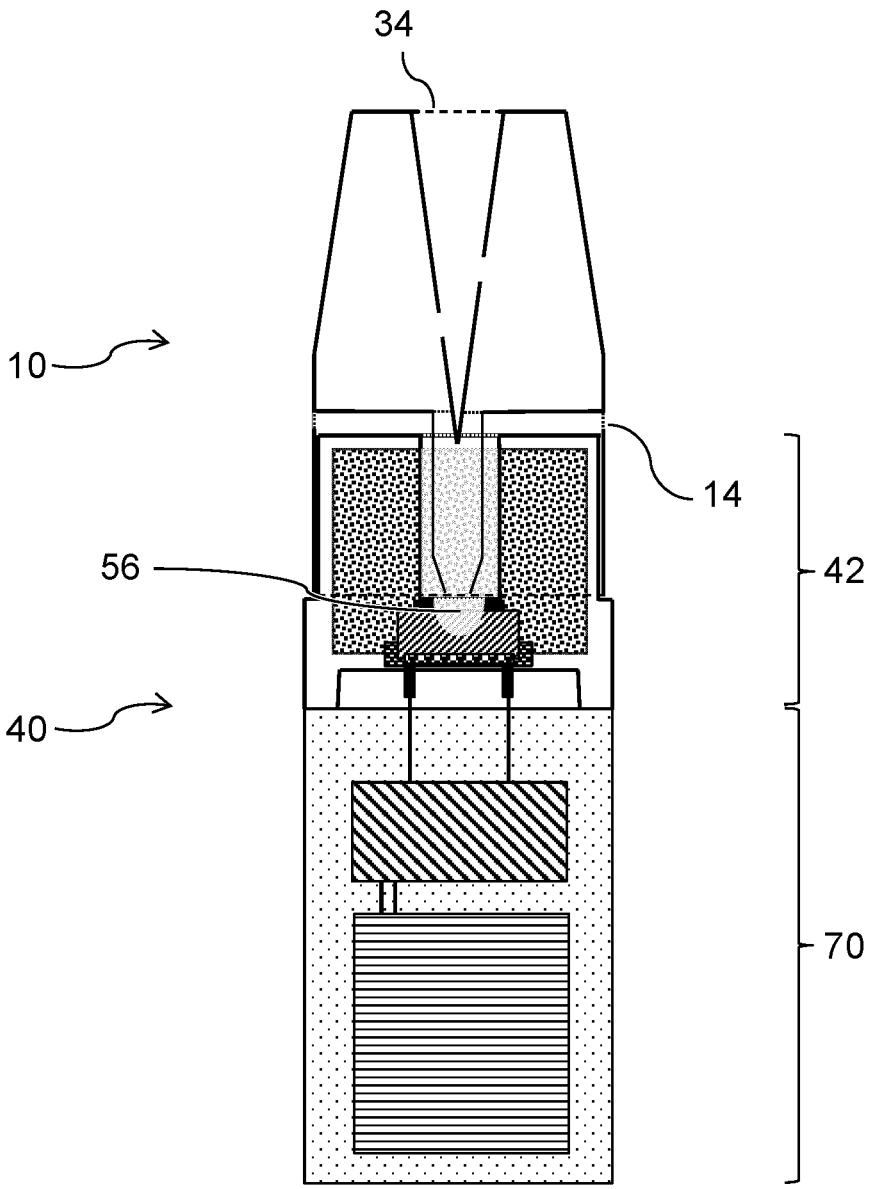


Fig. 3

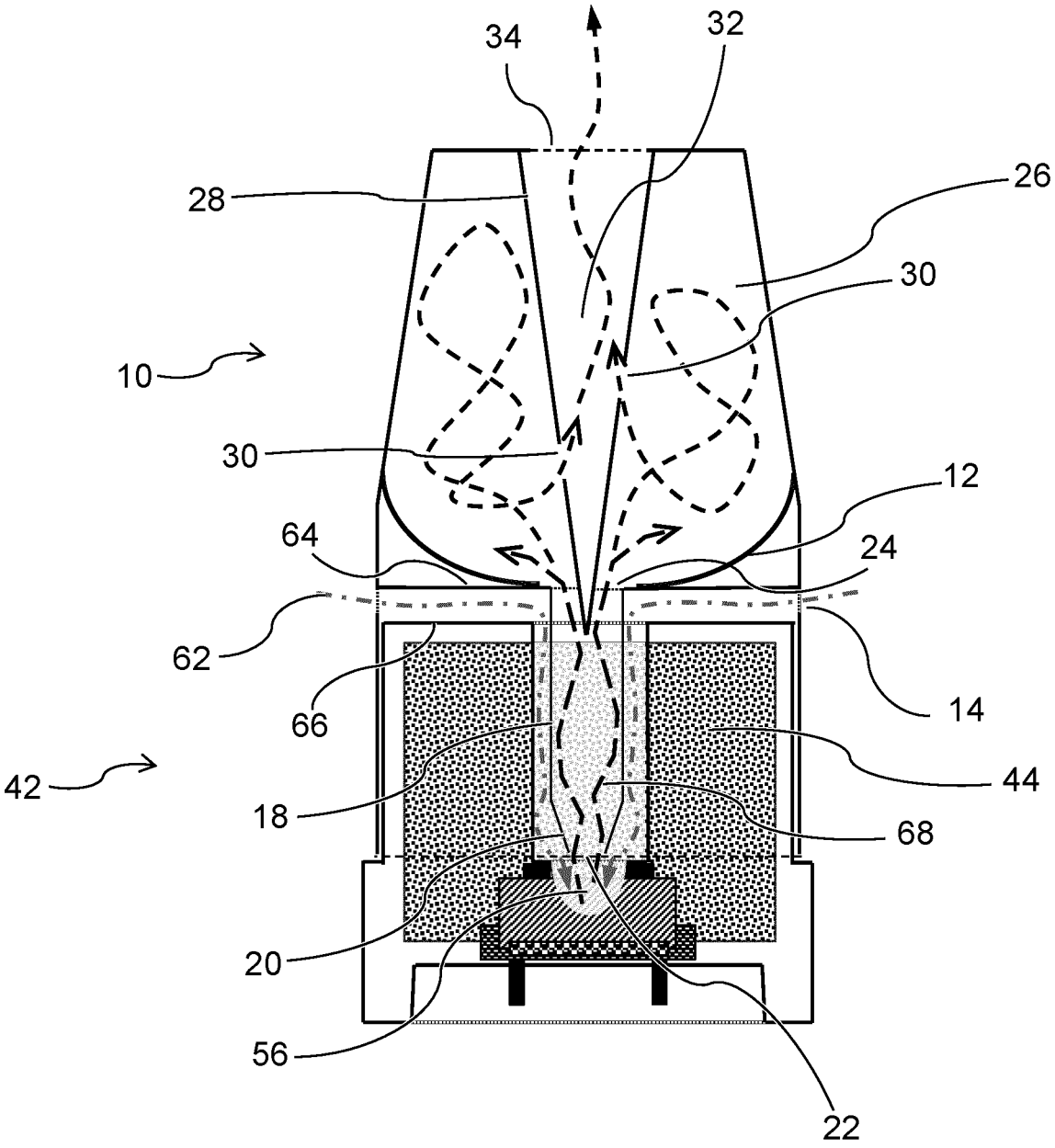
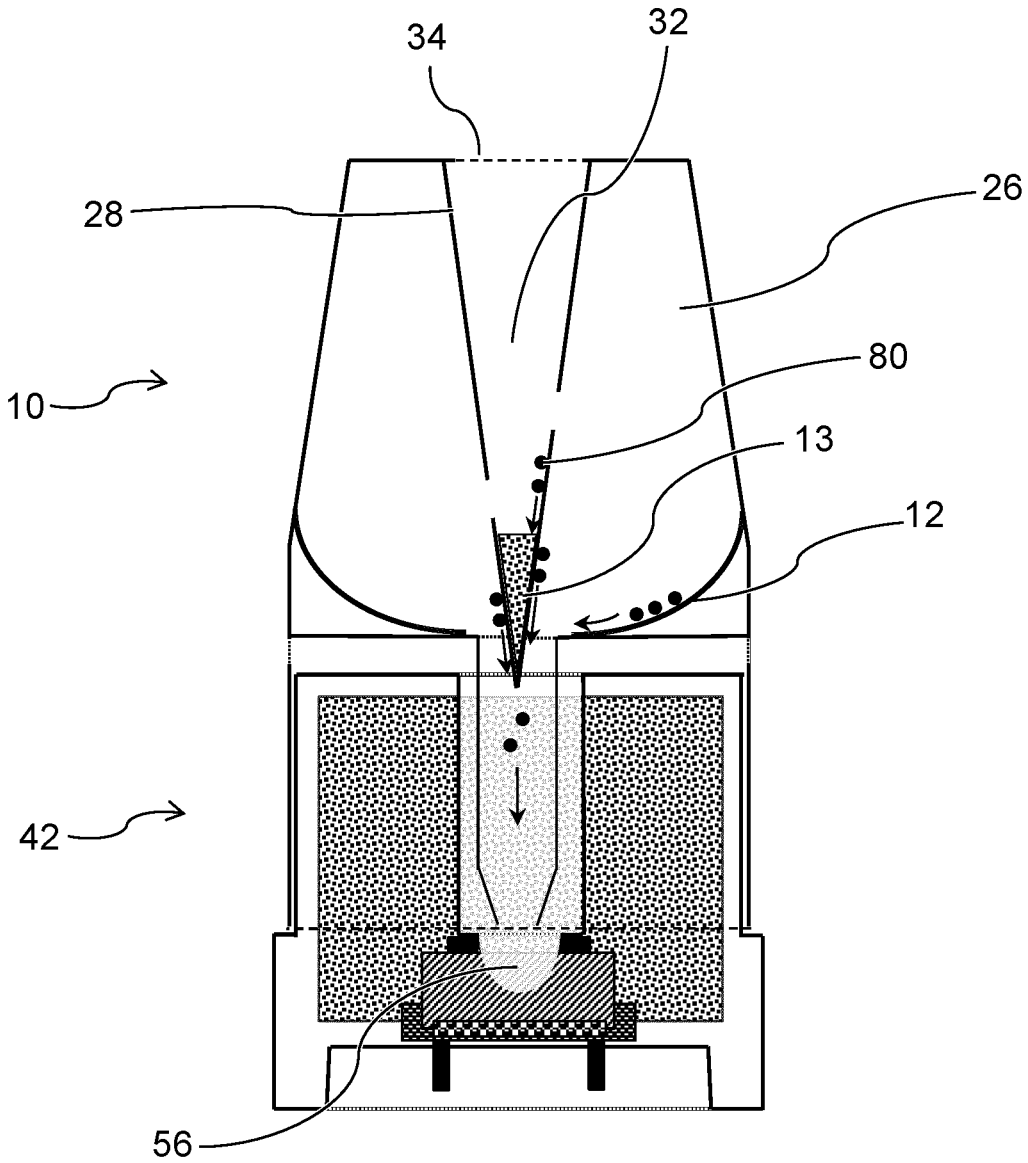


Fig. 4



MOUTHPIECE WITH CONDENSATION MANAGEMENT FEATURE

[0001] The present disclosure relates to a mouthpiece for an aerosol-generating system. The present disclosure further relates to an aerosol-generating system.

[0002] It is known to provide an aerosol-generating device or system for generating an inhalable vapor. Such systems may heat an aerosol-forming substrate to a temperature at which one or more components of the aerosol-forming substrate are volatilised without burning the aerosol-forming substrate. In aerosol-generating systems, a liquid aerosol-forming substrate may be delivered from a liquid storage portion to an electrical heating element. Upon heating to a target temperature, the aerosol-generating substrate vaporises to form an aerosol. The liquid substrate may be delivered to the heating element via a capillary component. The liquid storage portion may be formed as replaceable or refillable cartridge comprising a liquid aerosol-forming substrate. The cartridge may be attached to the aerosol-generating device for supplying the liquid aerosol-forming substrate to the device for aerosol generation.

[0003] Depending on the environmental circumstances, excessive condensation of aerosol may occur within the mouthpiece during use of an aerosol-generating system. For example, at low temperatures in winter, walls of the aerosol-generating device may become cold such that excessive condensation of aerosol may occur at cold walls of an airflow path. For example, in environments with high relative humidity, excessive condensation of aerosol in the device may be promoted. A higher relative humidity of the airflow entering the device may reduce the amount of aerosol the airflow is capable of carrying without excessive condensation.

[0004] It would be desirable to provide a mouthpiece for an aerosol-generating system or device which may reduce condensation of vaporized aerosol-forming substrate in the airflow path downstream of the heater. It would be desirable to provide a mouthpiece for an aerosol-generating system or device which may guide back condensed aerosol droplets from a location downstream of the heater towards the heater. It would be desirable to provide a mouthpiece for an aerosol-generating system or device which may catch condensed aerosol droplets to avoid leakage.

[0005] According to an embodiment of the invention there is provided a mouthpiece for an aerosol-generating system. The mouthpiece may comprise an airflow path of the mouthpiece. The mouthpiece may comprise a guiding member. The guiding member may be cone-shaped. The guiding member may be arranged in the airflow path of the mouthpiece. The guiding member may be configured to guide condensed liquid components in a direction towards an upstream end of the airflow path of the mouthpiece.

[0006] According to an embodiment of the invention there is provided a mouthpiece for an aerosol-generating system. The mouthpiece comprises an airflow path of the mouthpiece. The mouthpiece comprises a cone-shaped guiding member. The cone-shaped guiding member is arranged in the airflow path of the mouthpiece. The cone-shaped guiding member is configured to guide condensed liquid components in a direction towards an upstream end of the airflow path of the mouthpiece.

[0007] A mouthpiece for an aerosol-generating system or device which may reduce condensation of vaporized aerosol-forming substrate in the airflow path downstream of the heater is provided. A mouthpiece for an aerosol-generating system or device which may guide back condensed aerosol droplets from a location downstream of the heater towards the heater is provided. A mouthpiece for an aerosol-generating system or device which may catch condensed aerosol droplets to avoid leakage is provided.

[0008] Excessive condensation of the aerosol and droplet formation may occur at an outer surface of the cone-shaped guiding member. Due to the configuration of the cone-shaped guiding member, droplets formed on the outer surface of the cone-shaped guiding member may be guided in a direction towards an upstream end of the airflow path of the mouthpiece.

[0009] The cone-shaped guiding member may be configured to guide condensed liquid components in a direction towards an upstream end of the airflow path of the mouthpiece by means of the cone-shaped guiding member being configured such that a tip of the cone-shaped guiding member faces in a direction towards an upstream end of the airflow path of the mouthpiece.

[0010] A tip of the cone-shaped guiding member may face in a direction towards a distal end of the mouthpiece. When the mouthpiece is attached to the aerosol-generating system, the tip of the cone-shaped guiding member may face in a direction towards a distal end of the aerosol-generating system. When the mouthpiece is attached to the aerosol-generating system, the tip of the cone-shaped guiding member may face in a direction towards the atomizer of the aerosol-generating system.

[0011] Due to the shape and orientation of the hollow cone-shaped guiding member, condensed liquid droplets may be guided towards the atomizer. This guiding of droplets may be driven by gravity because, most commonly, the aerosol-generating system is predominantly used in a mainly upright or slightly tilted position with the proximal end of the mouthpiece generally facing away from the center of gravity. Alternatively or in addition, the guiding of droplets may be driven by capillarity effects of the thin tip region of the hollow cone-shaped guiding member.

[0012] After the condensed liquid droplets have been guided towards the atomizer, vaporization of the condensed liquid droplets may occur in an atomizing region in proximity to the atomizer.

[0013] A longitudinal axis of the cone-shaped guiding member may be arranged in parallel to a longitudinal axis of the mouthpiece. Additionally, a base of the cone-shaped guiding member may be directed towards a proximal end of the mouthpiece.

[0014] The cone-shaped guiding member may be a hollow cone-shaped guiding member.

[0015] The hollow cone-shaped guiding member may divide the airflow path of the mouthpiece into a downstream airflow chamber arranged within the hollow cone-shaped guiding member and an upstream airflow chamber surrounding the hollow cone-shaped guiding member. The upstream airflow chamber may be a homogenization chamber. The downstream airflow chamber may be a homogenization chamber. Both the upstream and the downstream airflow chamber may be homogenization chambers.

[0016] The homogenization chamber may assist in the evolution of the aerosol after the initial event of vaporization. The homogenization chamber may assist in creating a turbulent airflow. A more homogenized distribution of the

volatized particles in the aerosol may be achieved. More homogenized sizes of the volatized particles in the aerosol may be achieved.

[0017] A distal portion of the upstream airflow chamber may comprise a bowl-shaped wall element. The bowl-shaped wall element may function as an additional guiding member. A surface of the bowl-shaped wall element may comprise a hydrophobic material. This may advantageously reduce sticking of liquid droplets to the wall. This may advantageously promote the guiding effect. The hollow cone-shaped guiding member may comprise one or more apertures arranged to fluidly connect the upstream airflow chamber and the downstream airflow chamber.

[0018] When being arranged within an airflow chamber, preferably within a homogenization chamber, the bowl-shaped wall element may additionally increase one or both of turbulence of the airflow and homogenization of the aerosol.

[0019] The hollow cone-shaped guiding member may comprise a plurality of apertures asymmetrically arranged at one or both of different axial and different radial positions of the hollow cone-shaped guiding member. Such irregular arrangement of the apertures on the hollow cone-shaped guiding member may additionally improve turbulences of the airflow within the hollow cone-shaped guiding member.

[0020] The base (the widest part) of the hollow cone-shaped guiding member may comprise an aperture configured as an airflow outlet port.

[0021] The mouthpiece may comprise a high retention material arranged within the hollow cone-shaped guiding member. The high retention material may comprise a capillary material as described herein.

[0022] The high retention material may be arranged at a tip region of the hollow cone-shaped guiding member.

[0023] Excessive condensation of the aerosol and droplet formation may occur within an interior space of the hollow cone-shaped guiding member. Liquid droplets may thus form on an inner surface of the hollow cone-shaped guiding member. Due to the shape and orientation of the hollow cone-shaped guiding member, the droplets may be guided towards the high retention material. This guiding of droplets may be driven by one or both of gravity and capillarity effects of the thin tip region of the hollow cone-shaped guiding member. The droplets may then be soaked by, and trapped within, the high retention material. Thereby, leakage may advantageously be reduced or avoided.

[0024] A surface of the cone-shaped guiding member may comprise a hydrophobic material. An internal surface of the cone-shaped guiding member may comprise a hydrophobic material. An external surface of the cone-shaped guiding member may comprise a hydrophobic material. This may advantageously reduce sticking force of liquid droplets to the surface and enhance the mobility of the droplets along the surface. This may advantageously promote the guiding effect.

[0025] The mouthpiece may be configured to be replaceable. The replaceable mouthpiece may be a disposable item. The mouthpiece may be reusable.

[0026] As used herein, the term 'cone-shaped' may relate to shapes which may be substantially described by the geometrical shape of a right circular cone, an elliptical cone, a cone with an oval base, or a pyramid. The cone-shape may conform to the outer shape of the mouthpiece.

[0027] The mouthpiece may have any suitable outer shape. For example, the mouthpiece may have a generally rectangular, square, oval, elliptical, or circular cross-section perpendicular to a longitudinal direction of the mouthpiece, i.e. perpendicular to a direction extending from the proximal end to the distal end of the mouthpiece. The mouthpiece may be generally cylindrical having a generally circular cross-section.

[0028] One or both of the shape and size of the cross-section may change from the distal end to the proximal end of the mouthpiece. For example, the mouthpiece may have a generally circular cross-section with a shrinking diameter in a region towards the proximal end, such that the proximal region of the mouthpiece assumes the shape of a truncated cone.

[0029] According to an embodiment of the invention there is provided an aerosol-generating system comprising a mouthpiece as described herein. The aerosol-generating system comprises a main unit comprising an atomizer. The aerosol-generating system comprises an airflow path of the system extending from an air inlet via the atomizer to the airflow path of the mouthpiece. The cone-shaped guiding member is configured to guide liquid components condensed from the airflow in a direction towards the atomizer.

[0030] The main unit may comprise a liquid storage portion for holding a liquid aerosol-forming substrate. The atomizer may be configured for heating the liquid aerosol-forming substrate. The atomizer may comprise a heating element. The atomizer may be configured as a heating element.

[0031] The aerosol-generating system may comprise a cartridge for storing aerosol-forming substrate. The cartridge may comprise the liquid storage portion. The main unit may comprise a main body and a replaceable cartridge. The main body may comprise control electronics and a power supply. The main body may comprise the atomizer, or the cartridge may comprise the atomizer and the liquid storage portion. The mouthpiece may be releasably attached to the cartridge. The cartridge may be releasably attached to the main body. The mouthpiece and the cartridge of the main unit together may form an integral replaceable portion which is releasably attachable to the main body.

[0032] The system may be a three-part system, wherein one end of the cartridge is releasably attachable to the main body and another end of the cartridge is releasably attachable to the mouthpiece. The system may be a three-part system, wherein the mouthpiece is releasably attachable to the main body and the cartridge is either releasably attachable to the main body or is releasably insertable into the main body.

[0033] The system may be a two-part system, wherein the cartridge and the mouthpiece form an integral part which is releasably attachable to the main body. The system may be a two-part system, wherein the main body and the cartridge form an integral part which is releasably attachable to the mouthpiece.

[0034] The aerosol-generating system may have any suitable outer shape. For example, the aerosol-generating system may have a generally rectangular, square, elliptical, oval, or circular cross-section perpendicular to a longitudinal direction of the aerosol-generating system, i.e. perpendicular to a direction from the proximal end to the distal end of the aerosol-generating system. The aerosol-generating system may be generally cylindrical having a generally

circular cross-section. One or both of the shape and size of the cross-section may change from the distal end to the proximal end of the aerosol-generating system.

[0035] As used herein, the term 'aerosol-forming substrate' relates to a substrate capable of releasing one or more volatile compounds that can form an aerosol. Such volatile compounds may be released by heating the aerosol-forming substrate. An aerosol-forming substrate may conveniently be part of a cartridge. The cartridge may be configured to be replaceable or refillable.

[0036] The aerosol-forming substrate may be provided in a liquid form. The liquid aerosol-forming substrate may comprise an aerosol former such as propylene glycol or glycerine, and other additives and ingredients, such as flavourants. The liquid aerosol-forming substrate may comprise water, solvents, ethanol, plant extracts and natural or artificial flavours. The liquid aerosol-forming substrate may comprise alkaloids or cannabinoids. The liquid aerosol-forming substrate may comprise nicotine. The liquid aerosol-forming substrate may have a nicotine concentration of between about 0.5% and about 10%, for example about 2%. The liquid aerosol-forming substrate may be contained in a liquid storage portion of the aerosol-generating article, in which case the aerosol-generating article may be denoted as a cartridge. The aerosol-forming substrate may comprise an aerosol former that facilitates the formation of a dense and stable aerosol. Suitable aerosol-formers are well known in the art and include, but are not limited to: polyhydric alcohols, such as triethylene glycol, 1,3-butanediol and glycerine; esters of polyhydric alcohols, such as glycerol mono-, di- or triacetate; and aliphatic esters of mono-, di- or polycarboxylic acids, such as dimethyl dodecanedioate and dimethyl tetradecanedioate. Aerosol formers may be polyhydric alcohols or mixtures thereof, such as triethylene glycol, 1,3-butanediol and glycerine. The aerosol-former may be propylene glycol. The aerosol former may comprise both glycerine and propylene glycol.

[0037] As used herein, an 'aerosol-generating system' relates to a system comprising a main unit and a cartridge comprising an aerosol-forming substrate. The main unit may be an 'aerosol-generating device'.

[0038] As used herein, an 'aerosol-generating device' relates to a device that interacts with an aerosol-forming substrate to generate an aerosol. The aerosol-forming substrate may be comprised in a cartridge. The aerosol-generating device may comprise a housing, electric circuitry, a power supply, a heating chamber and a heating element.

[0039] The electric circuitry may comprise a microprocessor, which may be a programmable microprocessor. The microprocessor may be part of a controller. The electric circuitry may comprise further electronic components. The electric circuitry may be configured to regulate a supply of power to the atomizer.

[0040] Preferably, the atomizer is provided as a part of a vaporizing unit. The atomizer may be any device suitable for heating the liquid aerosol-forming substrate and vaporize at least a part of the liquid aerosol-forming substrate in order to form an aerosol.

[0041] The atomizer may comprise a heating element. The heating element may exemplarily be a coil heater, a capillary tube heater, a mesh heater, a metal plate heater, or one or more electrically conductive tracks on an insulating substrate. The heater may exemplarily be a resistive heater which receives electrical power and transforms at least part of the received electrical power into heat energy. Alternatively, or in addition, the heating element may be a susceptor that is inductively heated by a time varying magnetic field. The heating element may comprise only a single heating element or a plurality of heating elements. The temperature of the heating element or elements is preferably controlled by electric circuitry.

[0042] In any of the embodiments described above, the at least one heating element preferably comprises an electrically resistive material. Suitable electrically resistive materials include but are not limited to: semiconductors such as doped ceramics, electrically "conductive" ceramics (such as, for example, molybdenum disilicide), carbon, graphite, metals, metal alloys and composite materials made of a ceramic material and a metallic material. Such composite materials may comprise doped or undoped ceramics. Examples of suitable doped ceramics include doped silicon carbides. Examples of suitable metals include titanium, zirconium, tantalum and metals from the platinum group. Examples of suitable metal alloys include stainless steel, nickel-, cobalt-, chromium-, aluminium-titanium-zirconium-, hafnium-, niobium-, molybdenum-, tantalum-, tungsten-, tin-, gallium-, manganese- and iron-containing alloys, and super-alloys based on nickel, iron, cobalt, stainless steel, Timetal® and iron-manganese-aluminium based alloys. In composite materials, the electrically resistive material may optionally be embedded in, encapsulated or coated with an insulating material or vice-versa, depending on the kinetics of energy transfer and the external physicochemical properties required. Examples of suitable composite heater elements are disclosed in U.S. Pat. No. 5,498,855, WO-A-03/095688 and U.S. Pat. No. 5,514,630.

[0043] The vaporizing unit may further comprise a capillary material for transferring liquid aerosol-forming substrate to the heater element. The capillary material may have a fibrous or spongy structure. The capillary material preferably comprises a bundle of capillaries. For example, the capillary material may comprise a plurality of fibres or threads or other fine bore tubes. The fibres or threads may be generally aligned to convey liquid to the heater. Alternatively, the capillary material may comprise sponge-like or foam-like material. The structure of the capillary material forms a plurality of small pores or tubes, through which the liquid can be transported by capillary action. The capillary material may comprise any suitable material or combination of materials. Examples of suitable materials are porous material. Examples of suitable materials are sponge or foam material. Examples of suitable material include ceramic material. Examples of suitable material include graphite-based material. Suitable materials may be fibres. Suitable materials may be sintered powders. Suitable material may be foamed metal. Suitable material may be plastics material. Suitable material may fibrous material. Suitable material may be made of spun fibres. Suitable material may be made of extruded fibres. Suitable material may be made of cellulose acetate. Suitable material may be made of polyester. Suitable material may be made of bonded polyolefin. Suitable material may be made of polyethylene. Suitable material may be made of ethylene. Suitable material may be made of polypropylene. Suitable material may be made of nylon fibre. Suitable material may be made of ceramic. Suitable material may be made of combinations of one or more of ethylene, polyethylene, ethylene, polypropylene or nylon. The capillary material may have any suitable capil-

larity and porosity so as to be used with different liquid physical properties. The liquid has physical properties, including but not limited to viscosity, surface tension, density, thermal conductivity, boiling point and vapour pressure, which allow the liquid to be transported through the capillary material by capillary action. The capillary material may be configured to convey the aerosol-forming substrate to the vaporiser. The capillary material may extend into interstices in the vaporiser.

[0044] The one or more capillary wicks may be arranged to contact liquid held in the liquid storage portion. The one or more capillary wicks may extend into the liquid storage portion. In this case, in use, liquid may be transferred from the liquid storage portion to the one or more elements of the aerosol-generating means by capillary action in the one or more capillary wicks. The one or more capillary wicks may have a first end and a second end. The first end may extend into the liquid storage portion to draw liquid aerosol-forming substrate held in the liquid storage portion into the aerosol generating means.

[0045] Capillary material may be arranged to contact liquid held in the liquid storage portion. The capillary material may extend into the liquid storage portion. In this case, in use, liquid may be transferred from the liquid storage portion to the one or more elements of the aerosol-generating means by capillary action in the capillary material. The capillary material may have a first end and a second end. The first end may extend into the liquid storage portion to draw liquid aerosol-forming substrate held in the liquid storage portion into the aerosol generating means.

[0046] As used herein, the terms "upstream", and "downstream", are used to describe the relative positions of components, or portions of components, of the mouthpiece or an aerosol-generating device used together with the mouthpiece in relation to the direction in which air flows through the mouthpiece or aerosol-generating device during use thereof along the airflow path. The mouthpiece according to the invention may comprise a proximal end through which, in use, an aerosol exits the mouthpiece. The proximal end of the aerosol generating device may also be referred to as the mouth end or the downstream end. The proximal end of the aerosol generating device may be the mouthpiece connected to the aerosol generating device. The mouth end is downstream of the distal end. The distal end of the aerosol generating device or the mouthpiece may also be referred to as the upstream end. Components, or portions of components, of the mouthpiece or the aerosol generating device may be described as being upstream or downstream of one another based on their relative positions with respect to the airflow path through the mouthpiece or the aerosol generating device.

[0047] The term 'airflow path' as used herein denotes a channel suitable to transport gaseous media. An airflow path may be used to transport ambient air. An airflow path may be used to transport an aerosol. An airflow path may be used to transport a mixture of air and aerosol.

[0048] The cartridge for storing aerosol-forming substrate may be part of the replaceable mouthpiece. The cartridge may form an integral part of the mouthpiece. The cartridge may be refillable. When the aerosol-forming substrate is consumed, the user may refill the cartridge such that the mouthpiece including the refillable cartridge can be re-used. Designing parts to be re-usable helps to reduce waste and reduces the ecological impact of the device or the system or the cartridge on the environment.

[0049] The cartridge for storing aerosol-forming substrate may be part of the main unit of the aerosol-generating system. The cartridge may form an integral part of the main unit. The cartridge may be refillable. When the aerosol-forming substrate is consumed, the user may refill the cartridge such that the mouthpiece including the refillable cartridge can be re-used.

[0050] The cartridge for storing aerosol-forming substrate may be configured to be replaceable. When the aerosol-forming substrate is consumed, the user may remove the cartridge from the aerosol-generating system and may replace the used cartridge by a new filled cartridge.

[0051] Upon assembly of the aerosol-generating system, an airflow path may be defined between the mouthpiece and the main unit. The mouthpiece and the main unit may be connected using any suitable connection means. The connection means may include a screw connection, a friction fit or a form fit connection. The connection means may be configured such that the connection can be established by a user by hand. This may facilitate handling and assembly of the aerosol-generating system.

[0052] The mouthpiece and the main unit may have corresponding structural components with complementary geometrical shapes. The structural components with complementary geometrical shapes are preferably provided at adjacent interface portions of the mouthpiece and the main unit. Upon assembly of the mouthpiece and the main unit, these interface portions may be located next to each other. When the mouthpiece is connected to the main unit, these corresponding structural components of the mouthpiece and the main unit may define an airflow path from an air inlet to the air outlet via the atomizer or heating element. The airflow path may be formed upon assembly of the main unit and the mouthpiece. In those embodiments, without the mouthpiece, the main unit may be rendered inoperable, since no continuous airflow path for inhaling an aerosol is provided. Thereby, the main unit alone does not allow for formation of an aerosol suitable for inhalation. Thereby, an efficient protection mechanism against unauthorized use may be provided.

[0053] The cartridge and the mouthpiece may both be replaceable. One or both ends of the cartridge or the mouthpiece may be protected by a sealing foil. The sealing foil may be a pierceable sealing foil, which is ruptured during assembly of the aerosol-generating system. The sealing foil may be a removable sealing foil, which is removed from the cartridge before it is used.

[0054] Such sealing foil protects the cartridge and the mouthpiece during shipping and in particular before use from debris or other undesired contaminations.

[0055] Below, there is provided a non-exhaustive list of non-limiting examples. Any one or more of the features of these examples may be combined with any one or more features of another example, embodiment, or aspect described herein.

[0056] Example A: A mouthpiece for an aerosol-generating system, comprising an airflow path of the mouthpiece and a cone-shaped guiding member;

[0057] wherein the cone-shaped guiding member is arranged in the airflow path of the mouthpiece, and

[0058] wherein the cone-shaped guiding member is configured to guide condensed liquid components in a direction towards an upstream end of the airflow path of the mouthpiece.

[0059] Example B: The mouthpiece according to Example A, wherein a tip of the cone-shaped guiding member faces in a direction towards a distal end of the mouthpiece.

[0060] Example C: The mouthpiece according to Example A or Example B, wherein the cone-shaped guiding member is a hollow cone-shaped guiding member.

[0061] Example D: The mouthpiece according to any of the preceding examples, wherein a longitudinal axis of the cone-shaped guiding member is arranged in parallel to a longitudinal axis of the mouthpiece, and wherein a base of the cone-shaped guiding member is directed towards a proximal end of the mouthpiece.

[0062] Example E: The mouthpiece according to Example C or Example D, wherein the cone-shaped guiding member is hollow and divides the airflow path of the mouthpiece into a downstream airflow chamber arranged within the hollow cone-shaped guiding member and an upstream airflow chamber surrounding the hollow cone-shaped guiding member.

[0063] Example F: The mouthpiece according to Example E, wherein a distal portion of the upstream airflow chamber comprises a bowl-shaped wall element.

[0064] Example G: The mouthpiece according to Example E or Example F, wherein the hollow cone-shaped guiding member comprises one or more apertures arranged to fluidly connect the upstream airflow chamber and the downstream airflow chamber.

[0065] Example H: The mouthpiece according to Example G, wherein the hollow cone-shaped guiding member comprises a plurality of apertures asymmetrically arranged at different axial and radial positions of the hollow cone-shaped guiding member.

[0066] Example I: The mouthpiece according to any of Examples C to H, wherein the base of the hollow cone-shaped guiding member comprises an aperture configured as an airflow outlet port.

[0067] Example J: The mouthpiece according to any of Example C to I, comprising a high retention material arranged within the hollow cone-shaped guiding member.

[0068] Example K: The mouthpiece according to Example J, wherein the high retention material is arranged at a tip region of the hollow cone-shaped guiding member.

[0069] Example L: The mouthpiece according to any of the preceding examples, wherein a surface of the cone-shaped guiding member comprises a hydrophobic material.

[0070] Example M: The mouthpiece according to any of the preceding examples, wherein the mouthpiece is configured to be replaceable.

[0071] Example N: An aerosol-generating system, comprising

[0072] a mouthpiece according to any of the preceding examples;

[0073] a main unit comprising an atomizer; and

[0074] an airflow path of the system extending from an air inlet via the atomizer to the airflow path of the mouthpiece;

[0075] wherein the cone-shaped guiding member is configured to guide liquid components condensed from the airflow in a direction towards the atomizer.

[0076] Example O: The aerosol-generating system according to Example N, wherein the main unit comprises a liquid storage portion for holding a liquid aerosol-forming substrate, and wherein the atomizer is configured for heating the liquid aerosol-forming substrate.

[0077] Example P: The aerosol-generating system according to Example O, wherein the main unit comprises a main body and a replaceable cartridge,

[0078] the main body comprising control electronics and a power supply; and

[0079] the cartridge comprising the atomizer and the liquid storage portion;

[0080] wherein the mouthpiece is attached to the cartridge and wherein the cartridge is attached to the main body.

[0081] Example Q: The aerosol-generating system according to Example O, wherein the mouthpiece and the cartridge of the main unit together form an integral replaceable portion which is releasably attachable to the main body.

[0082] Example R: The aerosol-generating system according to any of Examples N to Q, wherein the atomizer comprises a heating element.

[0083] Example S: The aerosol-generating system according to any of Examples N to R, wherein the mouthpiece is replaceable.

[0084] Features described in relation to one embodiment may equally be applied to other embodiments of the invention.

[0085] The invention will be further described, by way of example only, with reference to the accompanying drawings in which:

[0086] FIG. **1** shows an aerosol-generating system in detached configuration;

[0087] FIG. **2** shows an assembled aerosol-generating system;

[0088] FIG. **3** shows a portion of an assembled aerosol-generating system; and

[0089] FIG. **4** shows a portion of an assembled aerosol-generating system.

[0090] FIG. **1** shows a cross-section of a generally cylindrically shaped aerosol-generating system comprising a replaceable mouthpiece **10** and a main unit **40** in a detached configuration.

[0091] The replaceable mouthpiece **10** shown in FIG. **1** comprises an optional bowl-shaped wall element **12** and an optional high retention material **13**, both of which are omitted in the embodiment of FIG. **2**. The replaceable mouthpiece **10** comprises air inlets **14** and an open chamber part **16**.

[0092] The replaceable mouthpiece **10** comprises a hollow element. In the embodiment shown, the hollow element is a hollow tubular element **18**. However, the hollow element may as well be of a different shape, for example a hollow truncated cone or a hollow cuboid, as long as the airflow route (as described below) will not be blocked. The hollow tubular element **18** comprises a conical end portion **20**, a tube inlet opening **22**, and a tube outlet opening **24**. The tube outlet opening **24** is in direct fluid connection with an annular homogenization chamber **26**. The bowl-shaped wall element **12** is located within the homogenization chamber **26** at distal portion thereof.

[0093] The mouthpiece **10** further comprises a cone-shaped guiding member **28** with apertures **30**. A longitudinal axis of the cone-shaped guiding member **28** is arranged in

parallel to a longitudinal axis of the mouthpiece **10**. At the same time, the longitudinal axis of the cone-shaped guiding member **28** is arranged in parallel to a longitudinal axis of the aerosol-generating system. A base of the cone-shaped guiding member **28** is directed towards a proximal end of the mouthpiece **10** and, at the same time, of the aerosol-generating system. The cone-shaped guiding member **28** is hollow circumscribing an empty interior space **32**.

[0094] The hollow cone-shaped guiding member **28** thus divides the airflow path of the mouthpiece **10** into a downstream airflow chamber arranged within the hollow cone-shaped guiding member **28** and an upstream airflow chamber surrounding the hollow cone-shaped guiding member **28**, wherein the interior space **32** of the hollow cone-shaped guiding member **28** is the downstream airflow chamber, and wherein the homogenization chamber **26** is the upstream airflow chamber.

[0095] The homogenization chamber **26** is in fluid connection with the interior space **32** of the hollow cone-shaped guiding member **28** via the apertures **30**. The base of the cone-shaped guiding member **28** forms an air outlet **34** for inhalation by a user.

[0096] As can be seen from the upper part of FIG. **1**, no continuous airflow path is defined in the mouthpiece **10** between the air inlet openings **14** and the outlet end **34**. This is due to the open distal end of the mouthpiece **10** (see the dotted line at the bottom end of the mouthpiece **10** in FIG. **1**) which does not provide an enclosed air channel from the air inlets **14** to the inside of the hollow tubular element **18**.

[0097] The main unit **40** is an aerosol-generating device comprising a cartridge-and-heating section **42** and a power-and-control section **70**. The cartridge-and-heating section **42** and the power-and-control section **70** may be detachable or may be formed as an integral main unit **40**.

[0098] The cartridge-and-heating section **42** comprises a liquid storage portion **44** filled with a liquid aerosol-forming substrate. The liquid storage portion **44** coaxially surrounds a tubular cavity **46** with an open proximal end **48**. The inner diameter of the tubular cavity **46** is larger than the outer diameter of the tubular element **18** of the mouthpiece **10**.

[0099] The cartridge-and-heating section **42** comprises an atomizer configured as a heating element for heating an aerosol-forming substrate. The heating element comprises a ceramic heater main body **50** in connection to an electrical resistance **52** and electrical contacts **54**. The ceramic heater main body **50** is a porous ceramic component that is in fluid communication with the liquid aerosol-forming substrate stored in the liquid storage portion **44**. An aerosolization zone **56** is provided in a bowl-shaped cavity which is surrounded by the ceramic heater main body **50**. Further provided are overmolded sealings **58**, **60** for mounting the heating element in a leak-tight manner.

[0100] The power-and-control section **70** comprises a controller **72** and a battery **74**. The controller **72** is in electrical connection to both the contacts **54** of the heating element and the battery **74**.

[0101] When the heating element is activated, liquid aerosol-forming substrate absorbed in the porous ceramic component **50** is evaporated. The evaporated aerosol-forming substrate is mixed with ambient air to form an aerosol. For this purpose, an airflow path is defined within the assembled aerosol-generating system.

[0102] FIG. **2** shows a cross-section of an aerosol-generating system similar to the system of FIG. **1** in an assembled configuration where the replaceable mouthpiece **10** is attached to the main unit **40**. The difference to the system of FIG. **1** is that the bowl-shaped wall element **12** and the high retention material **13** of FIG. **1** are omitted in the embodiment of FIG. **2**.

[0103] In the assembled configuration, the mouthpiece **10** is sleeved around and frictionally engaged with the cartridge-and-heating section **42** of the main unit **40**. In the fully assembled position, an enclosed airflow path is defined between the corresponding structural components of the mouthpiece **10** and the cartridge-and-heating section **42** of the main unit **40** having complementary geometrical shapes. The airflow path extends from the air inlets **14** to the aerosolization zone **56** of the heating element, and further from the aerosolization zone **56** to the air outlet **34**.

[0104] When a user draws a puff at the outlet end **34** of the mouthpiece **10**, an airflow is established from the air inlet openings **14** towards the aerosolization zone **56** where drawn air is mixed with an atomized aerosol-forming substrate. Under aerosol formation, the mixture is transported to the air outlet **34** where it is inhaled by a user. The airflow path is shown in more detail in FIG. **3**.

[0105] FIG. **3** shows a cross-section of a portion of the aerosol-generating system of FIG. **2** in an assembled configuration, where the replaceable mouthpiece **10** is attached to the cartridge-and-heating section **42** of the main unit **40**. Additionally, in difference to the mouthpiece **10** of FIG. **2**, the mouthpiece **10** of FIG. **3** comprises a bowl-shaped wall element **12**.

[0106] When a user draws a puff at the air outlet **34** of the mouthpiece **10**, an airflow is established. Ambient air **62** enters the air inlets **14** into a first portion of the airflow path formed between walls **64** of the mouthpiece **10** and walls **66** of the cartridge-and-heating section **42**. The air **62** further travels along a second portion of the airflow path formed between walls **18**, **20** of the mouthpiece **10** and walls of the liquid storage portion **44** towards the aerosolization zone **56**. The drawn air is mixed at the aerosolization zone **56** with the atomized aerosol-forming substrate such that an aerosol **68** is formed. The aerosol **68** is transported through tube inlet opening **22** into the hollow tubular element **18** with its conical end portion **20**. The aerosol **68** further travels into the annular homogenization chamber **26**. The annular homogenization chamber **26** provides for a turbulent airflow creating good conditions for homogenization of the aerosol **68**. The bowl-shaped wall element **12** may additionally increase turbulence and homogenization within the annular homogenization chamber **26**.

[0107] Then, the mixture **68** enters apertures **30** into interior space **32** of the cone-shaped guiding member **28** to finally exit the mouthpiece **10** via air outlet **34** to be inhaled by a user. The apertures **30** are asymmetrically, or irregularly, disposed to additionally increase turbulence and homogenization within interior space **32**.

[0108] FIG. **4** shows a portion of an aerosol-generating system highly similar to that of FIG. **3**, with the sole exception that, in difference to the mouthpiece **10** of FIG. **3**, the mouthpiece **10** of FIG. **4** comprises a high retention material **13**. In FIG. **4**, the airflow route is not indicated. Instead, the condensation management of the mouthpiece **10** is indicated. For that reason, several dot-shaped condensed liquid droplets **80** are shown, and their moving direction is indicated by arrows.

[0109] When the aerosol-generating system is used, for example in cold environments or in environments with a high relative humidity, excessive condensation of the aerosol may occur. The condensation may lead to the formation of liquid droplets **80** at walls of the airflow path of the mouthpiece **10**.

[0110] Excessive condensation of the aerosol and droplet **80** formation may occur within the homogenization chamber **26**. Droplets **80** may thus form on an outer surface of the hollow cone-shaped guiding member **28**. Due to the shape and orientation of the hollow cone-shaped guiding member **28**, droplets **80** are guided towards the heating element and the aerosolization zone **56**, where the droplets may be heated to vaporize. This guiding of droplets may be driven by gravity because, most commonly, the aerosol-generating system is predominantly used in a mainly upright or slightly tilted position, with the proximal end of the mouthpiece generally facing away from the center of gravity. Further, the guiding of droplets may be driven by capillarity effects of the thin tip region of the hollow cone-shaped guiding member **28**.

[0111] Excessive condensation of the aerosol and droplet **80** formation may occur within the interior space **32** of the hollow cone-shaped guiding member **28**. Droplets **80** may thus form on an inner surface of the hollow cone-shaped guiding member **28**. Due to the shape and orientation of the hollow cone-shaped guiding member **28**, droplets **80** are guided towards the high retention material **13**. This guiding of droplets may similarly be driven by one or both of gravity and capillarity effects of the thin tip region of the hollow cone-shaped guiding member **28**. The droplets may then be soaked by and trapped in the high retention material **13**. Thereby, leakage out of the outlet end **34** of the mouthpiece **10** may advantageously be reduced or avoided.

[0112] In addition, the bowl shape of the bowl-shaped wall element **12** may assist in guiding condensed droplets **80** which have been formed within the homogenization chamber **26** back towards the heating element and the aerosolization zone **56**, where the droplets may be heated to vaporize. This effect may be additionally enhanced when the surface of the bowl-shaped wall element **12** comprises a hydrophobic material.

1. A mouthpiece for an aerosol-generating system, comprising

an airflow path of the mouthpiece and a cone-shaped guiding member;

wherein the cone-shaped guiding member is arranged in the airflow path of the mouthpiece,

wherein the cone-shaped guiding member is configured to guide condensed liquid components in a direction towards an upstream end of the airflow path of the mouthpiece, and

wherein a tip of the cone-shaped guiding member faces in a direction towards a distal end of the mouthpiece.

2. The mouthpiece according to claim **1**, wherein the cone-shaped guiding member is a hollow cone-shaped guiding member.

3. The mouthpiece according to claim **1**, wherein a longitudinal axis of the cone-shaped guiding member is arranged in parallel to a longitudinal axis of the mouthpiece, and wherein a base of the cone-shaped guiding member is directed towards a proximal end of the mouthpiece.

4. The mouthpiece according to claim **2**, wherein the cone-shaped guiding member is hollow and divides the airflow path of the mouthpiece into a downstream airflow chamber arranged within the hollow cone-shaped guiding member and an upstream airflow chamber surrounding the hollow cone-shaped guiding member.

5. The mouthpiece according to claim **4**, wherein a distal portion of the upstream airflow chamber comprises a bowl-shaped wall element.

6. The mouthpiece according to claim **4**, wherein the hollow cone-shaped guiding member comprises one or more apertures arranged to fluidly connect the upstream airflow chamber and the downstream airflow chamber.

7. The mouthpiece according to claim **6**, wherein the hollow cone-shaped guiding member comprises a plurality of apertures asymmetrically arranged at different axial and radial positions of the hollow cone-shaped guiding member.

8. The mouthpiece according to claim **2**, wherein a base of the hollow cone-shaped guiding member comprises an aperture configured as an airflow outlet port.

9. The mouthpiece according to claim **2**, comprising a high retention material arranged within the hollow cone-shaped guiding member.

10. The mouthpiece according to claim **9**, wherein the high retention material is arranged at a tip region of the hollow cone-shaped guiding member.

11. The mouthpiece according to claim **1**, wherein a surface of the cone-shaped guiding member comprises a hydrophobic material.

12. An aerosol-generating system, comprising

a mouthpiece according to claim **1**;

a main unit comprising an atomizer; and

an airflow path of the system extending from an air inlet via the atomizer to the airflow path of the mouthpiece;

wherein the cone-shaped guiding member is configured to guide liquid components condensed from the airflow in a direction towards the atomizer.

13. The aerosol-generating system according to claim **12**, wherein the main unit comprises a liquid storage portion for holding a liquid aerosol-forming substrate; wherein the atomizer is configured for heating the liquid aerosol-forming substrate; wherein the main unit comprises a main body and a replaceable cartridge,

the main body comprising control electronics and a power supply; and

the cartridge comprising the atomizer and the liquid storage portion; and

wherein the mouthpiece is attached to the cartridge and wherein the cartridge is attached to the main body.

14. The aerosol-generating system according to claim **13**, wherein the mouthpiece and the cartridge of the main unit together form an integral replaceable portion which is releasably attachable to the main body.

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