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(57) **ABSTRACT**

The invention relates to an aerosol-generating system comprising a main unit and a replaceable mouthpiece. The main unit comprises a heating element for heating an aerosol-forming substrate. The mouthpiece comprising an outlet channel. The mouthpiece and the main unit have corresponding structural components with complementary geometrical shapes. When the mouthpiece is connected to the main unit, the corresponding structural components of the mouthpiece and the main unit define an inlet channel. The inlet channel and the outlet channel form an airflow path from an air inlet to an air outlet via the heating element.

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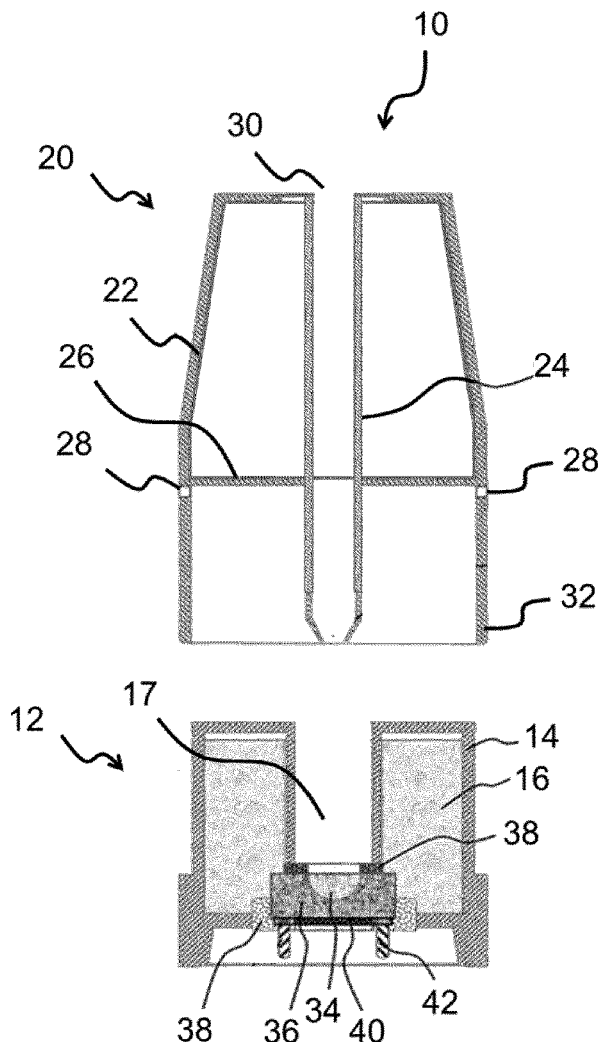


Fig. 1

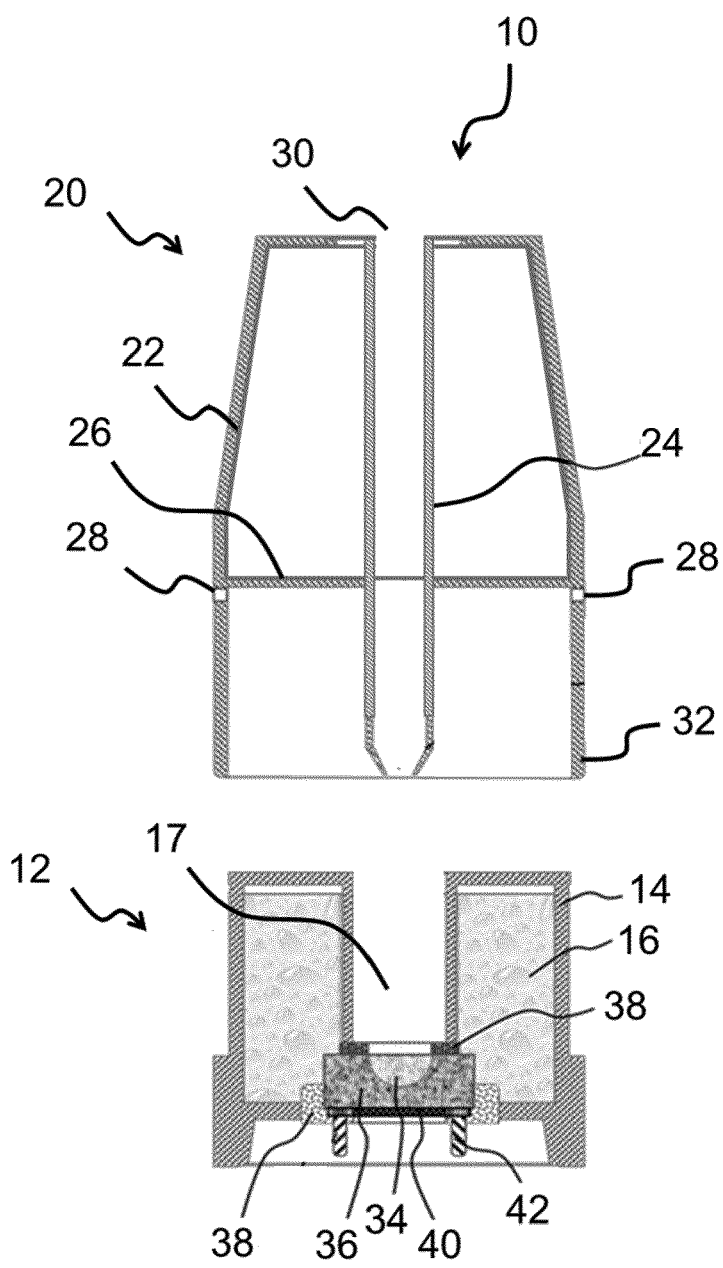


Fig. 2

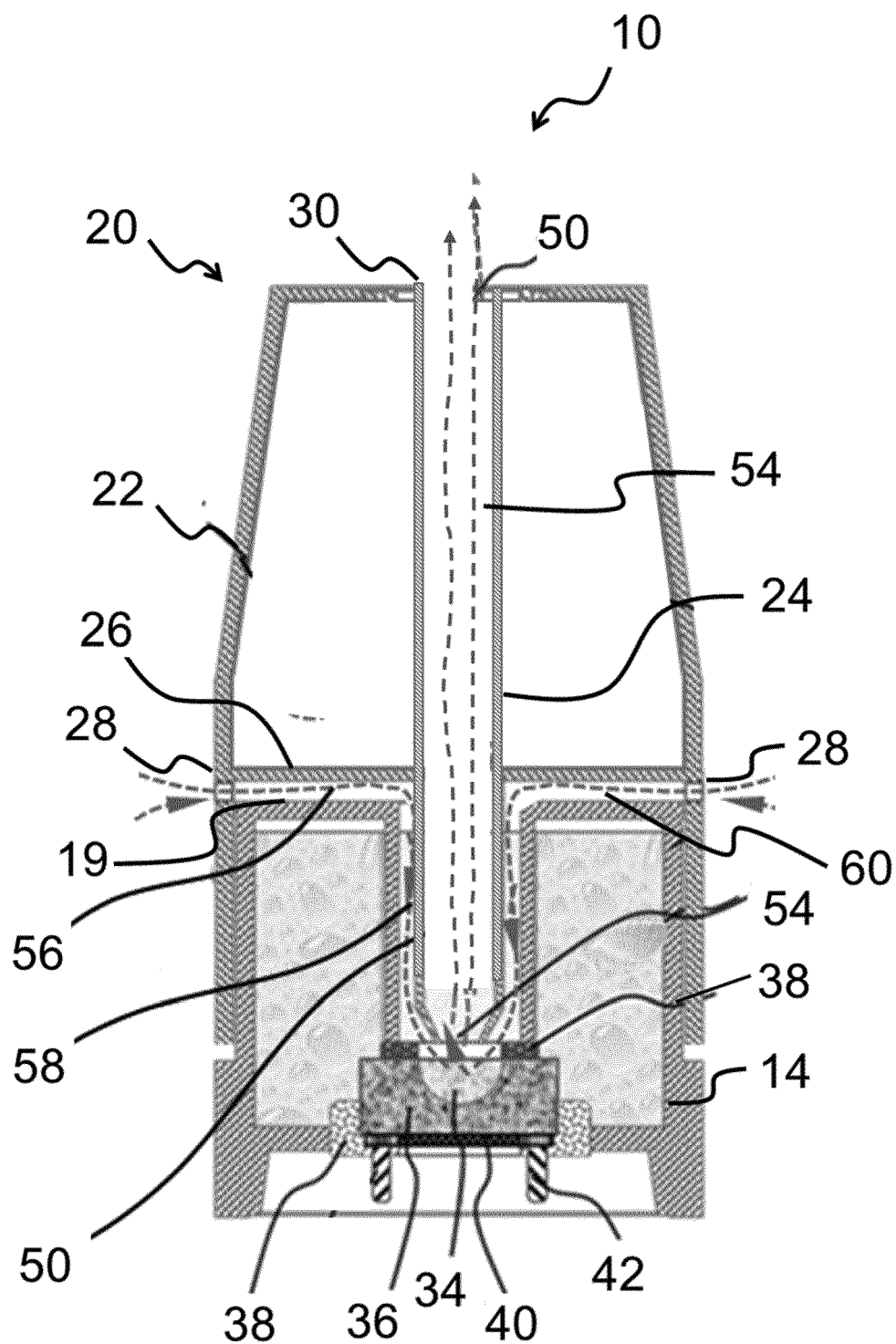


Fig. 3

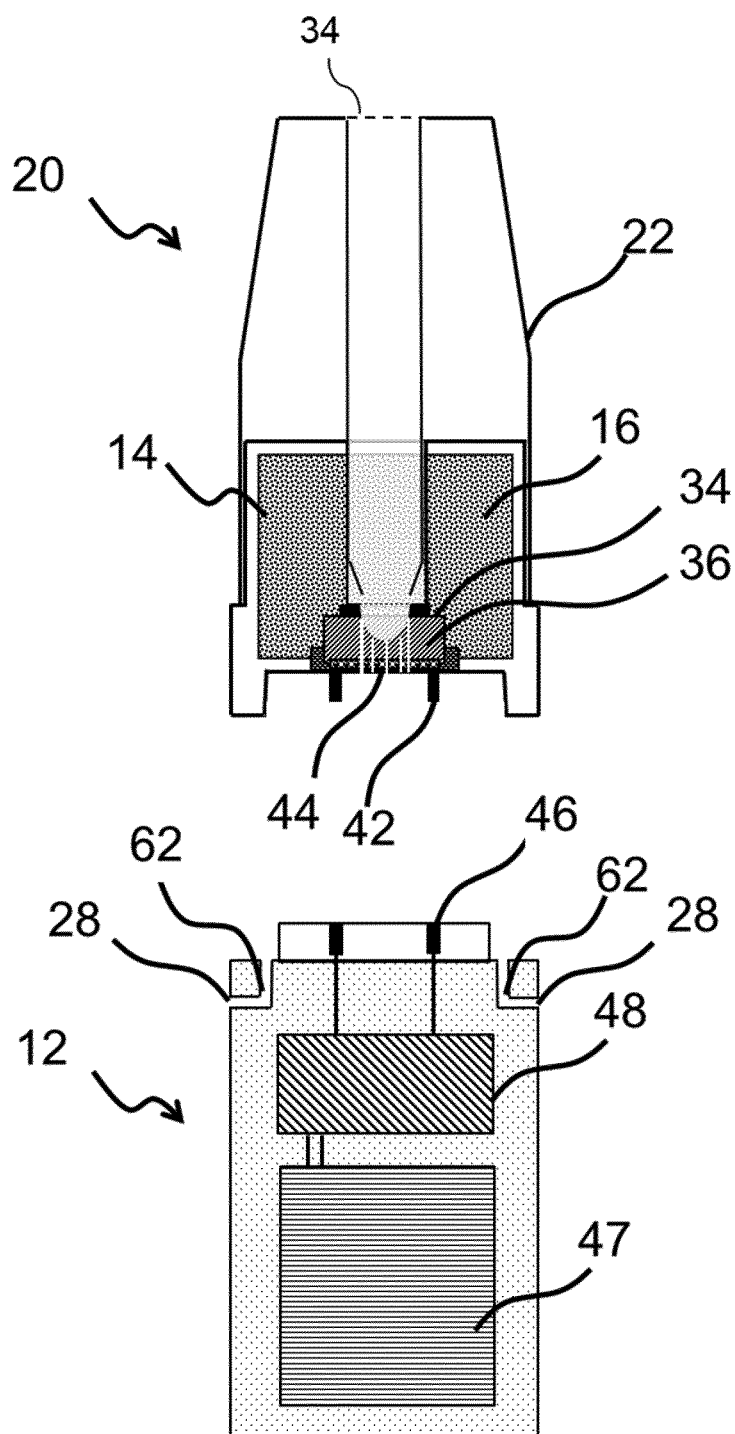


Fig. 4

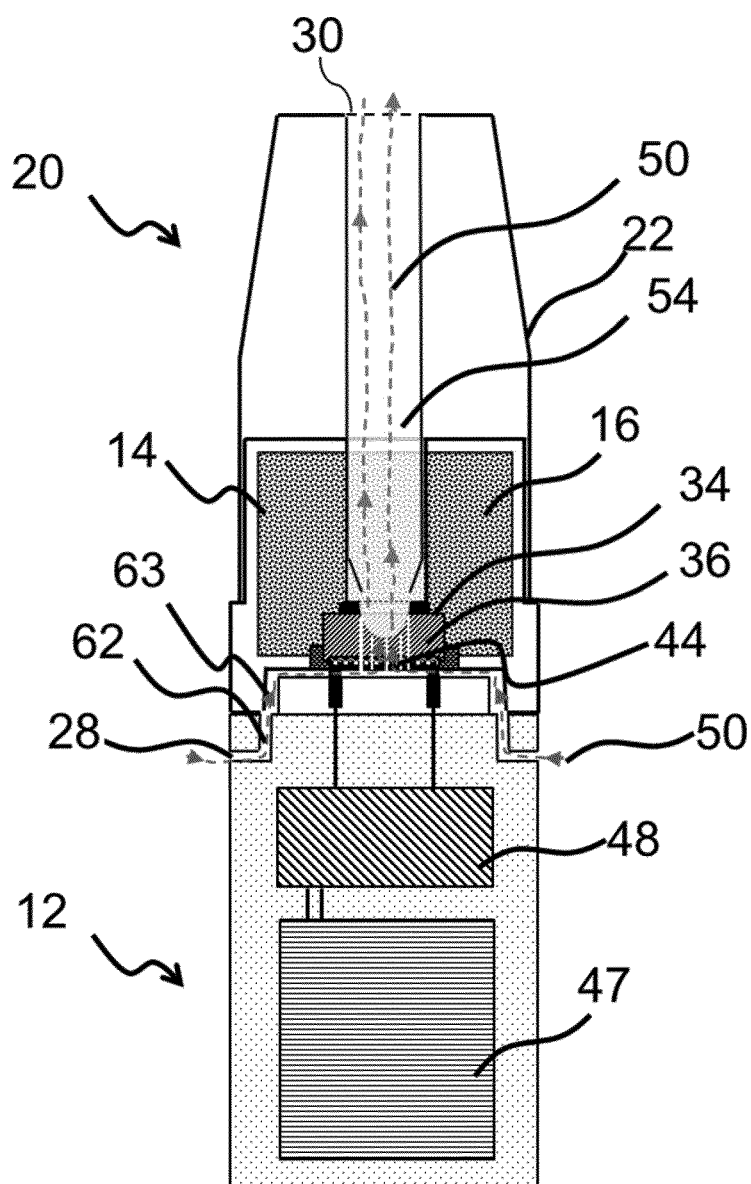
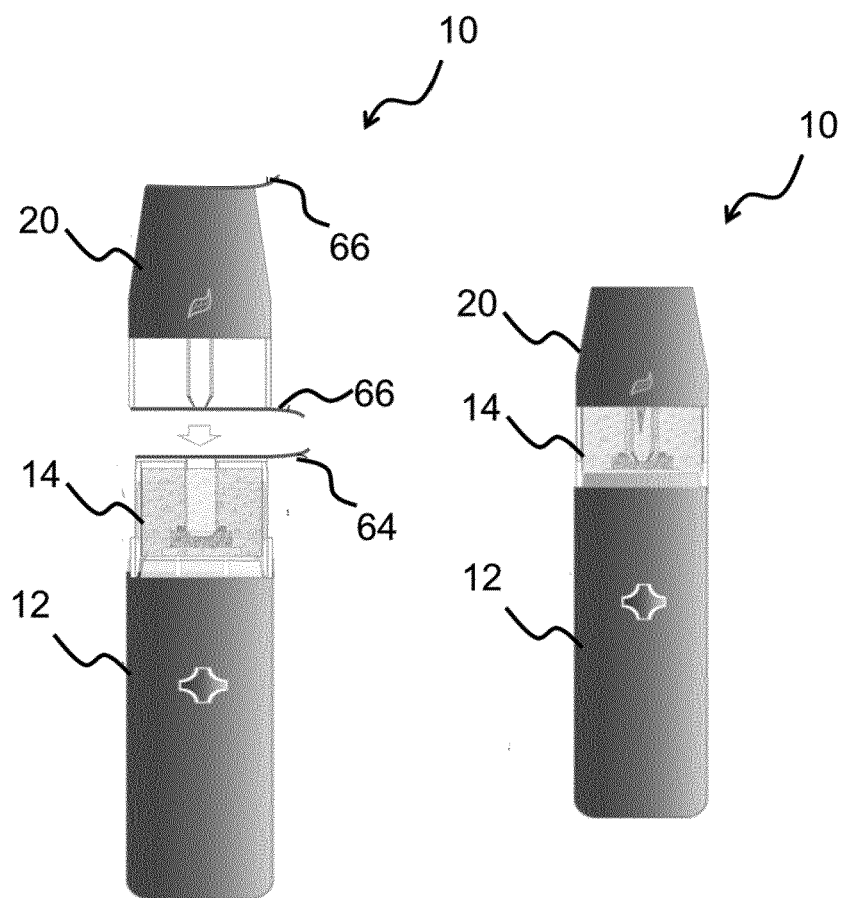


Fig. 5



AEROSOL-GENERATING SYSTEM WITH REPLACEABLE MOUTHPIECE

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

[0002] It is known to provide an aerosol-generating device 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 or devices 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 a replaceable or a 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] The replaceable cartridges may comprise a variety of different aerosol-forming substrates. Some of these aerosol-forming substrates may be suitable for adult use only. Authenticity and quality of the aerosol-forming substrate is of increased importance.

[0004] Aerosol generated by vaporizing the liquid aerosol-forming substrate may condense at a sidewall of the airflow path. This may be particularly pertinent in cold environments. Further, a mouthpiece may become unpleasantly cold when an aerosol-generating system is used by a user in cold environments.

[0005] It would be desirable to provide an aerosol-generating system, which provides a protection mechanism against misuse and counterfeiting.

[0006] It would further be desirable to provide an aerosol-generating system which may reduce condensation of vaporized aerosol-forming substrate in the airflow path downstream of the heater. It would be desirable to provide an aerosol-generating system which may guide back condensed aerosol droplets from a location downstream of the heater towards the heater. It would be desirable to provide an aerosol-generating system with a comfortably warm mouthpiece independent of an ambient temperature.

[0007] According to an embodiment of the invention there is provided an aerosol-generating system comprising a main unit and a replaceable mouthpiece. The main unit may comprise a heating element for heating an aerosol-forming substrate. The mouthpiece may comprise an outlet channel. The mouthpiece and the main unit may have corresponding structural components with complementary geometrical shapes. When the mouthpiece is connected to the main unit, the corresponding structural components of the mouthpiece and the main unit may define an inlet channel. The inlet channel and the outlet channel may form an airflow path from an air inlet to an air outlet via the heating element.

[0008] According to an embodiment of the invention there is provided an aerosol-generating system comprising a main unit and a replaceable mouthpiece. The main unit comprises a heating element for heating an aerosol-forming substrate. The mouthpiece comprises an outlet channel. The mouthpiece and the main unit have corresponding structural components with complementary geometrical shapes. When the mouthpiece is connected to the main unit, the corresponding

structural components of the mouthpiece and the main unit define an inlet channel. The inlet channel and the outlet channel form an airflow path from an air inlet to an air outlet via the heating element.

[0009] According to an embodiment of the invention there is provided an aerosol-generating system comprising a main unit and a replaceable mouthpiece. The main unit comprises a heating element for heating an aerosol-forming substrate. The mouthpiece comprises an outlet channel and an outlet through which aerosol leaves the system, allowing a user to inhale an aerosol. The mouthpiece and the main unit have corresponding structural components with complementary geometrical shapes. When the mouthpiece is connected to the main unit, these corresponding structural components of the mouthpiece and the main unit define an inlet and an inlet channel from the inlet to the heater.

[0010] In embodiments, there is at least one air inlet. In embodiments, there are two air inlets. In embodiments, there are more than two air inlets. In embodiments, there are one or more air inlets.

[0011] The airflow path may comprise an inflow path and an outflow path. The outflow path may be fluidly connected to the inflow path. The outflow path may deliver air combined with aerosol to the outlet. Aerosol may be formed when the heater heats the aerosol-forming substrate. The aerosol-forming substrate may be vaporized at the heater. Aerosol may be formed as the vapor, formed at the heater, is taken up and cooled in the airflow that flows through the device from the inlet, through the inlet channel to the heater, and downstream of the heater in the outlet channel. Aerosol may continue to evolve as it is carried in the outlet channel to the outlet. That is, the aerosol may cool as it is carried in the outlet channel to the outlet. Aerosol may condense as it is carried in the outlet channel to the outlet. Aerosol particles may combine forming larger aerosol particles as the aerosol is carried in the outlet channel to the outlet. Aerosol may form smaller aerosol particles as it is carried in the outlet channel to the outlet. The size of aerosol particles may be affected by airflow speed, temperature, pressure, and the geometry of the airflow path in the system. Aerosol particles may impact surfaces in the outlet channel. Aerosol particles may stick to surfaces in the outlet channel. Larger aerosol particles may stick to surfaces in the outlet channel resulting in an aerosol having smaller average particle size reaching the outlet. The inlet channel is formed upon assembly of the main unit and the mouthpiece. After assembly of the aerosol-generating system of the present invention, the aerosol-generating system may be used for inhaling an aerosol.

[0012] The replaceable mouthpiece of the aerosol-generating device is designed to pair with the main unit to define an inlet channel to deliver airflow past the heater so that an aerosol can be formed. The aerosol is inhalable by a user via the outlet. Without the mouthpiece, the main unit is rendered inoperable, since no continuous airflow path from an air inlet to an air outlet for inhaling an aerosol is provided. The design of the aerosol-generating system thus represents an efficient protection mechanism against unauthorized use. The main unit alone does not allow for formation of an aerosol suitable for inhalation. The main unit alone does not have an air inlet. The main unit alone does not have an inlet channel. The main unit alone does not have an inlet or an inlet channel. The main unit alone does not have a mechanism for delivering air, entering the device through the inlet, to the heater. The main unit alone does not have a mecha-

nism for delivering air, carried through the device via the inlet channel to the heater, so that when the heater heats the aerosol-forming substrate, an aerosol can be formed and that aerosol can be carried away from the heater in the outlet channel. Therefore, the main unit alone does not have the structures necessary to create an inhalable aerosol.

[0013] Moreover, the design of the aerosol-generating system also helps to avoid counterfeiting, since only a mouthpiece having a specific design which cooperates with the main unit to create an inlet and an inlet channel may be used with the main unit of the aerosol-generating system to create an inhalable aerosol. In addition, it is ensured in this way that only complimentary components are used in the aerosol-generating system of the present invention. Thereby, high quality of the products and of the generated inhalable aerosol may be ensured.

[0014] The aerosol-generating system may comprise a cartridge for storing aerosol-forming substrate.

[0015] 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.

[0016] 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.

[0017] 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'.

[0018] 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.

[0019] 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 heater element.

[0020] Preferably, the heating element is provided as a part of a vaporizing unit. The heating element 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. The heating element may exemplarily be a coil heater, a capillary tube heater, a mesh heater or a metal plate heater. 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 heater 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.

[0021] 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 US-A-5 498 855, WO-A-03/095688 and U.S. Pat. No. 5,514,630.

[0022] 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 capillarity 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.

[0023] 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.

[0024] 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.

[0025] 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.

[0026] The term ‘airflow path’ as used herein denotes the path that air follows as it travels through the system. For example, the inlet, inlet channel, outlet channel and outlet are structures that create spaces that allow air to flow through the system. Air that enters the device through the inlet, moves through the inlet channel, past the heater, through the outlet channel and exits the device through the outlet follows the airflow path defined by these structures.

[0027] An air inflow path is an airflow path which directs air from an air inlet to the heater. An inflow path is an airflow path which directs air from an air inlet to the heater. “Air inflow path” and “inflow path” are synonymous.

[0028] “Air inlet” and “inlet” are synonymous. An inlet is an opening in the system which allows ambient air, i.e. air that surrounds the system, to enter the system.

[0029] An air outflow path is an airflow path which directs air from the heater to an air outlet. An outflow path is an airflow path which directs air from the heater to an outlet. The air from the heater to the outlet may include aerosol. “Air outflow path” and “outflow path” are synonymous.

[0030] “Air outlet” and “outlet” are synonymous. Air in the air outflow path or the outflow path may include aerosol. An outlet is an opening in the system which allows air that includes aerosol to exit the system.

[0031] The airflow path is the air inflow path and the air outflow path. An airflow path may be used to transport ambient air into the device, past the heater and to the outlet of the device. An airflow path may be used to transport an aerosol. An airflow path may be used to transport a mixture of air and aerosol. The airflow path may extend from the air inlet to the air outlet.

[0032] 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.

[0033] 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.

[0034] 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.

[0035] Upon assembly of the aerosol-generating system, the air inflow path is 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 facilitates handling and assembly of the aerosol-generating system.

[0036] The mouthpiece and the main unit have corresponding structural components with complementary geometrical shapes. The structural components with comple-

mentary 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 are located next to each other. The structural components with complementary geometrical shapes are configured such that upon assembly of the aerosol-generating system, these structural components form an inlet and an inlet channel. The inlet and the inlet channel form the inflow path. The system may have more than one inlet and more than one inlet channel.

[0037] The airflow path may comprise the inlet channel and the outlet channel. The inlet channel extends between an inlet of the aerosol-generating system and the heating element. The inlet channel serves for guiding ambient air which enters the system through the inlet towards the heating element, where the airflow is mixed with supersaturated vapor comprising vaporized components of the aerosol-forming substrate. The resulting aerosol is guided along the outlet channel towards the outlet of the mouthpiece and may be inhaled by the user.

[0038] It is not necessary that the complete inlet channel is defined by the corresponding structural components with complementary geometrical shapes of the mouthpiece and the main unit. The objective of the present invention may already be achieved if at least a portion of the inlet channel is defined by the corresponding structural components with complementary geometrical shapes of the mouthpiece and the main unit.

[0039] It is not necessary that the complete airflow path is defined by the corresponding structural components with complementary geometrical shapes of the mouthpiece and the main unit. The objective of the present invention may already be achieved if at least a portion of the airflow path is defined by the corresponding structural components with complementary geometrical shapes of the mouthpiece and the main unit.

[0040] The air inlet opening may be formed in an outer part of the housing of the aerosol-generating system. Depending on the construction of the aerosol-generating system, the air inlet opening may be formed in an outer part of the housing of the main unit or of the mouthpiece. The air inlet opening may be formed between the main unit and the mouthpiece. The air inlet opening may be partially formed in both, the main unit and the mouthpiece. The air inlet opening may be formed when the main unit and the mouthpiece are assembled together.

[0041] The inlet channel of the airflow path may be defined by the corresponding structural components with complementary geometrical shapes of the mouthpiece and the main unit.

[0042] The cartridge may be a part of the main unit. If the cartridge is present as a part of the main unit, the inlet channel of the airflow path may be defined between the mouthpiece and the cartridge of the main unit. The inlet channel of the airflow path may be defined by the corresponding structural components with complementary geometrical shapes of the mouthpiece and the cartridge.

[0043] The cartridge may have any shape or cross-section including oval, conical, rectangular, square or angled. In embodiments, the cartridge may have a tubular shape. The cartridge may have a central channel. The central channel may extend in a longitudinal direction through the complete cartridge. The cartridge may have an annular distal end, an annular proximal end, an outer side surface and an inner side

surface. The inner side surface may define the central channel through the cartridge.

[0044] The inlet channel may comprise a radial portion and an axial portion. The radial portion of the inlet channel may be defined between the proximal end of the cartridge and a corresponding radial wall element of the mouthpiece. For this purpose, the proximal end of the cartridge or the radial wall element of the mouthpiece or both may comprise a groove. In the assembled state, the groove extends from the air inlet opening in a radial direction to the interior of the aerosol-generating system.

[0045] The radial portion of the inlet channel may be in communication with the axial portion of the inlet channel. The axial portion of the inlet channel may be defined between the inner side surface defining the central channel of the cartridge and the outer surface of a corresponding wall element of the mouthpiece. The axial portion of the inlet channel may be configured to guide the airflow towards the heating element of aerosol generating device. The axial portion of the inlet channel may be defined between the inner side surface defining the tubular channel of the cartridge and the outer surface of a corresponding tubular wall element of the mouthpiece

[0046] The wall element of the mouthpiece may be hollow. The wall element of the mouthpiece may define a central hollow channel that forms part of the outlet channel of the airflow path. The hollow wall element of the mouthpiece may have any suitable cross-section. The cross-section of the wall element may correspond to the cross section of the central channel of the cartridge. The cross-section of the wall element may be circular, oval, rectangular, square or angled. The wall element may have a conical distal end. A conical distal end may facilitate insertion of the wall element into the central channel of the cartridge upon assembly of the aerosol-generating system. If the cross-section of the wall element is circular, the wall element may also be referred to as a tubular wall element.

[0047] The outlet channel extends from the heating element to the outlet of the mouthpiece and is configured to guide the generated aerosol towards the outlet of the mouthpiece.

[0048] By designing the aerosol-generating device such that a portion of the airflow path is defined between a cartridge and a complementary portion of the mouthpiece, a simple construction is obtained that achieves the objective of the present invention. The main unit comprising the cartridge can only be used with the specific mouthpiece that may have a radial wall element and a complementary portion as described above. Only with such specific mouthpiece, the main unit can be used to generate an inhalable aerosol. Thus, it can be ensured that aerosol is only generated when the correct and original mouthpiece is used. Thus, unauthorized use or counterfeiting may be efficiently prevented.

[0049] The mouthpiece may have an outer housing. The outer housing of the mouthpiece may have any suitable shape. The outer housing of the mouthpiece may have a shape that corresponds to the shape of the main unit. The outer housing of the mouthpiece may have a circular, oval, rectangular, square or angled cross-section. The outer housing of the mouthpiece may have a generally cylindrical shape. The outer housing may have a lateral surface and a proximal end. The outlet may be defined at the proximal end of the mouthpiece.

[0050] The mouthpiece to be connected to the main unit may have corresponding structural components with complementary geometrical shapes that correspond with the shape of the cartridge. In such embodiment, the airflow path may be defined between the mouthpiece and the cartridge. The mouthpiece may have a first structural component that, in an assembled state, extends in a direction that is essentially parallel to the proximal side face of the cartridge. The mouthpiece may have a second structural component that is hollow and that, in an assembled state, extends in a direction that is essentially parallel to the central channel of the cartridge. The hollow component may have smaller dimensions than the central channel of the cartridge, such that upon assembly the hollow component may extend into the central channel of the cartridge. The second structural component of the mouthpiece may be formed by the above described wall element of the mouthpiece. Accordingly, the airflow channel established between the mouthpiece and the cartridge may comprise a radial portion and a longitudinal portion.

[0051] The cartridge may be a part of the mouthpiece. When the cartridge is part of the mouthpiece, the inlet channel of the airflow path may be formed between corresponding structural components with complimentary geometrical shapes located at the bottom of the cartridge of the mouthpiece and the top of the main unit when the system is assembled. When assembled, the inlet channel may be defined between the main unit and the cartridge of the mouthpiece. The inlet channel of the airflow path may be defined by the corresponding structural components with complementary geometrical shapes of the main unit and the cartridge.

[0052] The inlet channel may comprise a radial portion and an axial portion. The radial portion of the inlet channel may be defined between the proximal end of the main unit and cartridge and a corresponding radial wall element of the mouthpiece. For this purpose, the proximal end of the main unit or the radial wall element of the mouthpiece or both may comprise a groove. In the assembled state, the groove may extend from the air inlet opening in a radial direction to the interior of the aerosol-generating system.

[0053] The radial portion of the inlet channel may be in communication with an axial portion of the inlet channel. Also in this embodiment, the inlet channel extends between the air inlet opening of the aerosol-generating system and the heating element. The inlet channel serves for guiding ambient air towards the heating element, where the airflow is mixed with supersaturated vapor comprising vaporized components of the aerosol-forming substrate. The resulting aerosol is guided along the outlet channel towards the outlet of the mouthpiece and may be inhaled by the user.

[0054] In embodiments in which the cartridge is part of the mouthpiece, the cartridge may be refillable or replaceable. In such case the cartridge may be refilled or replaced when depleted and the mouthpiece may be used repeatedly.

[0055] The cartridge may also be configured to be neither refillable nor replaceable. In such case, the complete mouthpiece is to be replaced when the cartridge is depleted.

[0056] 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 assembled with the main device or main unit.

[0057] Such sealing foil may protect the cartridge and the mouthpiece during shipping and in particular before use from debris or other undesired contaminations.

[0058] 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.

[0059] Example A: An aerosol-generating system comprising a main unit and a replaceable mouthpiece,

[0060] the main unit comprising a heating element for heating an aerosol-forming substrate;

[0061] the mouthpiece comprising an outlet channel;

[0062] wherein the mouthpiece and the main unit have corresponding structural components with complementary geometrical shapes;

[0063] wherein, when the mouthpiece is connected to the main unit, the corresponding structural components of the mouthpiece and the main unit define an inlet channel; and

[0064] wherein the inlet channel and the outlet channel form an airflow path from an air inlet to an air outlet via the heating element.

[0065] Example B: The aerosol-generating system according to Example A, wherein the airflow path is formed upon assembly of the main unit and the mouthpiece.

[0066] Example C: The aerosol-generating system according to any preceding example, wherein the aerosol-generating system comprises a cartridge for storing aerosol-forming substrate.

[0067] Example D: The aerosol-generating system according to Example C, wherein the cartridge is configured to be replaceable.

[0068] Example E: The aerosol-generating system according to Example C or D, wherein the cartridge for storing aerosol-forming substrate is part of the main unit.

[0069] Example F: The aerosol-generating system according to Example C or D, wherein the cartridge for storing aerosol-forming substrate is part of the replaceable mouthpiece.

[0070] Example G: The aerosol-generating system according to any of Examples A to E, wherein the airflow path is defined between the cartridge and the mouthpiece.

[0071] Example H: The aerosol-generating system according to any preceding example, wherein the cartridge has a tubular shape.

[0072] Example I: The aerosol-generating system according to any preceding example, wherein the cartridge defines a central channel.

[0073] Example J: The aerosol-generating system according to Example I, wherein the airflow path leads through the central channel of the cartridge.

[0074] Example K: The aerosol-generating system according to Example I or Example J, wherein the complementary structural components of the mouthpiece or the main unit comprise a hollow element that extends into the central channel of the cartridge.

[0075] Example L: The aerosol-generating system according to any preceding example, wherein the mouthpiece has an outer housing with a lateral surface and a proximal end.

[0076] Example M: The aerosol-generating system according to any preceding example, wherein the air inlet is arranged in the lateral surface of the outer housing of the mouthpiece.

[0077] Example N: The aerosol-generating system according to any preceding example, wherein the air inlet is arranged in the lateral surface of the outer housing of the main unit.

[0078] Example O: The aerosol-generating system according to any preceding example, wherein the air outlet is arranged at the proximal end of the mouthpiece.

[0079] Features described in relation to one embodiment may equally be applied to other embodiments of the invention.

[0080] The invention will be further described, by way of example only, with reference to the accompanying drawings in which:

[0081] FIG. 1 shows an aerosol-generating system in disassembled form;

[0082] FIG. 2 shows an aerosol-generating system in assembled form;

[0083] FIG. 3 shows a further aerosol-generating system in disassembled form;

[0084] FIG. 4 shows the further aerosol-generating system in assembled form; and

[0085] FIG. 5 shows an aerosol-generating system in disassembled form with sealing foils.

[0086] FIG. 1 depicts a cross-sectional view of a top part of an aerosol-generating system 10, including a main unit 12, a cartridge 14 comprising liquid aerosol-forming substrate 16 and a replaceable mouthpiece 20.

[0087] The replaceable mouthpiece 20 is adapted to be removable from and connectable to the main unit 12 and has a generally cylindrical housing 22. A hollow, tubular element 24 extends centrally along the full length of the mouthpiece 20. An annular, radial wall element 26 extends between the housing 22 of the mouthpiece 20 and the tubular element 24. Air inlet openings 28 are provided at opposing locations in the side surface of the housing 22. These air inlet openings 28 are provided just below the radial wall element 26.

[0088] The opening of the tubular element 24 at the proximal end of the mouthpiece 20 is configured as an outlet end 30 for inhalation by a user. The distal end 32 of the mouthpiece 20 is configured to be attached to the main unit 12. As can be seen from FIG. 1, no continuous airflow path is defined in the mouthpiece 20 between the air inlet openings 28 and the outlet end 30.

[0089] The main unit 12 is an aerosol-generating device comprising a cartridge 14, a power source, electronic circuitry and a vaporizing unit 34. The cartridge 14 is provided on the proximal end of the main unit 12. The cartridge 14 has a tubular shape and is configured for holding liquid aerosol-forming substrate 16. The inner diameter of the central channel 17 of the cartridge 16 is bigger than the outer diameter of the tubular element 24 of the mouthpiece 20.

[0090] The vaporizing unit 34 comprises a porous ceramic component 36 that is in fluid communication with the liquid aerosol-forming substrate 16 stored in the cartridge 14.

Sealing elements 38 are provided that prevent undesired leakage of the liquid aerosol-forming substrate 16 to the power components including the power source and control circuitry.

[0091] A resistive heater element 40 is provided on the backside of the porous ceramic component 36. The resistive heater element 40 is electrically connected via contacts 42 to the power source of the aerosol-generating system. The power source and control circuitry of the aerosol-generating system are provided in lower portion of the main unit, which is not shown in FIG. 1.

[0092] When the resistive heater element 40 is activated, liquid aerosol-forming substrate 16 absorbed in the porous ceramic component 36 is evaporated. The evaporated aerosol-forming substrate is mixed with ambient air to form an aerosol. The aerosol is then transported through the airflow path to the outlet 30. For this purpose, an airflow path is defined within the assembled aerosol-generating system 10.

[0093] The assembled aerosol-generating system 10 is depicted in FIG. 2. Upon assembly, the mouthpiece 20 is sleeved around and frictionally engaged with the cartridge 14. In the fully assembled position, an airflow path 50 is defined between the corresponding structural components of the mouthpiece 20 and the main unit 12 having complementary geometrical shapes. The airflow path 50 comprises an inlet channel 52 and an outlet channel 54. The inlet channel 52 forms an inflow path which is the part of the airflow path 50 that extends between the air inlet openings 28 and the vaporizing unit 34. The outlet channel 54 forms an outflow path which is the part of the airflow path 50 that extends between the vaporizing unit 34 and the outlet 30.

[0094] In the embodiment depicted in FIG. 2, the inlet channel 52 comprises a radial portion 56 and an axial portion 58. The radial portion 56 of the inlet channel 52 is defined between the proximal end 19 of the cartridge 14 and the radial wall element 26 of the mouthpiece 20. The proximal end 19 of the cartridge 14 comprises radially extending grooves 60 that extend from the air inlet openings 28 in a radial direction towards the interior of the aerosol-generating system 10. The radial portion 56 of the inlet channel 52 extends into the axial portion 58 of the inlet channel 52.

[0095] The axial portion 58 of the inlet channel 52 is defined between the inner side surface of the cartridge 14 and the outer surface of the tubular element 24 of the mouthpiece 20. The axial portion 58 of the inlet channel 52 is configured to guide the airflow towards the vaporizing unit 34.

[0096] The outlet channel 54 is defined by the inner channel of the tubular element 24 of the mouthpiece 20. The outlet channel 54 extends from the vaporizing unit 34 to the outlet end 30 of the aerosol-generating system 10.

[0097] When a user draws a puff at the outlet end 30 of the mouthpiece 20, an airflow is established from the air inlet openings 28 through the inlet channel 52 towards the vaporizing unit 34. The drawn air is mixed at the vaporizing unit 34 with the vaporized aerosol-forming substrate 16 to form an aerosol. This aerosol is transported through the outlet channel 54 and is inhaled by the user at the outlet end 30.

[0098] Without the specific mouthpiece 20 having the construction as depicted in FIGS. 1 and 2, the aerosol-generating device cannot be used for generating an inhalable aerosol. Accordingly, the aerosol-generating device can only

be used with this specific mouthpiece 20, which helps to prevent or reduce unauthorized use and counterfeiting.

[0099] FIG. 3 depicts a cross-sectional view of a further embodiment of an aerosol-generating system 10 including a main unit 12, a cartridge 14 and a replaceable mouthpiece 20 in disassembled configuration.

[0100] In this embodiment, the replaceable mouthpiece 20 is adapted to be removable from and connectable to the main unit 12 and has a generally cylindrical housing 22. The replaceable mouthpiece comprises the cartridge 14 and the vaporizing unit 34.

[0101] The vaporizing unit 34 again comprises a porous ceramic component 36 that is in fluid communication with the liquid aerosol-forming substrate 16 stored in the cartridge 14. The ceramic component 36 has run-through holes 44 that allow the airflow to pass through the ceramic component 36.

[0102] In the embodiment of FIG. 3, the cartridge 14 is permanently connected to the mouthpiece 20. However, also in this embodiment the cartridge 14 could be configured to be replaceable. For this purpose, the housing 22 of the mouthpiece 20 may be configured to comprise two connectable portions. By disconnecting these two portions, the cartridge 14 may be accessible and may be replaced after depletion.

[0103] Upon assembly of the aerosol-generating system 10, the electric contacts of the vaporizing unit 34 are contacted with corresponding electric contacts 46 of the main unit 12.

[0104] In this embodiment, the main unit 12 is an aerosol-generating device comprising a power source 47 and electronic circuitry 48. The main unit 12 also comprises the air inlet openings 28 of the aerosol-generating system 10. The air inlet openings 28 are connected to main unit air channels 62. The other ends of the main unit air channels 62 are open at the proximal end of the main unit 12.

[0105] Again, in the disassembled state, no continuous airflow path is defined between the air inlet openings 28 and the outlet end 30 of the aerosol-generating system 10.

[0106] FIG. 4 shows the aerosol-generating system 10 of FIG. 3 in assembled configuration. Upon assembly of the main unit 12 and the mouthpiece 20, a continuous air inlet channel 52 is formed that extends from the air inlet openings 28 towards the vaporizing unit 34. In more detail, the air inlet channel 52 extends from the air inlet openings 28 in the main unit 12 through the main unit air channels 62. The main unit air channels 62 are connected to an air inlet channel portion 63 formed at the interface between the proximal end of the main unit 12 and the distal end of the mouthpiece 20. This air inlet channel portion 63 is connected to the run through holes 44 in the ceramic component 36 and guides the airflow through the vaporizing unit. The airflow is mixed at the vaporizing unit 34 with the vaporized aerosol-forming substrate 16 to form an aerosol. This aerosol is transported through the outlet channel 54 and is inhaled by the user at the outlet end 30.

[0107] FIG. 5 shows a further embodiment of an aerosol-generating system 10 of the present invention. The aerosol-generating system 10 comprises a main unit 12, a replaceable cartridge 14 and a replaceable mouthpiece 20. In the left view of FIG. 5, the aerosol-generating system 10 is shown in a partly disassembled state.

[0108] A new, filled cartridge 14 has already been inserted into the main unit 12. The proximal end of the cartridge 14

is protected by a removable sealing foil 64. This sealing foil protects the cartridge 14 during shipping, and in particular before use, from debris or other undesired contaminations. When the cartridge 14 is inserted in the main unit 12, and before use of the aerosol-generating system, the sealing foil 64 is removed.

[0109] The mouthpiece 20 depicted in FIG. 5 is also still sealed at the distal end and the proximal end. Each of these ends is still covered by a sealing foil 66. Each of these sealing foils 66 is used to protect the open ends of the mouthpiece 20 from debris and contaminations prior to use.

[0110] During assembly of the aerosol-generating system 10, the sealing foils 66 of the mouthpiece 20 are removed. In the right view of FIG. 5 the aerosol-generating system 10 is depicted in the fully assembled state.

1. An aerosol-generating system comprising a main unit and a replaceable mouthpiece,

the main unit comprising a cartridge for storing an aerosol-forming substrate, and a heating element for heating an aerosol-forming substrate;

the mouthpiece comprising an outlet channel;

wherein the mouthpiece and the main unit have corresponding structural components with complementary geometrical shapes;

wherein, when the mouthpiece is connected to the main unit, the corresponding structural components of the mouthpiece and the main unit define an inlet channel; and

wherein the inlet channel and the outlet channel form an airflow path from an air inlet to an air outlet via the heating element.

2. The aerosol-generating system according to claim 1, wherein the airflow path is formed upon assembly of the main unit and the mouthpiece.

3. The aerosol-generating system according to claim 1, wherein the cartridge is configured to be replaceable.

4. The aerosol-generating system according to claim 1, wherein the airflow path is defined between the cartridge and the mouthpiece.

5. The aerosol-generating system according to claim 1, wherein the cartridge has a tubular shape.

6. The aerosol-generating system according to claim 1, wherein the cartridge defines a central channel.

7. The aerosol-generating system according to claim 6, wherein the airflow path leads through the central channel of the cartridge.

8. The aerosol-generating system according to claim 6, wherein the complementary structural components of the mouthpiece or the main unit comprise a hollow element that extends into the central channel of the cartridge.

9. The aerosol-generating system according to claim 1, wherein the mouthpiece has an outer housing with a lateral surface and a proximal end.

10. The aerosol-generating system according to claim 9, wherein the air inlet is arranged in the lateral surface of the outer housing of the mouthpiece.

11. The aerosol-generating system according to claim 1, wherein the air inlet is arranged in a lateral surface of an outer housing of the main unit.

12. The aerosol-generating system according to claim 9, wherein the air outlet is arranged at the proximal end of the mouthpiece.

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