



(51) International Patent Classification:

A24F 7/00 (2006.01)

A24F 40/485 (2020.01)

(21) International Application Number:

PCT/EP2022/083473

(22) International Filing Date:

28 November 2022 (28.11.2022)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

AM20210097

02 December 2021 (02.12.2021) AM

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(81) Designated States (unless otherwise indicated, for every

kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM,

DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every

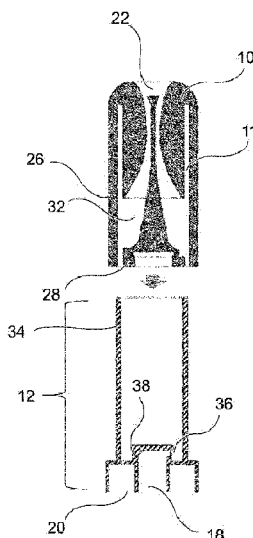
kind of regional protection available): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- as to the identity of the inventor (Rule 4.17(i))
- as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))

(54) Title: MOUTHPIECE FOR AEROSOL-GENERATING DEVICE WITH LOCKING/UNLOCKING OF A VALVE ELEMENT

Fig. 3



(57) Abstract: The invention relates to a mouthpiece (10) for an aerosol-generating device comprising: an airflow channel (18) through the mouthpiece (10), an airflow control element (30), wherein the airflow control element (30) is configured to be movable from a first position to a second position, the airflow control element (30) being configured to block airflow (16) through the airflow channel (18) in the first position and to allow airflow (16) through the airflow channel (18) in the second position, wherein the airflow control element (30) is further configured to be movable from the first position to the second position via a first movement of the airflow control element (30), and a locking element (44), wherein the locking element (44) is configured to be arranged in a third position and a fourth position, the locking element (44) being configured to block the first movement of the airflow control element (30) in the third position of the locking element (44) and to allow the first movement of the airflow control element (30) in the fourth position of the locking element (44), wherein the locking element (44) is further configured to be movable from the third position to the fourth position via a second movement of the locking element (44).

Published:

- *with international search report (Art. 21(3))*
- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments (Rule 48.2(h))*

MOUTHPIECE FOR AEROSOL-GENERATING DEVICE WITH LOCKING/UNLOCKING OF A VALVE ELEMENT

The present invention relates to a mouthpiece for an aerosol-generating device.

It is known to provide an aerosol-generating device for generating an inhalable aerosol.

5 Such devices 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. Aerosol-forming substrate may be provided as part of an aerosol-generating article or a cartridge containing liquid aerosol-forming substrate. A heating element may be arranged in or around the heating chamber for heating the aerosol-forming substrate once the
10 aerosol-generating article or the cartridge is inserted into the heating chamber of the aerosol-generating device. Aerosol-generating systems are known, wherein the cartridge containing aerosol-forming substrate is received in an aerosol-generating device for heating the substrate. Such a system may additionally include a mouthpiece connectable to the cartridge. The aerosol-forming substrate is heated by the heating element and produced aerosol is directed
15 towards an air outlet of the device. The air outlet may be configured as a mouthpiece or a separate mouthpiece may be provided attachable to the device. Users may carry aerosol-generating devices or aerosol-generating systems around. This may lead to an inadvertent opening or inadvertent activation of the aerosol-generating device or the aerosol-generating system during transport, leading to a spill of the aerosol-forming substrate or the accidental
20 generation of aerosol. The aerosol-generating-systems may only allow a user to turn on and off the system without any option to further customize the aerosol inhaled upon a user's convenience.

It would be desirable to have a mouthpiece for an aerosol-generating device or an aerosol-generating system which avoids an inadvertent opening of the aerosol-generating
25 system. Furthermore, it would be desirable to have a mouthpiece which provides a user with the option to customize the aerosol. It would be desirable to have a mouthpiece for an aerosol-generating device that prevents accidental usage of the device. It would be desirable to have a mouthpiece for an aerosol-generating device that enables secure operation of the device. It would be desirable to have a mouthpiece for an aerosol-generating device that securely
30 delivers the generated aerosol.

According to an embodiment of the invention there is provided a mouthpiece for an aerosol-generating device or an aerosol-generating system comprising an airflow channel through the mouthpiece. The mouthpiece may comprise an airflow control element, wherein the airflow control element may be configured to be movable from a first position to a second
35 position. The airflow control element may be configured to block airflow through the airflow channel in the first position. The airflow control element may be configured to allow airflow through the airflow channel in the second position. The airflow control element may further be

configured to be movable from the first position to the second position via the first movement of the airflow control element. The mouthpiece furthermore may comprise a locking element. The locking element may be configured to be arranged in a third position and a fourth position. The locking element may be configured to block the first movement of the airflow control element in the third position of the locking element. The locking element may be configured to allow the first movement of the airflow control element in the fourth position of the locking element. The locking element may further be configured to be movable from the third position to the fourth position via a second movement of the locking element.

Another embodiment of the invention provides a mouthpiece for an aerosol-generating device comprising an airflow channel through the mouthpiece. The mouthpiece furthermore comprises an airflow control element, wherein the airflow control element is configured to be movable from a first position to a second position. In the first position the airflow control element is configured to block air flow through the airflow channel. In the second position the airflow control element is configured to allow airflow through the airflow channel of the mouthpiece. The airflow control element is further configured to be movable from the first position to the second position via the first movement of the airflow control element. The mouthpiece furthermore comprises a locking element, wherein the locking element is configured to be arranged in a third position and in a fourth position. In the third position, the locking element is configured to block the first movement of the airflow control element. In the fourth position the locking element is configured to allow the first movement of the airflow control element. The locking element is further configured to be movable from the third position to the fourth position via a second movement of the locking element. The first movement may be a movement along a first motion path.

The locking element of the mouthpiece may disable an accidental move of the airflow control element from the first position, blocking airflow through the airflow channel to its second position allowing the movement of airflow. This may prevent an accidental activating of an aerosol-generating system or aerosol-generating device including the mouthpiece. This may also avoid the accidental leakage of aerosol-forming substrate.

The airflow channel of the mouthpiece allows an airflow to be transported through if a user first moves the locking element via the second movement from its third position to the fourth position and then moves the airflow control element from its first position to its second position. This sequence of the second movement and the first movement may prevent an accidental activation of the airflow channel in the mouthpiece. The airflow channel through the mouthpiece may only be open for airflow if a user deliberately carries out the second movement of the locking element and subsequently the first movement of the airflow control element. This may unlock the airflow channel for the airflow and may allow transport of aerosol.

In the first position of the airflow control element, airflow may be blocked completely through the airflow channel of the mouthpiece. In the second position of the airflow control element, the airflow channel may be completely opened to allow the maximum amount of airflow through the mouthpiece.

5 The airflow control element may be configured to be incrementally movable from the first position to the second position via the first movement of the airflow control element.

 This may incrementally open the airflow channel through the mouthpiece. In the first position the airflow channel may be completely blocked for airflow, whereas in the second position of the aerosol control element the airflow channel may be completely unblocked,
10 opening the airflow channel for transport of the maximum amount of airflow. Incrementally moving the airflow control element from the first position to the second position may only partially open the airflow channel for airflow.

 The airflow control element may be configured to be movable to at least one intermediate position between the first and second position. In the intermediate position the
15 airflow channel may be partially blocked by the airflow control element.

 This may allow a user to customize the airflow through the airflow channel of the mouthpiece. This may allow a user to customize the generation of the aerosol per puff.

 The first movement of the airflow control element may be different from the second movement of the locking element. This may require a user to carry out a separate second
20 movement before a different first movement of the airflow control element can be carried out.

 This may improve the locking function of the locking element. This may reduce the risk that the unlocking of the locking element and the unblocking of the airflow channel by the airflow control element is accidentally carried out.

 The first movement of the airflow control element may be a rotational movement of the
25 airflow control element. This may provide a convenient way for a user to customize the aerosol generation.

 The first movement of the airflow control element may be a rotational movement of the housing of the mouthpiece. The first motion path of the first movement may therefore be rotational motion path.

30 This may allow a user to conveniently operate the airflow control element of the mouthpiece. In particular, the aerosol-generating system may comprise a longitudinal axis. This longitudinal axis may run through the mouthpiece and a cartridge connected to the mouthpiece. The rotational movement of the housing of the mouthpiece may be around the longitudinal axis of the aerosol-generating system. In particular, the longitudinal axis of the
35 aerosol-generating system may be the center of rotation for rotational movement during the first movement of the airflow control element. This may allow the user to conveniently rotate the mouthpiece while holding the aerosol-generating system.

The second movement of the locking element may be a compression movement of the locking element. The second movement of the locking element may be a compression movement of at least one outer side wall of the housing of the mouthpiece.

A user may carry out the compression movement by applying a force to the outer side wall of the housing of the mouthpiece, wherein the force is directed towards the interior of the mouthpiece. This compression movement towards the interior of the mouthpiece may unlock the locking element. This compression movement may move the locking element from the third position, locking the airflow control element in its first position to the fourth position, which allows first movement of the airflow control element to at least partially unblock the airflow channel through the mouthpiece.

The compression movement may be carried out by a user by pressing on the outer side wall of the housing of the mouthpiece in a flexible region of the housing of the mouthpiece. Preferably, the compression movement may be carried out by a user by gripping the mouthpiece at two opposite regions of the mouthpiece. Preferably, the user may grip the mouthpiece with two fingers and may apply a force with the two fingers, the force being directed towards the interior of the mouthpiece. This may be a particular convenient way in order to carry out the compression movement.

The mouthpiece may comprise or be made of flexible materials such as plastic or rubber. These materials may allow a user to carry out the compression movement without risking damaging the mouthpiece. The flexible region may comprise perforations in the material of the housing of the mouthpiece. This may increase the flexibility of the flexible region.

At least one indentation may be arranged on the outer side wall of the housing of the mouthpiece. The at least one indentation may be formed to be gripped by a user. This indentation may be a flexible region of the housing in order to allow the user to carry out the compression movement.

Two opposite indentations may be arranged on the outer side wall of the housing of the mouthpiece which are both formed to be gripped by a user. This may allow the user to particularly conveniently carry out the compression movement by applying pressure via two fingers resting on the opposite indentations. This may allow the user to carry out the compression movement in a controlled way.

The airflow control element may comprise a part of a valve. In particular, the airflow control element may comprise a part of a disc-valve. The first movement of the airflow control element may be a rotation of the disc-valve thereby opening the disc-valve. The opening of the disc-valve may unblock the airflow channel through the mouthpiece.

The mouthpiece may comprise an inner mouthpiece wall, wherein the inner mouthpiece wall is located in the interior of the mouthpiece. The inner mouthpiece wall may comprise the airflow control element. Preferably the airflow control element may comprise a first opening in

the inner mouthpiece wall. The first opening may form part of the valve, in particular the disc-valve.

The inner mouthpiece wall may comprise a circular connection element at an upstream end of the mouthpiece. The circular connection element may be configured to be connectable to either a cartridge or a device. The circular connection element may comprise the airflow control element. The airflow control element may comprise a first opening in the circular connection element. The first opening in the circular connection element may be connectable to an airflow channel of the cartridge or to an airflow channel of an aerosol-generating device.

Such a first opening may be well suited in order to control the airflow from the airflow channel of the cartridge or the aerosol-generating device into the mouthpiece.

The mouthpiece may comprise at least one protruding element at an inner surface of the sidewall of the housing of the mouthpiece. The protruding element may be configured to engage with at least one recess in a tubular connection portion of a cartridge or device. The at least one protruding element engaging with at least one recess in the tubular connection portion may prevent rotational movement of the mouthpiece relative to the tubular connection portion. This rotational movement may correspond to the first movement of the airflow control element as described above. The protruding element engaging with the at least one recess therefore may lock the airflow control element in its first position blocking airflow through the airflow channel. The at least one protruding element may engage with the at least one recess in the tubular connection portion in the absence of any compressive force applied to the sidewall of the housing of the mouthpiece. Applying the compressive force as the compression movement of the second movement of the locking element may compress the at least one protruding element. This may lead to the protruding element disengaging with the at least one recess of the tubular connection portion. This may allow the mouthpiece to be rotated relative to the tubular connection portion by carrying out the rotational movement as the first movement of the airflow control element.

The mouthpiece may comprise two protruding elements at the inner surface of the sidewall of the housing of the mouthpiece at opposing ends of the inner surface. Each of the two protruding elements may engage with one recess in the tubular connection portion of the cartridge or the device at opposing ends of the inner surface, when the mouthpiece is connected. A user may need to apply a compressive force by simultaneously pressing on opposing flexible regions of the outer walls of the mouthpiece in order to compress both protruding elements. The presence of at least two protruding elements may further reduce the risk of an accidental unlocking of the mouthpiece.

The at least one protruding element may be configured to be flexible. The at least one protruding element may be configured to be made of an elastic material, like for example plastic or may be a spring.

The mouthpiece may further comprise an outer mouthpiece side wall wherein the airflow channel through the mouthpiece is located between an inner surface of the outer mouthpiece side wall and the inner mouthpiece wall. The airflow channel may extend from the airflow control element to a downstream end of the mouthpiece through the space between the outer mouthpiece side wall and the inner mouthpiece wall. The airflow control element may form the most upstream element of the mouthpiece. This may the airflow control element allow to control the entry of the airflow into the mouthpiece.

As used herein, the terms “upstream”, and “downstream”, are used to describe the relative positions of components, or portions of components, of the mouthpiece, the cartridge or the aerosol-generating device in relation to the direction in which air flows through the aerosol-generating device during use thereof along the air flow path. Aerosol generating devices according to the invention comprise a proximal end through which, in use, an aerosol exits the device. The proximal end of the aerosol generating device or the mouthpiece may also be referred to as the mouth end or the downstream end. 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, the cartridge 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 aerosol generating device or the mouthpiece.

The mouthpiece may be configured to be connectable to one or both of a cartridge comprising aerosol-forming substrate and an aerosol-generating device. Preferably, the mouthpiece may be configured to be detachably connectable to one or both of the cartridge or the aerosol-generating device.

The mouthpiece may have a cylindrical shape including a cylindrical housing. This may allow a user to conveniently carry out the first movement of the airflow control element, in particular a rotational movement. The mouthpiece may further comprise a connection slit for receiving a tubular connection portion of either one of a cartridge comprising aerosol-forming substrate or of an aerosol-generating device. The connection slit may be located circumferentially within the cylindrical housing. This may allow the mouthpiece to be connectable to a tubular connection portion of either a cartridge or an aerosol-generating device. This may still allow a rotational movement of the mouthpiece relative to the tubular connection portion after both the mouthpiece and the tubular connection portion have been connected. The connection slit may be located in the housing of the mouthpiece between the outer mouthpiece side wall and the inner mouthpiece wall. This may position the tubular connection portion securely within the mouthpiece without disturbing the airflow channel through the mouthpiece.

The mouthpiece may comprise a Venturi element located in the airflow channel. The Venturi element may preferably be located downstream of the airflow control element. The Venturi element may comprise an inlet portion, a central portion and an outlet portion. The inlet portion may be configured to receive the airflow from the airflow control element. The outlet portion may be configured to provide an aerosol to a user. The central portion may be arranged between the inlet portion and the outlet portion. The inlet portion may be configured converging towards the central portion and the outlet portion may be configured diverging from the central portion.

The Venturi element may increase the mixing of the airflow, enabling or enhancing the formation of an aerosol.

The Venturi element preferably may be formed between an inner surface of the outer mouthpiece wall and the inner mouthpiece wall.

The invention also provides a cartridge, which may be configured to be attachable to the mouthpiece. Preferably the cartridge is detachably attachable to the mouthpiece. The cartridge may comprise a reservoir for holding the aerosol-forming substrate. The aerosol-forming substrate may preferably be liquid. The cartridge may comprise a tubular connection portion. The tubular connection portion may be configured to be attachable to the mouthpiece. The tubular connection portion may be configured to be detachably attachable to the mouthpiece. The tubular connection portion of the cartridge may be configured to be rotatably connectable to the mouthpiece. The tubular connection portion may be located at the downstream end of the cartridge. The tubular connection portion may include a cartridge locking element. The cartridge locking element may be configured to engage with the locking element of the mouthpiece when the cartridge and the mouthpiece are connected. This may provide for a third position of the locking element in the mouthpiece blocking the first movement of the airflow control element of the mouthpiece.

The cartridge may comprise a cartridge flow element. The cartridge flow element may be configured to engage with the airflow control element of the mouthpiece. This may allow control of the airflow from the cartridge into the mouthpiece.

The cartridge may comprise a cartridge airflow channel. The cartridge air flow channel may be configured to guide an airflow through the cartridge. The cartridge air flow channel may be fluidly connected to the reservoir of the cartridge. This may allow liquid aerosol-forming substrate to enter the airflow channel. The cartridge air flow channel may be at least partly surrounded by the reservoir of the cartridge.

The invention further provides an aerosol-generating system. The aerosol-generating system may comprise a mouthpiece as described herein. The aerosol-generating system furthermore may comprise one or both of a cartridge and an aerosol-generating device. The mouthpiece may be configured attachable, preferably removably attachable to the cartridge.

In another embodiment the invention further provides an aerosol-generating system. The aerosol-generating system comprises a mouthpiece as described herein. The aerosol-generating system furthermore comprises one or both of the cartridge and an aerosol-generating device.

5 The cartridge may include aerosol-forming substrate. The cartridge may include liquid aerosol-forming substrate. The cartridge may include a heating element for heating the aerosol-forming substrate. The heating element may be configured for evaporating the aerosol-forming substrate by heating. The heating element may comprise a susceptor element.

10 The mouthpiece of the aerosol-generating system may be configured to be attachable to a tubular connection portion of the cartridge. The tubular connection portion of the cartridge may have at least one recess, preferably multiple recesses located on its outer surface.

 The mouthpiece may comprise at least one protruding element arranged on an inner surface of the sidewall of the housing of the mouthpiece. The at least one protruding element may protrude into the above-mentioned connection slit.

15 The at least one protruding element may be configured to engage with the recess in the tubular portion when the tubular connection portion is received in the connection slit of the housing of the mouthpiece. This may correspond to the third position of the locking element which further blocks the first movement of the airflow control element.

20 The protruding element may be flexible. The flexible protruding element preferably may be a spring.

 Preferably, the aerosol-generating system comprises a cartridge. The cartridge includes the tubular connection portion. The tubular connection portion of the cartridge is configured to be connectable to the mouthpiece. Preferably the tubular connection portion is configured to be detachably connectable to the mouthpiece. The tubular connection portion is
25 configured to be rotatable connectable to the mouthpiece. This may allow the mouthpiece to be rotated relative to the cartridge, when the cartridge is connected to the mouthpiece.

 The cartridge may comprise a cartridge airflow control element, wherein the cartridge airflow control element is configured to engage with the airflow control element of the mouthpiece when the mouthpiece is attached to the cartridge. The airflow control element and
30 cartridge airflow control element are configured to enable airflow from the cartridge into the mouthpiece when the mouthpiece is rotated relative to the cartridge.

 The cartridge furthermore may comprise an inner cartridge wall around a central hollow portion of the cartridge. The cartridge wall may preferably be tubular. The inner cartridge wall may be connected to the tubular connection portion of the cartridge. A cartridge airflow channel
35 may extend through the central hollow portion of the cartridge. A reservoir including aerosol-forming substrate may at least partly surround the inner cartridge wall around the central hollow portion of the cartridge. The reservoir may preferably include liquid aerosol-forming substrate.

The inner cartridge wall may comprise a second opening. The above-described cartridge airflow control element may comprise the second opening. The second opening may be configured for allowing an airflow to pass from the cartridge air flow channel into the mouthpiece when the cartridge is connected to the mouthpiece. The inner cartridge wall may
5 comprise a connection portion. The connection portion may be configured to be connectable to the mouthpiece. The connection portion preferably may comprise the second opening.

In the aerosol-generating system the first opening of the inner mouthpiece wall and the second opening of the inner tubular cartridge wall may form part of the valve, preferably the disc-valve. This valve may allow an airflow to pass from the cartridge airflow channel into the
10 mouthpiece. The valve may control the airflow from the cartridge airflow channel into the mouthpiece.

The first opening in the inner mouthpiece wall and the second opening of the inner tubular cartridge wall may be rotatable relative to each other. An airflow may be allowed to pass from the cartridge airflow channel into the mouthpiece when the first opening and the second opening are aligned to the maximum extent or may completely overlap. The position
15 in which the first opening and the second opening are aligned to the maximum extent or completely overlap may correspond to the second position of the airflow control element. Airflow may be blocked, when the first opening and the second opening do not overlap, so that no air flow path from the cartridge airflow channel into the mouthpiece is present. This position,
20 wherein the first opening and the second opening do not overlap, may correspond to the first position of the airflow control element.

A user may rotate the mouthpiece relative to the cartridge by carrying out the first movement of the airflow control element. This may rotate the first opening relative to the second opening.

In particular, in the aerosol-generating system of the invention the first opening of the inner mouthpiece wall may be configured rotatable with respect to the second opening of the inner tubular cartridge wall. The first opening of the inner mouthpiece wall may be configured rotatable with respect to the second opening of the inner tubular cartridge wall between the first position and the second position of the airflow control element. In the first position of the
30 airflow control element the first opening and the second opening may not overlap. This may result in the blocking of airflow through the airflow channel of the mouthpiece. In the second position of the airflow control element, the first opening and the second opening may overlap. In particular, in the second position of the airflow control element, the first opening and the second opening may be aligned to the maximum extent or may completely overlap. This may
35 allow a maximum of airflow through the airflow channel of the mouthpiece. The first opening and the second opening may have the same size. In the second position the first opening and the second opening may then completely overlap. The first opening and the second opening

may have a different size. In the second position the first opening and the second opening may then be aligned to the maximum extent.

The first opening may be configured incrementally rotatable with respect to the second opening. This may allow an incremental opening of airflow into the airflow channel of the mouthpiece. In particular, the first opening may be configured incrementally rotatable with respect to the second opening to at least one intermediate position between the first and second position. In this intermediate position the first opening and the second opening only partially overlap. This may allow some airflow being smaller than the maximum airflow to pass through the airflow channel of the mouthpiece. This may allow a user to customize the airflow and the aerosol generated.

The aerosol-generating system of the present invention may comprise a mouthpiece as described herein, a cartridge as described herein and an aerosol-generating device comprising a cavity for receiving at least the cartridge.

The cartridge may comprise a reservoir. The reservoir may at least partially surround the cartridge air flow channel. The reservoir may comprise aerosol-forming substrate, in particular liquid aerosol-forming substrate. The reservoir may be in fluid connection with the cartridge airflow channel. The reservoir may be in fluid connection with the cartridge airflow channel through a porous high retention material. In particular, the porous high retention material may allow liquid aerosol-forming substrate to pass through the high retention material.

The cartridge may furthermore comprise a susceptor element. The susceptor element may be a porous susceptor element. This may allow liquid aerosol-forming substrate to pass through the porous susceptor element while being heated and evaporated. This may allow the formation of either an aerosol from the aerosol-forming substrate in the cartridge airflow channel or the formation of an airflow including components of the aerosol-forming substrate.

The susceptor element may be formed from any material that can be inductively heated to a temperature sufficient to generate an aerosol from the aerosol-forming substrate. A preferred susceptor element may comprise or consist of a ferromagnetic material, for example a ferromagnetic alloy, ferritic iron, or a ferromagnetic steel or stainless steel. A suitable susceptor may be, or comprise, aluminium. Preferred susceptors may be heated to a temperature in excess of 250 degrees Celsius.

Preferred susceptors elements are metal susceptors, for example stainless steel. However, susceptor materials may also comprise or be made of graphite, molybdenum, silicon carbide, aluminum, niobium, Inconel alloys (austenite nickel-chromium-based superalloys), metallized films, ceramics such as for example zirconia, transition metals such as for example iron, cobalt, nickel, or metalloids components such as for example boron, carbon, silicon, phosphorus, aluminium.

The porous susceptor element may comprise or consist of an electrically conductive ceramic material, such as lanthanum-doped strontium titanate, or yttrium-doped strontium titanate. Porous inductively heatable ceramic material may be a ceramic ferrite. The porous susceptor element may comprise or consist of an open-porous ferrimagnetic or ferromagnetic ceramic material, such as a ceramic ferrite. As used herein, ferrites are ferrimagnetic ceramic compounds derived from iron oxides such as hematite (Fe_2O_3) or magnetite (Fe_3O_4) as well as oxides of other metals.

A stainless-steel mesh may be used as a porous susceptor element.

The porous susceptor element may have a porosity of between 35 to 80 percent preferably between 45 to 65 percent, most preferably between 50 to 60 percent. As used herein, the term 'porosity' refers to a fraction of void space in a susceptor. The porosity of the susceptor may be chosen to enable lateral airflow through the susceptor. The porosity may additionally or alternatively be influenced by providing slits or holes in the susceptor.

The liquid aerosol-forming substrate in the reservoir of the cartridge may comprise at least one aerosol-former. An aerosol-former is any suitable known compound or mixture of compounds that, in use, facilitates formation of a dense and stable aerosol and that is substantially resistant to thermal degradation at the temperature of operation of the system. 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.

The liquid aerosol-forming substrate may comprise 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 nicotine. The liquid aerosol-forming substrate may have a nicotine concentration of between about 0.5 percent and about 10 percent, for example about 2 percent.

The aerosol-generating device of the aerosol-generating system may provide a heating element. The heating element may be configured to heat the liquid aerosol-forming substrate for generating an aerosol.

The heating element may comprise an inductor coil. The inductor coil may be configured to heat the susceptor element of the cartridge. This may enable a heating of the liquid aerosol-forming substrate via inductive heating for generating an aerosol.

The inductor coil of the heating element may at least partly surround the cavity for receiving the cartridge.

This may allow the inductor coil to heat the susceptor of the cartridge when the cartridge is fully received in the cavity.

Upon inductive heating the susceptor may be heated by the alternating magnetic field of the inductive heating element. This may also heat the liquid aerosol-forming substrate being adjacent to or being transported through the susceptor. For induction heating, the heating element preferably comprises an induction coil. An alternating current may be supplied to the induction coil for generating an alternating magnetic field. The alternating current may have a high frequency. As used herein, the term "*high frequency oscillating current*" means an oscillating current having a frequency of between 500 kilohertz and 30 megahertz. The high frequency oscillating current may have a frequency of from about 1 megahertz to about 30 megahertz, preferably from about 1 megahertz to about 10 megahertz and more preferably from about 5 megahertz to about 8 megahertz.

The aerosol-generating device may comprise a power supply, typically a battery, within the casing of the aerosol-generating device. In one embodiment, the power supply is a Lithium-ion battery. Alternatively, the power supply may be a Nickel-metal hydride battery, a Nickel cadmium battery, or a Lithium based battery, for example a Lithium-Cobalt, a Lithium-Iron-Phosphate, Lithium Titanate or a Lithium-Polymer battery. As an alternative, the power supply may be another form of charge storage device such as a capacitor. The power supply may require recharging and may have a capacity that enables to store enough energy for one or more usage experiences; for example, the power supply may have sufficient capacity to continuously generate aerosol for a period of around six minutes or for a period of a multiple of six minutes. In another example, the power supply may have sufficient capacity to provide a predetermined number of puffs or discrete activations of the heating element.

The aerosol-generating device may comprise electric circuitry. The electric circuitry may comprise a microprocessor, which may be a programmable microprocessor. The microprocessor may be part of a control unit. The electric circuitry may comprise further electronic components. The electric circuitry may be configured to regulate a supply of power to the heating element, particularly to the resistive heating element or the conductive heating element. Power may be supplied to the heating element continuously following activation of the aerosol-generating device or may be supplied intermittently, such as on a puff-by-puff basis. The power may be supplied to the heating element in the form of pulses of electrical current. The electric circuitry may be configured to monitor the electrical resistance of the heating element, and preferably to control the supply of power to the heating element dependent on the electrical resistance of the heating element.

The invention further provides a method of enabling air flow through a mouthpiece as described herein. The method comprises moving the airflow control element from the first position to the second position via the first movement of the airflow control element and moving

the locking element from the third position to the fourth position via the second movement of the locking element.

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.

Example Ex1: A mouthpiece for an aerosol-generating device comprising:

an airflow channel through the mouthpiece,

an airflow control element, wherein the airflow control element is configured to be movable from a first position to a second position, the airflow control element being configured to block airflow through the airflow channel in the first position and to allow airflow through the airflow channel in the second position, wherein the airflow control element is further configured to be movable from the first position to the second position via a first movement of the airflow control element, and

a locking element, wherein the locking element is configured to be arranged in a third position and a fourth position, the locking element being configured to block the first movement of the airflow control element in the third position of the locking element and to allow the first movement of the airflow control element in the fourth position of the locking element, wherein the locking element is further configured to be movable from the third position to the fourth position via a second movement of the locking element.

Example Ex2: The mouthpiece according to example Ex1, wherein the first movement of the airflow control element is a rotational movement of the airflow control element.

Example Ex3: The mouthpiece according to any of the preceding examples, wherein the first movement of the airflow control element is a rotational movement of a housing of the mouthpiece.

Example Ex4: The mouthpiece according to any of the preceding examples, wherein the second movement of the locking element is a compression movement of the locking element.

Example Ex5: The mouthpiece according to any of the preceding examples, wherein the second movement of the locking element is a compression movement of at least one outer sidewall of the housing of the mouthpiece.

Example Ex6: The mouthpiece according to the preceding example Ex5, wherein at least one indentation is arranged on the outer sidewall of the housing of the mouthpiece, wherein the at least one indentation is formed to be gripped by a user.

Example Ex7: The mouthpiece according to any of the preceding examples, wherein the first movement of the airflow control element is different from the second movement of the locking element.

Example Ex8: The mouthpiece according to any of the preceding examples, wherein the airflow control element comprises a part of a valve.

Example Ex9: The mouthpiece according to any of the preceding examples, wherein the airflow control element comprises a part of a disc-valve.

5 Example Ex10: The mouthpiece according to the preceding example Ex9, wherein the first movement of the airflow control element is a rotation of the disc-valve thereby opening the disc-valve.

 Example Ex11: The mouthpiece according to any of the preceding examples, wherein the airflow control element is configured to be incrementally movable from the first
10 position to the second position, preferably wherein the airflow control element is configured to be movable to at least one intermediate position between the first and second position, wherein in the intermediate position the airflow channel is partially blocked by the airflow control element.

 Example Ex12: The mouthpiece according to any of the preceding examples,
15 comprising an inner mouthpiece wall, the inner mouthpiece wall comprising the airflow control element, preferably wherein the airflow control element comprises a first opening in the inner mouthpiece wall.

 Example Ex13: The mouthpiece according to the preceding example Ex12, further comprising an outer mouthpiece sidewall, preferably wherein the airflow channel
20 through the mouthpiece is located between the outer mouthpiece sidewall and the inner mouthpiece wall, more preferably wherein the airflow channel extends from the airflow control element to a downstream end of the mouthpiece through a space between the outer mouthpiece sidewall and the inner mouthpiece wall.

 Example Ex14: An aerosol-generating system comprising the mouthpiece of any
25 of examples Ex1 to Ex13 and one or both of a cartridge or an aerosol-generating device, wherein the mouthpiece is configured attachable, preferably removably attachable, to the cartridge.

 Example Ex15: The aerosol-generating system according to the preceding example Ex14, wherein the mouthpiece is configured to be attachable to a tubular connection
30 portion of the cartridge, wherein the tubular connection portion has at least one recess, preferably multiple recesses, on the outer surface, wherein the locking element further comprises at least one protruding element arranged on an inner surface of a sidewall of a housing of the mouthpiece, and wherein the protruding element is configured to engage with the recess in the tubular portion in the third position of the locking element thereby preventing
35 the first movement of the airflow control element.

Example Ex16: The aerosol-generating system according to the preceding example, wherein the protruding element is flexible, preferably wherein the flexible protruding element is a spring.

Example Ex17: The aerosol-generating system according to any of the preceding examples Ex14 to Ex16, wherein the cartridge furthermore comprises an inner tubular cartridge wall around a central hollow portion, wherein a cartridge airflow channel extends through the central hollow portion.

Example Ex18: The aerosol-generating system according to the preceding example Ex17, wherein the inner tubular cartridge wall comprises a second opening, the second opening being configured for allowing an airflow from the cartridge airflow channel into the mouthpiece.

Example Ex19: The aerosol-generating system according to the preceding example Ex18, wherein the first opening of the inner mouthpiece wall and the second opening of the inner tubular cartridge wall form part of a valve, preferably a disc valve.

Example Ex20: The aerosol-generating system according to any of the preceding examples Ex16 to Ex19, wherein the cartridge comprises a blocking element, and wherein the blocking element is configured to engage with the airflow control element of the mouthpiece when the mouthpiece is attached to the cartridge, and wherein the airflow control element and blocking element are configured to enable airflow from the cartridge into the mouthpiece when the mouthpiece is rotated relative to the cartridge.

Example Ex21: A method of enabling airflow through the mouthpiece of any of examples Ex1 to Ex13, wherein the method comprises moving the airflow control element from the first position to the second position via the first movement of the airflow control element and moving the locking element from the third position to the fourth position via the second movement of the locking element.

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

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

Fig. 1 shows a perspective view of an aerosol-generating system comprising the mouthpiece and a cartridge in a first position of the airflow control element;

Fig. 2 shows a perspective view of an aerosol-generating system comprising the mouthpiece and a cartridge in a second position of the airflow control element;

Fig. 3 depicts a cross-sectional schematic view of a mouthpiece being connected to an upper section of the cartridge;

Fig. 4 depicts a cross-sectional schematic view of the mouthpiece and the cartridge shown in Fig. 3 after having been connected;

Fig. 5 depicts in the upper half a schematic cross-sectional view of the mouthpiece and in the lower half a perspective view of the housing of the mouthpiece;

5 Fig. 6 depicts a schematic cross-sectional view of a mouthpiece connected to a cartridge in the first position of the airflow control element;

Fig. 7 depicts a schematic cross-sectional view of the mouthpiece connected to the cartridge in a second position of the airflow control element;

10 Fig. 8 shows a schematic cross-sectional view of a mouthpiece connected to a cartridge in the first position of the airflow control element with a dashed line for providing a cross-sectional view;

Fig. 9 shows a cross-sectional view of the first and second opening along the dashed line shown in Fig. 8;

15 Fig. 10 shows a schematic cross-sectional view of a mouthpiece connected to a cartridge in the second position of the airflow control element with a dashed line for providing a cross-sectional view;

Fig. 11 provides a cross-sectional view of the first and second opening along the dashed line shown in Fig. 10;

20 Fig. 12 shows a perspective view of the mouthpiece including an indentation with a dashed line through the indentation to provide a cross-sectional view;

Fig. 13 shows a cross-sectional view of the mouthpiece connected to the cartridge along the dashed line shown in Fig. 12 in a third position of the locking element;

25 Fig. 14 shows a cross-sectional view of the mouthpiece connected to the cartridge along the dashed line through the indentation shown in Fig. 12 in the fourth position of the locking element.

In the following the same elements are marked with the same reference numerals throughout all the figures.

30 Fig. 1 shows a perspective view of an aerosol-generating system including the cartridge 12 connected to the mouthpiece 10. The mouthpiece 10 contains a downstream opening 22. The cartridge 12 furthermore includes a porous susceptor element 24 which is in fluid communication with a reservoir 20 including liquid aerosol-forming substrate. The cartridge 12 furthermore comprises a cartridge airflow channel 18 providing an airflow channel through the cartridge to the mouthpiece 10. An inner tubular cartridge wall 38 separates the cartridge airflow channel from the reservoir. Such an assembly of the cartridge connected to the
35 mouthpiece can be received in the cavity of an aerosol-generating device, wherein the aerosol-generating device includes an inductive coil for heating the susceptor element. In Fig. 1 the

mouthpiece is in position "0" which is the first position of the airflow control element blocking airflow through the cartridge airflow channel 18 into the mouthpiece.

Fig. 2 shows a perspective view of the aerosol-generating system shown in Fig. 1 wherein the mouthpiece has been rotated relative to the cartridge as indicated by the arrow 14. In this position, the mouthpiece is in a position indicated by "1". This corresponds to the second position of the airflow control element, which allows an air flow from the cartridge into the mouthpiece.

Fig. 3 shows in the upper part a schematic cross-sectional view of the mouthpiece 10 with the downstream opening 22. The mouthpiece 10 comprises an outer mouthpiece side wall 26 and an inner mouthpiece wall 28 which confine a central hollow portion 32 with the airflow channel. The upstream part of the inner mouthpiece wall 28 of the mouthpiece 10 comprises a connection portion to be configured for being connected to an inner tubular cartridge wall 38 of the cartridge 12. Furthermore, the mouthpiece 10 includes a connection slit 11 for receiving a tubular connection portion 34 of the cartridge 12. The lower part of Fig. 3 shows the upper part of the cartridge 12 with the reservoir 20 of the cartridge and the cartridge airflow channel 18. The inner tubular cartridge wall 38 includes a second opening 36 which would allow an airflow from the cartridge airflow channel into the mouthpiece 10. The mouthpiece 10 can be connected to the cartridge 12 as indicated by the arrow between the mouthpiece and the cartridge. The cartridge 12 includes a tubular connection portion 34 of the cartridge for connecting to the mouthpiece 10. The tubular connection portion 34 can include at least one recess for engaging with a protruding element of the mouthpiece, wherein the recess may be located in the connection slit 11 (both the recess and the protruding element are not shown in Fig. 3 for reasons of clarity).

Fig. 4 depicts the mouthpiece and the cartridge shown in Fig. 3 after having been connected. The tubular connection portion 34 of the cartridge has been received by the connection slit 11 of the mouthpiece and the connection portion of the inner tubular cartridge wall 28 has been connected to the inner tubular mouthpiece wall. It can be seen, that the second opening 36 in the inner tubular cartridge wall 38 is blocked by the inner mouthpiece wall 28. This corresponds to the first position of the airflow control element.

Fig. 5 shows a schematic perspective view of the mouthpiece 10 which additionally shows the first opening 30 in the inner mouthpiece wall 28.

Fig. 6 shows a schematic cross-sectional view of the mouthpiece 10 connected to the upper part of cartridge 12. Any airflow or aerosol 16 is blocked by the inner mouthpiece wall 28 blocking the second opening 36 of the inner tubular cartridge wall.

Fig. 7 shows a schematic cross-sectional view of the mouthpiece 10 connected to the upper part of cartridge 12 after a rotational movement of the mouthpiece 10 relative to the cartridge was carried out. This first movement, which is a rotational movement resulted in the

second opening 36 of the inner tubular wall overlapping with the first opening 30 of the inner mouthpiece wall. This allows airflow or aerosol 16 to enter the airflow channel of the mouthpiece 10 through the disc-valve formed by both the first opening and the second opening. This corresponds to the second position of the airflow control element.

5 Fig. 8 depicts the mouthpiece 10 connected to the upper part of the cartridge in the first position of the airflow control element. Airflow of the aerosol 16 into the mouthpiece is blocked by the inner mouthpiece wall 28.

 Fig. 9 depicts a cross-sectional view along the dashed line 40 shown in Fig. 8. It can be seen that in the first position of the airflow control element the inner mouthpiece wall 28
10 blocks the entry of any aerosol from the cartridge airflow channel into the mouthpiece 10. The first opening 30 of the inner mouthpiece wall and the second opening 36 of the inner tubular cartridge wall do not overlap, preventing any airflow into the mouthpiece as indicated by the "X".

 Fig. 10 depicts a cross-sectional view of the mouthpiece connected to the upper part
15 of the cartridge in the second position of the airflow control element. A user can rotate the mouthpiece relative to the cartridge from the first position of the airflow control element as shown in Fig. 8 to the second position. The second opening 36 of the inner tubular cartridge wall and the first opening 30 of the inner mouthpiece wall both overlap, allowing the airflow of air and aerosol 16 through the mouthpiece.

20 Fig. 11 depicts a cross-sectional view of the aerosol-generating device shown in Fig. 10 along the dashed line 40. It can be seen that the first opening 30 of the inner mouthpiece wall and the second opening 36 of the inner tubular cartridge wall both overlap, thereby allowing the entry of airflow into the mouthpiece.

 Fig. 12 shows a perspective view of the mouthpiece 10 with the outer mouthpiece wall
25 26 which also includes an indentation 42. This indentation 42 allows a user to apply a compressive force in order to move the locking element from its third position to its fourth position.

 Fig. 13 shows a cross-sectional view of the mouthpiece of Fig. 12 along the dashed
line 50 shown in Fig. 12. The outer mouthpiece side wall 26 includes at its inner surface a
30 flexible protruding element 42, for example a spring. The flexible element 42 is located at the inner surface of the outer mouthpiece side wall 26 opposite of the indentation 42. This spring can engage with a recess 46 of the tubular connection portion 34 of the cartridge. When the spring 44 engages with the recess 46, then the locking element is in its third position, blocking a rotational move of the mouthpiece from the first position to the second position. Fig. 13 also
35 shows that the first opening and the second opening of the tubular inner cartridge wall and the inner tubular mouthpiece wall do not overlap, thereby blocking airflow into the mouthpiece.

The flexible element 44 can be disengaged from the recess 46 via a compression movement as indicated by the arrow 42, in Fig. 14. This corresponds to the locking element moving from its third to its fourth position. In this fourth position of the locking element, the mouthpiece can be rotated relative to the cartridge so that the airflow control element can be brought from its first position and to its second position, allowing the flow of air into the mouthpiece. The first motion path of the first movement, the rotational movement of the airflow control element which is possible after the locking element has been moved to its fourth position is indicated by the arrows 48.

CLAIMS

1. A mouthpiece for an aerosol-generating device comprising:

an airflow channel through the mouthpiece,

an airflow control element, wherein the airflow control element is configured to be movable from a first position to a second position, the airflow control element being configured to block airflow through the airflow channel in the first position and to allow airflow through the airflow channel in the second position, wherein the airflow control element is further configured to be movable from the first position to the second position via a first movement of the airflow control element, and

a locking element, wherein the locking element is configured to be arranged in a third position and a fourth position, the locking element being configured to block the first movement of the airflow control element in the third position of the locking element and to allow the first movement of the airflow control element in the fourth position of the locking element, wherein the locking element is further configured to be movable from the third position to the fourth position via a second movement of the locking element.

2. The mouthpiece according to claim 1, wherein the first movement of the airflow control element is a rotational movement of the airflow control element.

3. The mouthpiece according to any of the preceding claims, wherein the first movement of the airflow control element is a rotational movement of a housing of the mouthpiece.

4. The mouthpiece according to any of the preceding claims, wherein the second movement of the locking element is a compression movement of the locking element.

5. The mouthpiece according to any of the preceding claims, wherein the second movement of the locking element is a compression movement of at least one outer sidewall of the housing of the mouthpiece.

6. The mouthpiece according to any of the preceding claims, wherein the airflow control element comprises a part of a valve.

7. The mouthpiece according to any of the preceding claims, wherein the airflow control element comprises a part of a disc-valve.

8. The mouthpiece according to the preceding claim, wherein the first movement of the airflow control element is a rotation of the disc-valve thereby opening the disc-valve.

9. The mouthpiece according to any of the preceding claims, wherein the airflow control element is configured to be incrementally movable from the first position to the second position, preferably wherein the airflow control element is configured to be movable to at least one intermediate position between the first and second position, wherein in the intermediate position the airflow channel is partially blocked by the airflow control element.

10. The mouthpiece according to any of the preceding claims, comprising an inner mouthpiece wall, the inner mouthpiece wall comprising the airflow control element, preferably wherein the airflow control element comprises a first opening in the inner mouthpiece wall.

11. An aerosol-generating system comprising the mouthpiece of any of the preceding claims and one or both of a cartridge or an aerosol-generating device, wherein the mouthpiece is configured attachable, preferably removably attachable, to the cartridge.

12. The aerosol-generating system according to the preceding claim, wherein the mouthpiece is configured to be attachable to a tubular connection portion of the cartridge, wherein the tubular connection portion has at least one recess, preferably multiple recesses, on the outer surface, wherein the locking element further comprises at least one protruding element arranged on an inner surface of a sidewall of a housing of the mouthpiece, and wherein the protruding element is configured to engage with the recess in the tubular portion in the third position of the locking element thereby preventing the first movement of the airflow control element.

13. The aerosol-generating system according to the preceding claim, wherein the protruding element is flexible, preferably wherein the flexible protruding element is a spring.

14. The aerosol-generating system according to any of the preceding claims 11 to 13, wherein the cartridge comprises a cartridge airflow control element, and wherein the cartridge airflow control element is configured to engage with the airflow control element of the mouthpiece when the mouthpiece is attached to the cartridge, and wherein the airflow control element and cartridge airflow control element are configured to enable airflow from the cartridge into the mouthpiece when the mouthpiece is rotated relative to the cartridge.

15. A method of enabling airflow through the mouthpiece of any of claims 1 to 10, wherein the method comprises moving the airflow control element from the first position to the second position via the first movement of the airflow control element and moving the locking element from the third position to the fourth position via the second movement of the locking
5 element.

Fig. 1

Fig. 2

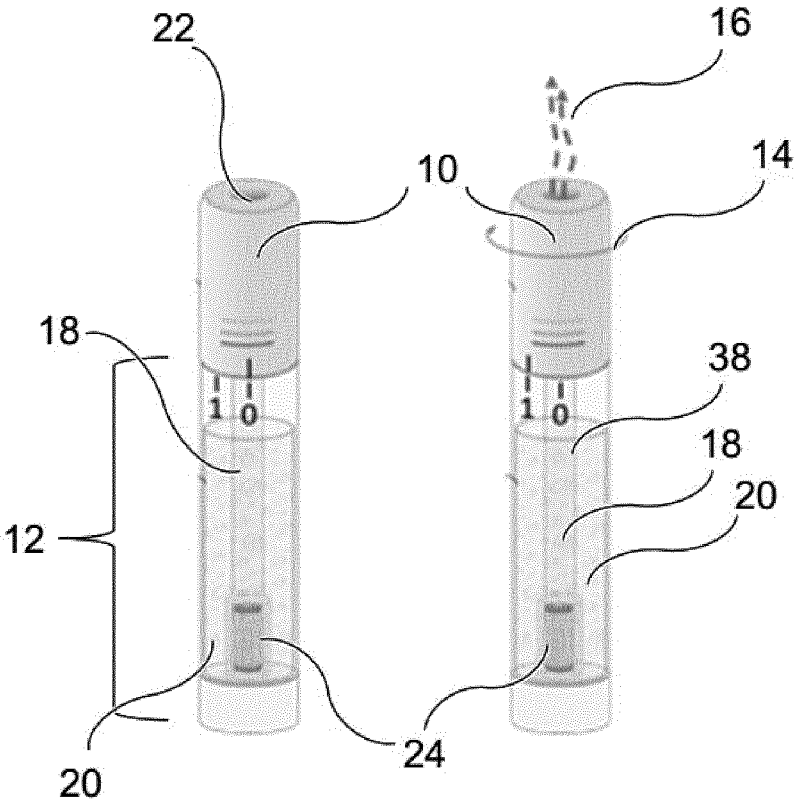


Fig. 3

Fig. 4

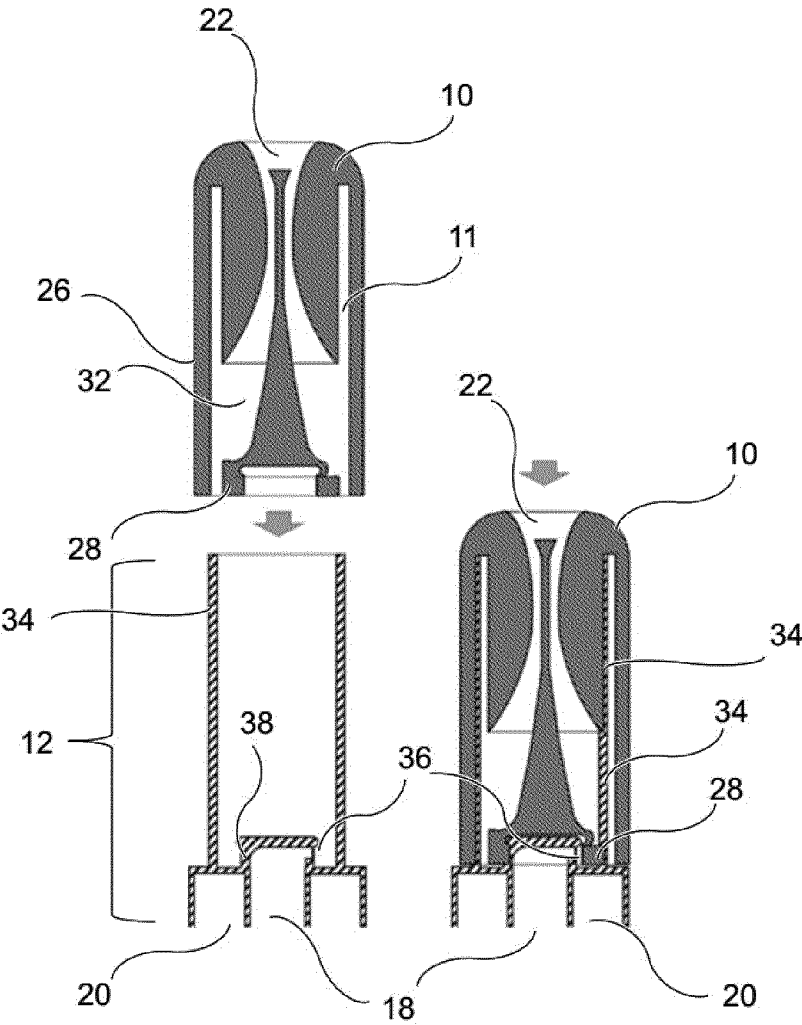


Fig. 5 Fig. 6 Fig. 7

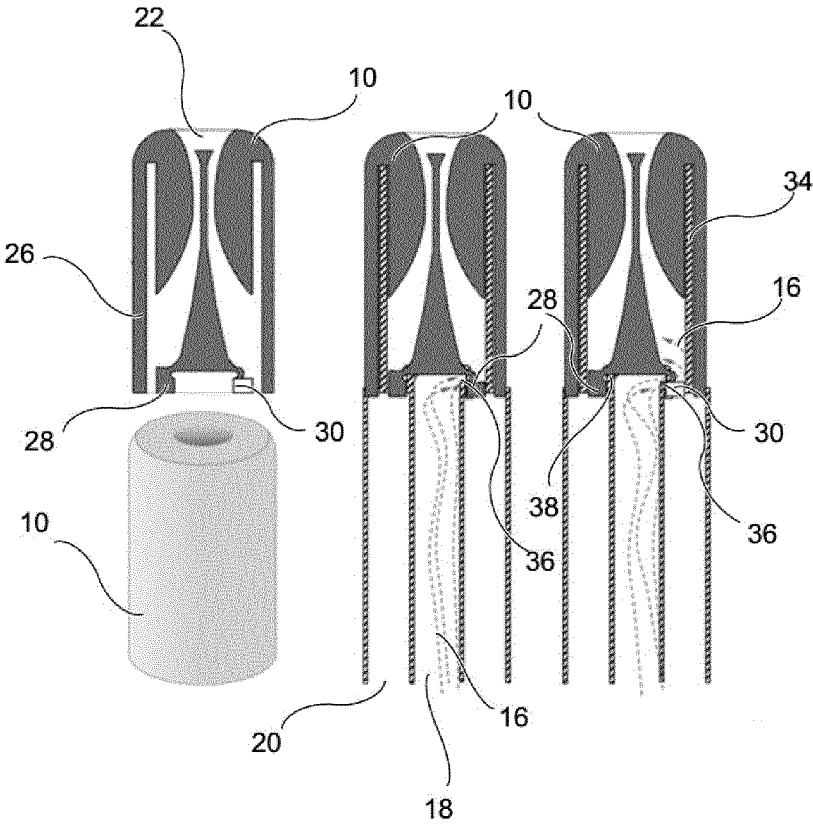


Fig. 8

Fig. 9

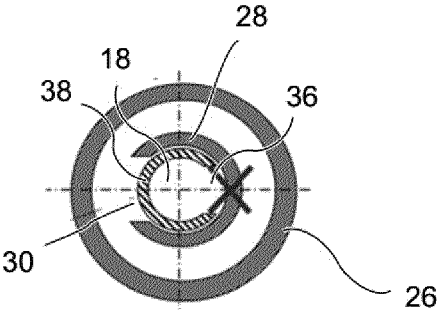
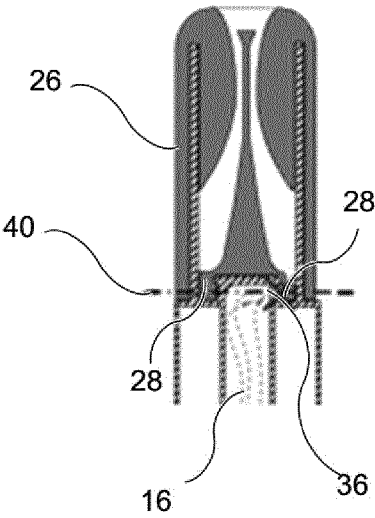


Fig. 10

Fig. 11

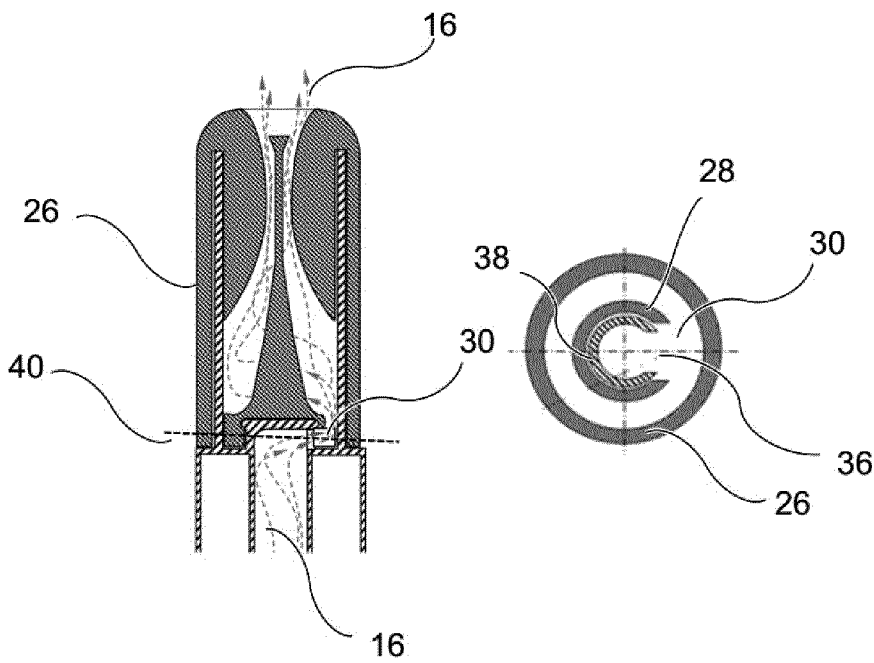


Fig. 12

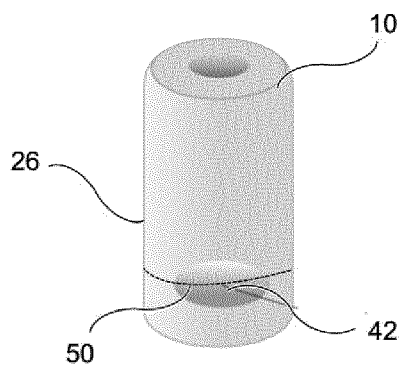


Fig. 13

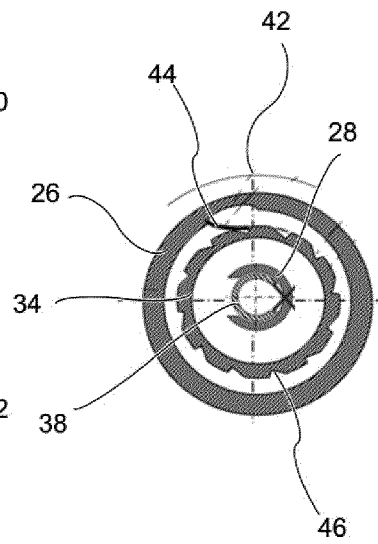
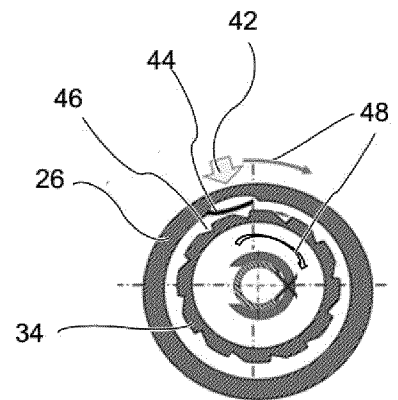


Fig. 14



INTERNATIONAL SEARCH REPORT

International application No

PCT/EP2022/083473

A. CLASSIFICATION OF SUBJECT MATTER

INV. **A24F7/00** **A24F40/485**

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A24F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	figures 1-4, 7, 8	12-14
	paragraph [0010] - paragraph [0015]	

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	paragraph [0084] - paragraph [0096]	

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	figure 11	
	paragraph [0101]	

A	EP 3 337 541 B1 (PHILIP MORRIS PRODUCTS SA [CH]) 12 February 2020 (2020-02-12)	1, 6-11,
	figures 1-7	15
	paragraph [0150] - paragraph [0183]	



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents :

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search

20 March 2023

Date of mailing of the international search report

28/03/2023

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/EP2022/083473

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