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(54) AEROSOL GENERATION ASSEMBLY AND METHOD FOR USING SUCH ASSEMBLY

(57) The present invention relates to an aerosol generation assembly (10) comprising:
- an aerosol generation device (12) defining a cover receiving part (12R) adjacent to a mouthpiece end;
- a cover (14) designed to be inserted on the cover receiving part;
- retaining means (16) movable between a locking position in which the cover is retained on the cover receiving part and an unlocking position in which the cover is free to move in respect with the cover receiving part along a device axis, by passing through an intermediate position, the retaining means moving from the locking position to the intermediate position when the cover is actuated according to a first predetermined movement; and
- unlocking means (18) moving the retaining means from the intermediate position to the unlocking position when the unlocking means are actuated according to a second predetermined movement different from the first predetermined movement.

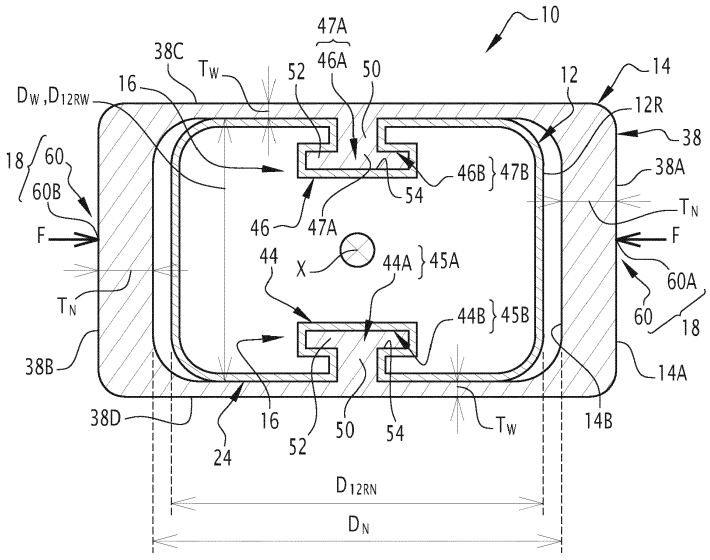

FIG.4

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Description

FIELD OF THE INVENTION

[0001] The invention concerns an aerosol generation assembly.

[0002] The invention concerns also concerns a method for using such an aerosol generation assembly.

BACKGROUND OF THE INVENTION

[0003] Different types of aerosol generation devices are already known in the art. Generally, such devices comprise a storage portion for storing a vaporizable material, which can comprise for example a liquid or a solid. A heating system is formed of one or more electrically activated resistive heating elements arranged to heat said vaporizable material to generate the aerosol. The aerosol is released into a flow path extending between an inlet and outlet of the device. The outlet may be arranged as a mouthpiece, through which a user inhales for delivery of the aerosol.

[0004] Children, especially young children, tend to put objects in their mouths and/or play with objects that catch their attention and that are within their reach. In addition, children tend to mimic adult gestures. This is particularly the case for aerosol generation devices that would be accessible to children. It is thus desirable to prevent children from using an aerosol generation device. It is in particular desirable to prevent children from inhaling aerosol and/or ingesting small pieces of the device or even vaporizable material.

[0005] Existing solutions preventing children from using an aerosol generation device do not give entire satisfaction because they are not sufficiently reliable.

SUMMARY OF THE INVENTION

[0006] One aim of the invention is to increase safety of an aerosol generation device and prevent its using by children.

[0007] For the purpose, the invention relates to an aerosol generation assembly comprising:

- an aerosol generation device extending between a battery end and a mouthpiece end along a device axis and defining a cover receiving part adjacent to the mouthpiece end;
- a cover extending along a cover axis, designed to be inserted on the cover receiving part and defining an external surface;
- retaining means movable between a locking position in which the cover is retained on the cover receiving part and an unlocking position in which the cover is free to move in respect with the cover receiving part along the device axis, by passing through an intermediate position, the retaining means being configured to move from the locking position to the intermediate position when the cover is actuated according to a first predetermined movement; and
- unlocking means designed to cause the retaining means to move from the intermediate position to the unlocking position when the unlocking means are actuated according to a second predetermined movement different from the first predetermined movement.

[0008] Thanks to the cover, the mouthpiece is inaccessible by a child when the aerosol generation device is not used. Moreover, the user wishing to use the device has to move the retaining means according to two different predetermined movements. This ensures a reliable unlocking of the cover from the cover retaining part and thus prevents children from having access to the mouthpiece.

[0009] According to some embodiments, the first predetermined movement is pushing or pulling of the cover along the device axis.

[0010] Such first predetermined movement of pulling or pushing is an ergonomic movement for the user in order to move the unlocking means from the locking position to the intermediate position.

[0011] According to some embodiments, the unlocking means comprise a pressing portion arranged on the external surface of the cover, the second predetermined movement being pressing of the pressing portion.

[0012] Such second predetermined movement of pressing is an ergonomic movement for the user in order to move the unlocking means from the intermediate position to the unlocking position.

[0013] According to some embodiments, the retaining means comprise at least one pair of cooperating elements in the locking position, preferably two pairs of cooperating elements, the or each pair of cooperating elements comprising a cover element and a device element the cover element being configured to be movable with respect to the device element along the device axis while moving the retaining means from the locking position to the intermediate position.

[0014] According to some embodiments, one of the elements of the or each pair of cooperating elements is formed by a protrusion and the other is formed by a groove, the groove comprising a locking portion extending along the device axis and configured to retain the protrusion in the groove and an unlocking portion adjacent to an end of the locking portion and configured to release the protrusion from the groove after the cover is pushed or pulled along the device axis.

[0015] Using these features, the locking portion of the groove enables to retain the protrusion in the groove when the protrusion is in the locking position and when the protrusion moves from the locking position to the intermediate position. Moreover, it is understood that the unlocking portion has a shape and dimensions adapted to the shape and the dimensions of the protrusion to allow the protrusion to be released from the groove.

[0016] According to some embodiments, the unlocking portion extends perpendicularly to the locking portion.

[0017] According to some embodiments, the retaining means are configured to move from the locking position to the intermediate position when the cover is pushed along the device axis during the first predetermined movement, and the locking portion and the unlocking portion are successively arranged according to the device axis following the direction from the mouthpiece end to the battery end.

[0018] According to some embodiments, the pressing portion and the or each cover element are arranged on a deformable part of the cover so as when the pressing portion is pressed in the intermediate position, the or each cover element moves away from the corresponding device element and wherein said deformable part is elastically deformable so as, when the cover is inserted on the cover receiving part the retaining means pass from the unlocking position to the intermediate position.

[0019] According to some embodiments, the pressing portion is formed by two pressing parts arranged on the external surface of the cover facing each other.

[0020] Those two pressing parts as the pressing portion enable an ergonomic movement for the user to move the retaining means from the intermediate position to the unlocking position.

[0021] According to some embodiments, each pressing part extends on the external surface of the cover between two planes perpendicular to the cover axis and wherein the retaining means comprise two pairs of cooperating elements, each cover being arranged on the internal surface of the cover between said two planes.

[0022] According to some embodiments, the cover comprises a pair of narrow sides facing each other and a pair of wide sides facing each other, each side extending along the cover axis and wherein the retaining means comprise two pairs of cooperating elements each cover element being arranged on one of the wide sides and each pressing part being arranged on one of the narrow sides.

[0023] Using these features, the identification of the pressing part by the user is intuitive.

[0024] According to some embodiments, the aerosol generation device further defines a cover fixing part adjacent to the battery end and designed to receive at least partially and fix the cover while using the aerosol generation device, the aerosol generation device further comprising fixing means designed to fix the cover on the cover fixing part, wherein the fixing means are formed by the retaining means.

[0025] These features prevent the user form losing the cover while using the aerosol generation device. Moreover, the cover at least partially fixed on the cover fixing part enables to thermally isolate the battery and thus prevents from transferring heat from the battery end to the fingers of the user.

[0026] According to some embodiments, the cover further comprises an absorbent element for leakage capture from the aerosol generation device, in the locking position of the retaining means, the mouthpiece of the aerosol generation device being adapted to be in contact with the absorbent element the absorbent element comprises preferably foam comprising an antimicrobial component, the foam comprising preferably Polyhexamethylene Biguanide (PHBM).

[0027] Using these features, leakage is prevented. Moreover, thanks to the absorbent element comprising an antimicrobial component such as PHMB, the mouthpiece is disinfected.

[0028] According to some embodiments, the mouthpiece and/or the cover are made of an antimicrobial material.

[0029] Using these features, the aerosol generation assembly enables to limit presence of bacteria on the cover and/or the mouthpiece and is thus hygienic.

[0030] The invention also relates to a method for using an aerosol generation assembly as defined above, when the cover is inserted into the cover receiving part and the retaining means are in the locking position, the method comprising a step of unlocking the retaining means, the step of unlocking comprising:

- moving the retaining means from the locking position to the intermediate position by actuated the cover according to the first predetermined movement; and
- actuating the unlocking means according to the second predetermined movement to move the retaining means from the intermediate position to the unlocking position.

BRIEF DESCRIPTION OF THE DRAWINGS

[0031] The invention and its advantages will be better understood upon reading the following description, which is given solely by way of non-limiting example and which is made with reference to the appended drawings in which:

- Figure 1 is a schematic front view of an aerosol generation assembly comprising an aerosol generation device and a cover inserted on a cover receiving part of the device;
- Figure 2 is a schematic cross-sectional view of the aerosol generation device of Figure 1;
- Figure 3 is a cross-sectional view of the aerosol generation assembly of Figure 1 according to the plane III-III of Figure 1;
- Figure 4 is a cross-sectional view of the aerosol generation assembly of Figure 1 according to the plane IV-IV of Figure 1;
- Figure 5 is a cross-sectional view of the aerosol generation assembly of Figure 1 according to plane IV-

IV when retaining means of the cover are in an unlocking position;

- Figure 6 is a view similar to the view of Figure 1, in which the cover is at least partially removed from the cover receiving part;

- Figure 7 is a detailed schematic view of retaining means arranged on the cover receiving part of the aerosol generation assembly of Figure 1;

- Figure 8 is a cross-sectional view of a part of the retaining means of Figure 7 according to plane VIII-VIII of Figure 7 in the locking position; and

- Figure 9 is a view similar to the view of Figure 1 in which the cover is inserted on a cover fixing part of the aerosol generation device, the cover fixing part being at least in part opposite to the cover receiving part.

DETAILED DESCRIPTION OF THE INVENTION

[0032] Before describing the invention, it is to be understood that it is not limited to the details of construction set forth in the following description. It will be apparent to those skilled in the art having the benefit of the present disclosure that the invention is capable of other embodiments and of being practiced or being carried out in various ways.

[0033] As used herein, the term **"aerosol generation device"** or **"device"** may include a vaping device configured to deliver an aerosol to a user generated from a vaporizable material by means of an aerosol generating unit (e.g. an aerosol generating element which generates vapor which condenses into an aerosol before delivery to an outlet of the device at, for example, a mouthpiece, for inhalation by a user). The device may be portable. "Portable" may refer to the device being for use when held by a user. The device may be adapted to generate a variable amount of aerosol, e.g. by activating a heater system for a variable amount of time (as opposed to a metered dose of aerosol), which can be controlled by a trigger. The trigger may be user activated, such as a vaping button and/or an inhalation sensor. The inhalation sensor may be sensitive to the strength of inhalation as well as the duration of inhalation to enable a variable amount of vapor to be provided (so as to mimic the effect of smoking a conventional combustible smoking article such as a cigarette, cigar or pipe, etc.). The device may include a temperature regulation control to drive the temperature of the heater and/or the heated vaporizable material to a specified target temperature and thereafter to maintain the temperature at the target temperature that enables efficient generation of aerosol.

[0034] As used herein, the term **"vaporizable material"** or **"precursor"** or **"aerosol forming substance"** or **"substance"** is used to designate any material that is vaporizable in air to form aerosol. Vaporization is generally obtained by a temperature increase up to the boiling point of the vaporizable material, such as at a temperature less than 400°C, preferably up to 350°C. The vaporizable material may, for example, comprise or consist of an aerosol-generating liquid, gel, wax, foam or the like, an aerosol-generating solid that may be in the form of a rod, which contains processed tobacco material, a crimped sheet or oriented strips of reconstituted tobacco (RTB), or any combination of these. The vaporizable material may comprise one or more of: nicotine, caffeine or other active components. The active component may be carried with a carrier, which may be a liquid. The carrier may include propylene glycol or glycerin. A flavoring may also be present. The flavoring may include Ethylvanillin (vanilla), menthol, Isoamyl acetate (banana oil) or similar.

[0035] As used herein, the term **"aerosol"** may include a suspension of vaporizable material as one or more of: solid particles; liquid droplets; gas. Said suspension may be in a gas including air. Aerosol herein may generally refer to/include a vapor. Aerosol may be formed by the vaporizable material or the tobacco article and may comprise one or several components of it.

[0036] As used herein, the term **"control unit"** refers to a component of the aerosol generation device configured to be part of the aerosol generation device. The control unit is configured to control the operation of the device according to a determined operation configuration. Thus, the control unit can control the operation of the heater and/or the power provided for example by a battery and/or the pressure of the vaporizable material or the air.

[0037] As used herein, the term **"operational settings"** may refer to settings usable by the control unit of the device to control the operation of the device. The operational settings may thus refer to a temperature of the heater and/or current or voltage values provided by the battery and/or vaporizable material or air pressure values.

[0038] An aerosol generation assembly 10 according to one embodiment of the invention is shown on Figures 1 to 9. The aerosol generation assembly 10 comprises an aerosol generation device 12, a cover 14 designed to be inserted on the aerosol generation device 12, retaining means 16 configured to retain the cover 14 on a cover receiving part of the aerosol generation device 12, the retaining means 16 being movable between a locking position, an unlocking position and an intermediate position, and unlocking means 18 designed to cause the retaining means 16 to move from the intermediate position to the unlocking position. The aerosol generation assembly 10 may comprise fixing means configured to retain the cover 14 on a cover fixing part of the aerosol generation device 12, as it will be explained in further detail below.

[0039] As shown on Figure 2, the aerosol generation device 12 extends between a battery end 20 and a mouthpiece end 22 along an axis referred hereinafter as "device

axis X". The aerosol generation device 12 comprises an outside casing 24 and internal components arranged in the outside casing 24. The outside casing 24 delimits an internal volume 26 and comprises a side surface 28 extending along the device axis X. The side surface 28 may be made of a single piece, from for example a metallic material. The side surface 28 may be made in a smooth material.

[0040] The internal components comprise a battery 30 for powering the device 12, a heating system 32 powered by the battery 30, a vaporizable material compartment 34 in contact with the heating system 32, a mouthpiece 36 and a control unit 37. The aerosol generation device 12 may further comprise other components performing different functionalities of the device 12. These other components are known *per se* and will be not explained in further detail below.

[0041] It should be noted that Figure 2 presents only a schematic view of different internal components of the aerosol generation device 12 and does not necessarily show the real physical arrangement and dimensions of these components. Some components or a part of them are represented in transparency by doted lines on Figures 1, 6 and 9. Particularly, such an arrangement can be chosen according to the design of the aerosol generation device 12 and technical features of its components.

[0042] The battery 30 is for example a known battery designed to be charged using the power supply furnished by an external charger and to provide a direct current of a predetermined voltage.

[0043] The vaporizable material compartment 34 is designed to store the vaporizable material used to generate aerosol. Particularly, based on the nature of the vaporizable material, the vaporizable material compartment 34 can be designed to store the vaporizable material in a liquid and/or solid form. The vaporizable material compartment 34 can be fixed in respect with the body of the aerosol generation device 12 or removable from it. In the first case, the vaporizable material compartment 34 can be refilled with the vaporizable material. In the second case, the vaporizable compartment 34 can present a replaceable cartridge (e.g., a pod or capsule containing e-liquid) or consumable (e.g., a tobacco rod) that can be removed and replaced by another one when the vaporizable material is no longer available. In some embodiments, the replaceable cartridge can be also refilled with the vaporizable material. The aerosol is released into a flow path extending between an inlet and outlet of the device. The outlet may be arranged as a mouthpiece, which a user of the aerosol generation device 12 inhales through for delivery of the aerosol.

[0044] As mentioned above, the mouthpiece 36 is arranged at the outlet of the flow path. The mouthpiece 36 is configured to deliver aerosol. The mouthpiece 36 may comprise a part of the outside casing 24 arranged in front of the outlet of the flow path and configured to be put in the mouth of the user. The mouthpiece 36 may be made of an antimicrobial material. For example, the antimicrobial material is an antimicrobial polymer such as a polymeric biocide, a biocidal polymer or a biocide-releasing polymer. According to another example, the antimicrobial material comprises an antimicrobial additive, such as antimicrobial silver ions, added in a base material, for example a polymer. For example, the antimicrobial material may be a thermoplastic polyurethane material having antimicrobial properties.

[0045] The control unit 37 is able to control the operation of the aerosol generation device 12, using operational settings. Particularly, using the operational settings, the control unit 37 is able to control the heater temperature and/or the power provided from the battery 30 to the heating system 32 and/or the pressure for example at the air inlet or aerosol outlet.

[0046] As shown on Figures 1 and 2, the outside casing 24 defines the battery end 20 and the mouthpiece end 22 of the aerosol generation device 12. The battery end 20 and the mouthpiece end 22 are opposed along the device axis X. The battery end 20 comprises the extremity of the outside casing 24 arranged substantially in front of the battery 30 and the mouthpiece end 22 comprises at least in part the mouthpiece 36. The outside casing 24 further defines a cover receiving part 12R and a cover fixing part 12F of the aerosol generation device 12. The cover receiving part 12R comprises the part of the outside casing 24 designed to be covered by the cover 14, in particular when the aerosol generation device 12 is not used by the user. The cover receiving part 12R comprises the mouthpiece end 22. According to the specific example shown on Figure 1, the cover receiving part 12R also comprises the part of the outside casing 24 arranged in front of the vaporizable material compartment 34. As shown on Figure 1, the cover receiving part 12R further comprises the part of the outside casing 24 arranged in front of the control unit 37. The length of the cover receiving part 12R along the device axis X is comprised for example between 25% and 80% of the total length of the outside casing 24 along the device axis X and preferably comprised between 45% and 75% of this total length. The cover fixing part 12F comprises a part of the aerosol generation device 12 designed to be covered by the cover 14 when the aerosol generation device 12 is used by a user to generate aerosol. In particular, the cover fixing part 12F is designed to fix the cover 14 while the user uses the aerosol generation device 12 to generate aerosol. The cover fixing part 12F comprises the battery end 20. According to the specific example shown on Figure 9, the cover fixing part 12F also comprises the part of the outside casing 24 arranged in front of the control unit 37. The length of the cover fixing part 12F along the device axis X is comprised for example between 25% and 80% of said total length, and advantageously between 33% and 75% of said total length.

[0047] The cover 14 extends along a cover axis and is designed to be arranged on the cover receiving part 12R as it is shown on Figure 1 or the cover fixing part 12F as it is shown on Figure 9. In the specific example shown

on these Figures, the cover axis coincides with the device axis X when the cover 14 is inserted on the cover receiving part 12R or the cover fixing part 12F.

[0048] The cover 14 has a tubular shape closed at one extremity and delimits an internal space for receiving the cover receiving part 12R or the cover fixing part 12F. The cover 14 comprises a lateral wall 38 and a transverse wall 40. The lateral wall 38 extends along the cover axis and defines an opening of the cover 14 at a first extremity of the cover 40. The transverse wall 40 closes the lateral wall 38 at the second extremity of the cover 14. The lateral wall 38 may comprise a plurality of sides or may have in cross-section, a circular shape or an oval shape. In the specific example shown on Figures 3 and 4, the lateral wall 38 has, in cross section, for example, a substantially rectangular shape with rounded edges. More specifically, the lateral wall 38 comprises a pair of narrow sides 38A, 38B facing each other and a pair of wide sides 38C, 38D facing each other. Each side 38A, 38B, 38C, 38D extends along the cover axis.

[0049] The cover 14 further defines an external surface 14A and an internal surface 14B. According to the example shown on Figures 3 and 4, the distance defined between the internal surface 14B and the external surface 14A of each narrow side 38A, 38B, referred hereinafter as "narrow side thickness T_N", is strictly superior to the distance Tw defined between the internal surface 14B and the external surface 14A of each wide side 38C, 38D, referred hereinafter as "wide side thickness Tw". For example, the ratio between the narrow side thickness T_N and the wide side thickness Tw is comprised between to 1 and 4 and advantageously comprised between 2 and 3. The narrow internal distance D_N measured between the internal surface 14B of the two narrow sides 38A, 38B is superior or equal to the dimension D_{12RN} of the cover receiving part 12R measured along the direction given by said narrow internal distance D_N. The wide internal distance D_{12RW} measured between the internal surface 14B of the two wide sides 38C, 38D is substantially equal to the dimension of the cover receiving part 12R measured along said wide internal distance Dw. Thus, as shown on Figures 3 and 4, when the cover 14 is inserted on the cover receiving part 12R, the internal surface 14B of the narrow sides 38A, 38B is at a distance from the cover receiving part 12R and the internal surface 14B of the narrow sides 38A, 38B is in contact with the cover receiving part 12R. Notably, when the cover 14 is inserted on the aerosol generation device 12, the cover 14 is maintained on the aerosol generation device 12.

[0050] The cover 14 comprises a deformable part. As used herein, the term "deformable part" refers to a part of the cover 14 adapted to be elastically deformable, for example using the fingers of the user of the aerosol generation assembly 10. For example, the deformable part comprises a part of the lateral wall 38, referred herein after as "lateral wall deformable portion". According to some embodiments, the deformable part extends from the first extremity of the cover 14 towards the second extremity of the cover 14, along the cover axis and circumferentially around the cover axis. The deformable part extends, for example, circumferentially on a deformable length along the cover axis comprised between 10% and 75% of the total length of the cover 14 along the cover axis, advantageously between 10% and 25% of said total length of the cover 14. In a particular example, the deformable part also comprises the transverse wall 40 of the cover 14, referred hereinafter as "deformable transverse wall".

[0051] According to an example, the cover 14 may also comprises a non-deformable part. As used herein, the term "non-deformable part" refers to a part of the cover 14 adapted to be non-deformable by the fingers of a user of the aerosol generation assembly 10. The non-deformable part may comprises a zone of the cover 14 defined between the lateral wall deformable portion and the deformable transverse wall.

[0052] In a specific example, the deformable part comprises at least a portion of one of the narrow sides 38A, 38B and preferably portions of both narrow sides 38A, 38B such that the or each deformable portion of both narrow sides 38A, 38B can be pressed. The deformable part of the cover 14 may also comprise at least a portion of one of the wide sides 38C, 38D and preferably portions of both wide sides 38C, 38D such that they can move away from the cover receiving part 12R when the deformable portion of the narrow sides 38A, 38B is pressed. In particular, as shown on Figure 5, when said portions of both narrow sides 38A, 38B are pressed, the wide sides 38C, 38D are configured to move in a direction opposed to the cover receiving part 12R. According to a particular example, the whole cover 14 is deformable.

[0053] According to a specific example, the external surface 14A of the deformable part of the cover 14 defines a pressing portion 60 of the unlocking means 18. In the particular example shown on Figures 4 and 5, the external surface 14A of the deformable portions of the narrow sides 38A, 38B of the cover 14 defines said pressing portion 60. More precisely, the external surface 14A of the deformable portions of both narrow sides 38A, 38B defines two pressing parts 60A, 60B of the pressing portion 60. In other words, the two pressing parts 60A, 60B of the pressing portion 60 extend on the external surface 14A of the narrow sides 38A, 38B of the cover 14. For example, the two pressing parts 60A, 60B face each other. Each pressing part 60A, 60B may extend on the external surface 14A of the cover 14 between two planes perpendicular to the cover axis. According to some embodiments, the cover 14 may be at least in part made of an antimicrobial material. For example, the antimicrobial material is an antimicrobial polymer such as a polymeric biocide, a biocidal polymer or a biocide-releasing polymer. According to other examples, the antimicrobial material comprises an antimicrobial additive, such as antimicrobial silver ions, added in a base material, for example a polymer. According to other examples, the antimicrobial material may be a thermoplastic polyurethane

material having antimicrobial properties. Preferentially, the internal surface 14B of the cover 14 comprises a layer of the antimicrobial material. The external surface 14A may comprise a layer of a material having a friction coefficient facilitating manipulation of the cover 14 by the fingers of the user. According to some embodiments, the external surface 14A is made of the antimicrobial material. Advantageously, the antimicrobial material has a friction coefficient facilitating manipulation of the cover 14 by the fingers of the user.

[0054] As shown on Figure 1, the cover 14 may further comprise an absorbent element 42 preventing leakage of the vaporizable material. For this purpose, the absorbent element 42 may comprise a foam comprising an antimicrobial component, such as for example, Polyhexamethylene Biguanide (PHMB). The mouthpiece 36 of the aerosol generation device 12 is adapted to be in contact with the absorbent element 42 when the cover 14 is inserted on the cover receiving part 12R and when the retaining means 16 are in the locking position. The absorbent element 42 may be arranged in the internal space of the cover 14 on the transverse wall 40 of the cover 14.

[0055] According to some embodiments, the cover 14 further comprises a tubular seal (not shown) arranged on the internal surface 14B of the cover 14 such that when the cover 14 is inserted on the cover receiving part 12R, the seal retains leakage of the vaporizable material. Preferentially, the seal is arranged at the first extremity of the cover 14. The seal can be used to prevent leakage in combination with the absorbent element 42 as explained below or without this element.

[0056] The retaining means 16 of the cover 14 are movable between the locking position in which the cover 14 is retained on the cover retaining part 12R and the unlocking position in which the cover 14 is free to move in respect with the cover receiving part 12R along the device axis X, by passing through the intermediate position. The retaining means 16 are configured to move from the locking position to the intermediate position when the cover 14 is actuated according to a first predetermined movement. Moreover, the retaining means 16 are configured to move from the intermediate position to the unlocking position when the unlocking means 18 are actuated according to a second predetermined movement different from the first predetermined movement. The first predetermined movement is for example pushing or pulling of the cover 14 along the device axis X. In the specific example of Figures 1 to 9, the first predetermined movement is pushing of the cover 14 along the device axis X. The second predetermined movement (symbolized by arrows "F" on Figures 4 and 5) is pressing the pressing portion 60 of the unlocking means 18 arranged on the external surface 14A of the cover 14 in a direction oriented towards the cover receiving part 12R. As shown in particular on Figure 5, for each pressing part 60A, 60B, the second predetermined movement comprises the displacement of said pressing part 60A, 60B in a direction oriented towards the cover receiving part 12R of the aerosol generation device 12. The displacement of the two pressing parts 60A, 60B are opposed along a direction perpendicular to the device axis X. The first and second predetermined movements may be done by the fingers of the user.

[0057] The retaining means 16 comprise at least one pair of cooperating elements in the locking position. The or each pair of cooperating elements is configured to retain the cover 14 on the cover receiving part 12R in the locking position. The or each pair of cooperating elements 44, 46 comprises a cover element 44A, 46A and a device element 44B, 46B, said cover element 44A, 46A may be referred in the following as "corresponding cover element 44A, 46A" and said device element 44B, 46B may be referred in the following as "corresponding device element 44B, 46B". The or each cover element 44A, 46A is arranged on the internal surface 14B of the cover 14 and may be arranged on the deformable part of the cover 14. The or each device element 44B, 46B is arranged on the cover receiving part 12R such that said device element 44B, 46B is able to cooperate with a corresponding cover element 44A, 46A in the locking position. In the specific example shown on Figures 4 and 5, the retaining means 16 comprise two pairs of cooperating elements 44, 46.

[0058] In the specific example shown on Figures 4 and 5, the cover elements 44A, 46A of said two pairs are facing each other. Each cover element 44A, 46A may be arranged on a respective wide side 38C, 38D of the cover 14. According to an example, the cover elements 44A, 46A are arranged on the internal surface 14B of the cover 14 between said two planes. The device elements 44B, 46B of said two pairs 44, 46 are facing each other and are adapted to cooperate with a corresponding cover element 44A, 46A in the locking position (Figure 4).

[0059] For the or each pair of cooperating elements 44, 46, the cover element 44A, 46A is configured to be movable with respect to the corresponding device element 44B, 46B along the device axis X while moving the retaining means 16 from the locking position to the intermediate position when the cover 14 is actuated according to the first predetermined movement. Particularly, the cover element 44A, 46A has an axial displacement in respect with the corresponding device element 44B, 46B along the device axis X towards the battery end 20 when the cover 14 is actuated according to the first predetermined movement. For the or each pair of cooperating elements 44, 46, the cover element 44A, 46A is configured to be movable away from the corresponding device element 44B, 46B when the pressing portion 60 is pressed, in other words, while moving the retaining means 16 from the intermediate position to the unlocking position.

[0060] In the specific example shown on Figures 4 and 5, the or each cover element 44A, 46A may be a protrusion 45A, 47A protruding from the internal surface 14B of the cover 14. According to some embodiments, each protrusion 45A, 47A comprises a body 50 and a head

52. The head 52 is connected to the internal surface 14B of the cover 14 by the body 50. The head 52 may have, in cross section, a rectangular shape. The width of the head 52 measured along an axis perpendicular to the cover axis is larger than the width of the body 50 measured along said axis perpendicular to the cover axis. According to some other examples, the or each protrusion 45A, 47A has another shape.

[0061] In the specific example shown on Figures 4 to 8, the or each device element 44B, 46B may be formed by a groove 45B, 47B. The or each groove 45B, 47B comprises a locking portion 54 (shown on Figures 4 and 6 to 8) configured to retain the corresponding protrusion 45A, 47A in said groove 45B, 47B and an unlocking portion 56 (shown on Figures 5, 6 and 7) adjacent to an end of the locking portion 54 of said groove 45B, 47B and configured to release the corresponding protrusion 45A, 47A from said groove 45B, 47B. The or each groove 45B, 47B may be defined in the thickness of the outside casing 24.

[0062] In the particular example shown on Figures 4 and 5, each pair of the two pairs of cooperating elements 44, 46 comprises a groove respectively 45B, 47B. A particular example of a groove is described in relation to the groove 47B of the pair of cooperating elements 46 in reference to Figures 6, 7 and 8 (groove 45B of the pair of cooperating elements 45 is not visible on these Figures and the cover 14 is not shown on Figure 7 for convenience). The other groove 45B is similar to the groove 47B. The groove 47B is arranged in the external casing 24 substantially in front of the control unit 37 as shown in Figure 6. The locking portion 54 and the unlocking portion 56 are successively arranged according to the device axis X following the direction from the mouthpiece end 22 to the battery end 20. The unlocking portion 56 is adjacent to an end of the locking portion 54.

[0063] In the particular example of the Figures, the groove 47B may have a shape of an inversed "T". In other words, the groove 47B opens at the exterior of the outside casing 24 by a hole defined by the outside casing 24 having said inversed T shape. In particular, the body of the "T" corresponds to the locking portion 54 of the groove 47B and the head of the "T" corresponds to the unlocking portion 56 of the groove 47B. In a variant, the unlocking portion 56 and the locking portion 54 are successively arranged according to the device X following the direction from the mouthpiece end 22 to the battery end 20. In this case, the first predetermined movement is pulling the cover 14. Thus, in said variant, the retaining means 16 are configured to move from the locking position to the intermediate position when the cover 14 is pulled along the device axis X. Moreover, according to this variant, the groove 47B may have the shape of a non-inversed "T".

[0064] As shown on Figures 6 and 7, the locking portion 54 extends along the device axis X and is configured to retain the corresponding protrusion 47A in the groove 47B in the locking position. More particularly, the locking portion 54 defines a stopper 57 of the protrusion 47A in the locking position. When the protrusion 47A is located against the stopper 57, the retaining means 16 are in the locking position and more specifically in a "first locking position PL1" shown on Figure 7. As shown on Figure 7, when the protrusion 47A is in the locking portion 54 and at a distance from the stopper 57, the retaining means 16 are also in the locking position and more specifically in a "second locking position PL2". As shown in particular on Figure 8, the locking portion 54 defines a head receiving part 54H of the protrusion 47A and a body receiving part 54BO of the protrusion 47A opening towards the exterior of the aerosol generation device 12. The head receiving part 54H of the locking portion 54 has a width adapted to receive the head 52 of the protrusion 47A. The body receiving part 54BO has a width adapted to receive the body 50 of the protrusion 47A. In particular, the body receiving part 54BO of the locking portion 54 has a width inferior to the width of the head 52 of the protrusion 47A such that the protrusion 47A is locked in the locking portion 54 of the groove 47B.

[0065] As shown on Figures 5 and 7, the unlocking portion 56 is configured to release the protrusions 45A, 47A from the groove 45B, 47B after the cover 14 is actuated according to the first predetermined movement. When the protrusions 45A, 47A are in the unlocking portion 56 of the corresponding grooves 45B, 47B, the retaining means 16 are in the intermediate position, referred in the following as "intermediate position PINT". Intermediate position PINT is shown on Figure 7 for the protrusion 47A and the corresponding groove 47B. Specifically, the unlocking portion 56 of the groove 47B has dimensions adapted to the dimensions of the protrusion 47A so that the protrusion 47A can be extracted from the unlocking portion 56 when the unlocking means 18 are actuated. Figure 5 shows the protrusions 45A, 47A extracted from the grooves 45B, 47B and in particular from the unlocking portions 56 of said grooves 45B, 47B when the pressing portion 60 is pressed. In such extracted position of the protrusions 45A, 47A from the corresponding grooves 45B, 47B, the retaining means 16 are in the unlocking position 16 referred in the following as "PUNL". In this position, the cover 14 can be extracted from the cover receiving part 12R along the device axis X, as shown by the arrow E on Figure 6. In particular, the deformable part of the cover 14 being elastically deformable, when the cover 14 is inserted on the cover receiving part 12R, the retaining means 16 pass automatically from the unlocking position PUNL to the intermediate position PINT when the pressing portion 60 is released.

[0066] The fixing means are designed to fix the cover 14 on the cover fixing part 12F while using the aerosol generation device, as shown on Figure 9. The fixing means are formed by the retaining means 16.

[0067] In particular, the retaining means 16 are movable between the locking position in which the cover 14 is retained on the cover fixing part 12F (Figure 9) and an unlocking position in which the cover 14 is free to move

in respect with the cover fixing part 12F along the device axis X, by passing through the intermediate position. The retaining means 16 are configured to move from the locking position to the intermediate position when the cover 14 is actuated according a predetermined movement which corresponds to the inversed first predetermined movement, i.e. pulling the cover 14 along the device axis X in a direction opposed to the aerosol generation device 12 according to the particular example of the assembly 10 of the Figures. The unlocking means 18 are designed to cause the retaining means 16 to move from the intermediate position to the unlocking position when the unlocking means 18 are actuated according to the second predetermined movement, different from the inversed first predetermined movement, in order to remove the cover 14 from the cover fixing part 12F.

[0068] In particular, in the locking position, the or each cover element 44A, 46A cooperate with a corresponding device element 44B, 46B so as to retain the cover 14 on the cover fixing part 12F. In the locking position, the retaining means 16 are advantageously in the first locking position PL1 in which, in the particular example of the Figures, the protrusions 45A, 47A are arranged against the stopper 57 of the corresponding grooves 45B, 47B. In the intermediate position, in the particular example of the Figures, the protrusions 45A, 47A are arranged in the unlocking portions 56 of the corresponding grooves 45B, 47B. In the unlocking position, the protrusions 45A, 47A are released from the corresponding grooves 45B, 47B and the cover 14 is thus free to move with respect to the cover fixing part 12F.

[0069] A method for using an aerosol generation assembly 10 will now be explained.

[0070] Initially, the cover 14 is inserted on the cover receiving part 12R as shown on Figure 1. In this position of the cover 14, the retaining means 16 (not shown on Figure 1) are in the locking position as shown on Figure 4. According to a specific example, the retaining means 16 are in the first locking position PL1, as shown on Figures 4, 7 and 8.

[0071] To remove the cover 14 for using the aerosol generation device 12, the cover 14 is actuated according to the first predetermined movement to move the retaining means 16 from the locking position to the intermediate position. In the specific example of the assembly 10 of Figures 1 to 9, during the first predetermined movement, the cover 14 is pushed along the device axis X towards the battery end 20. During this pushing, the transverse wall 40 of the cover 14 and the absorbent element 42 may be deformed. In reference to Figure 7, during this pushing, each protrusion 45A, 47A is moved from the stopper 57 of the corresponding groove 45B, 47B along the device axis X to the intermediate position PINT in the unlocking portion 56 of the groove 45B, 47B. During the movement of each protrusion 45A, 47A in the locking portion 54 of the corresponding groove 45B, 47B, the retaining means 16 move in a plurality of second locking positions PL2 until reaching the intermediate position PINT.

[0072] Then, the unlocking means 18 are actuated according to the second predetermined movement (i.e. pressing of the pressing portion 60) different from the first predetermined movement, causing the retaining means 16 to move from the intermediate position to the unlocking position (Figures 5 and 7) in which the cover 14 is free to move in respect with the cover receiving part 12R, as shown on Figure 6. In particular, when the pressing portion 60 is pressed as shown on Figure 5, for the or each pair of cooperating elements 44, 46, the cover element 44A, 46A moves away from the corresponding device element 44B, 46B. As long as the pressing portion 60 is pressed, said cover elements 44A, 46A are away from the corresponding device elements 44B, 46B and the cover 14 is free to move in respect with the cover receiving part 12R and can thus be extracted from the cover receiving part 12R. More specifically, in a particular example, for pressing the pressing portion 60, the two pressing parts 60A, 60B of the pressing portion 60 are pressed according to arrows F as shown on Figures 4 and 5. Such pressing elastically deforms the cover 14 and, in particular, deforms the internal surface 14B of the wide sides 38C, 38D of the cover 14, which moves away from the cover receiving part 12R. The movement of the said internal surface 14B of the wide sides 38C, 38D moves the protrusions 45A, 47A away from the corresponding unlocking portion 56 of the groove 45B, 47B, as shown on Figure 5. When the user releases the pressing portion 60 of the cover 14, the cover 14 automatically recovers its initial shape (i.e. non-deformed shape as shown on Figure 4).

[0073] While using the aerosol generation device 12, the user may insert and fix the cover fixing part 12F into the cover 14 using the cover fixing means. For this purpose, the user may insert the cover 14 on the cover fixing part 12F until the retaining means 16 are in the intermediate position and, then, the cover 14 is actuated according to the first predetermined movement, namely pushing the cover 14 until the retaining means 16 are in the locking position and preferably in the first locking position PL1 in which the protrusions 45A, 47A are located against the stopper 57 of the corresponding groove 45B, 47B (Figure 7).

[0074] Once the vaping session is over, the user moves the retaining means 16 from the locking position to the intermediate position by actuating the cover 14 according to the inversed first predetermined movement. The inversed first predetermined movement is pulling the cover 14 along the device axis X in a direction opposed to the aerosol generation device 12. Then, the user actuates the unlocking means 18 according to the second predetermined movement to move the retaining means 16 from the intermediate position to the unlocking position. The user can thus release the cover 14 from the cover fixing part 12F.

[0075] Then, the user inserts the cover 14 on the cover receiving part 12R until the retaining means 16 are in the

intermediate position. Then, the user actuates the cover 14 in the inversed predetermined direction (i.e. pulling the cover 14 along the device axis X in a direction opposed to the aerosol generation device 12) to move the retaining means 16 from the intermediate position in the locking position. More preferably, according to the example of Figure 7, the user move the retaining means from the intermediate position PINT to the first locking position PL1 in which the protrusions 45A, 47A are located against the stopper 57 of the corresponding groove 45B, 47B.

Claims

1. An aerosol generation assembly (10) comprising:

- an aerosol generation device (12) extending between a battery end (20) and a mouthpiece end (22) along a device axis (X) and defining a cover receiving part (12R) adjacent to the mouthpiece end (22);
- a cover (14) extending along a cover axis, designed to be inserted on the cover receiving part (12R) and defining an external surface (14A);
- retaining means (16) movable between a locking position (PL1, PL2) in which the cover (14) is retained on the cover receiving part (12R) and an unlocking position (PUNL) in which the cover (14) is free to move in respect with the cover receiving part (12R) along the device axis (X), by passing through an intermediate position (PINT), the retaining means (16) being configured to move from the locking position to the intermediate position (PINT) when the cover (14) is actuated according to a first predetermined movement; and
- unlocking means (18) designed to cause the retaining means (16) to move from the intermediate position (PINT) to the unlocking position (PUNL) when the unlocking means (18) are actuated according to a second predetermined movement different from the first predetermined movement.

2. The aerosol generation device (12) according to claim 1, wherein the first predetermined movement is pushing or pulling of the cover (14) along the device axis (X).

3. The aerosol generation device (12) according to claim 1 or 2, wherein the unlocking means (18) comprise a pressing portion (60) arranged on the external surface (14A) of the cover (14), the second predetermined movement being pressing of the pressing portion (60).

4. The aerosol generation device (12) according to any one of claims 1 to 3, wherein the retaining means (16) comprise at least one pair of cooperating elements (44, 46) in the locking position (PL1, PL2), preferably two pairs of cooperating elements (44, 46), the or each pair of cooperating elements (44, 46) comprising a cover element (44A, 46A) and a device element (44B, 46B), the cover element (44A, 46A) being configured to be movable with respect to the device element (44B, 46B) along the device axis (X) while moving the retaining means (16) from the locking position (PL1, PL2) to the intermediate position (PINT).

5. The aerosol generation device (12) according to claim 4, wherein one of the elements of the or each pair of cooperating elements (44, 46) is formed by a protrusion (45A, 47A) and the other is formed by a groove (45B, 47B);
the groove (45B, 47B) comprising a locking portion (54) extending along the device axis (X) and configured to retain the protrusion (45A, 47A) in the groove (45B, 47B) and an unlocking portion (56) adjacent to an end of the locking portion (54) and configured to release the protrusion (45A, 47A) from the groove (45B, 47B) after the cover (14) is pushed or pulled along the device axis (X).

6. The aerosol generation device (12) according to claim 5, wherein the unlocking portion (56) extends perpendicularly to the locking portion (54).

7. The aerosol generation device (12) according to 5 or 6, wherein:

- the retaining means (16) are configured to move from the locking position (PL1, PL2) to the intermediate position (PINT) when the cover (14) is pushed along the device axis (X) during the first predetermined movement;
- the locking portion (54) and the unlocking portion (56) are successively arranged according to the device axis (X) following the direction from the mouthpiece end (22) to the battery end (20).

8. The aerosol generation assembly (10) according to any one of claims 4 to 7 taken in combination with claim 3, wherein the pressing portion (60) and the or each cover element (44A, 46A) are arranged on a deformable part of the cover (14) so as when the pressing portion (60) is pressed in the intermediate position (PINT), the or each cover element (44A, 46A) moves away from the corresponding device element (44B, 46B), and wherein said deformable part is elastically deformable so as, when the cover (14) is inserted on the cover receiving part (12R), the retaining means (16) pass from the unlocking position (PUNL) to the intermediate position (PINT).

9. The aerosol generation assembly (10) according to

any one of the preceding claims taken in combination with claim 3, wherein the pressing portion (60) is formed by two pressing parts (60A, 60B) arranged on the external surface (14A) of the cover (14) facing each other.

10. The aerosol generation assembly (10) according to claim 9 taken in combination with claim 4, wherein each pressing part (60A, 60B) extends on the external surface (14A) of the cover (14) between two planes perpendicular to the cover axis and wherein the retaining means (16) comprise two pairs of cooperating elements (44, 46), each cover element (44A, 46A) being arranged on the internal surface (14B) of the cover (14) between said two planes.

11. The aerosol generation assembly (10) according to claims 4 and 9, wherein the cover (14) comprises a pair of narrow sides (38A, 38B) facing each other and a pair of wide sides (38C, 38D) facing each other, each side (38A to 38D) extending along the cover axis and wherein the retaining means (16) comprise two pairs of cooperating elements (44, 46), each cover element (44A, 46A) being arranged on one of the wide sides (38C, 38D) and each pressing part (60A, 60B) being arranged on one of the narrow sides (38A, 38B).

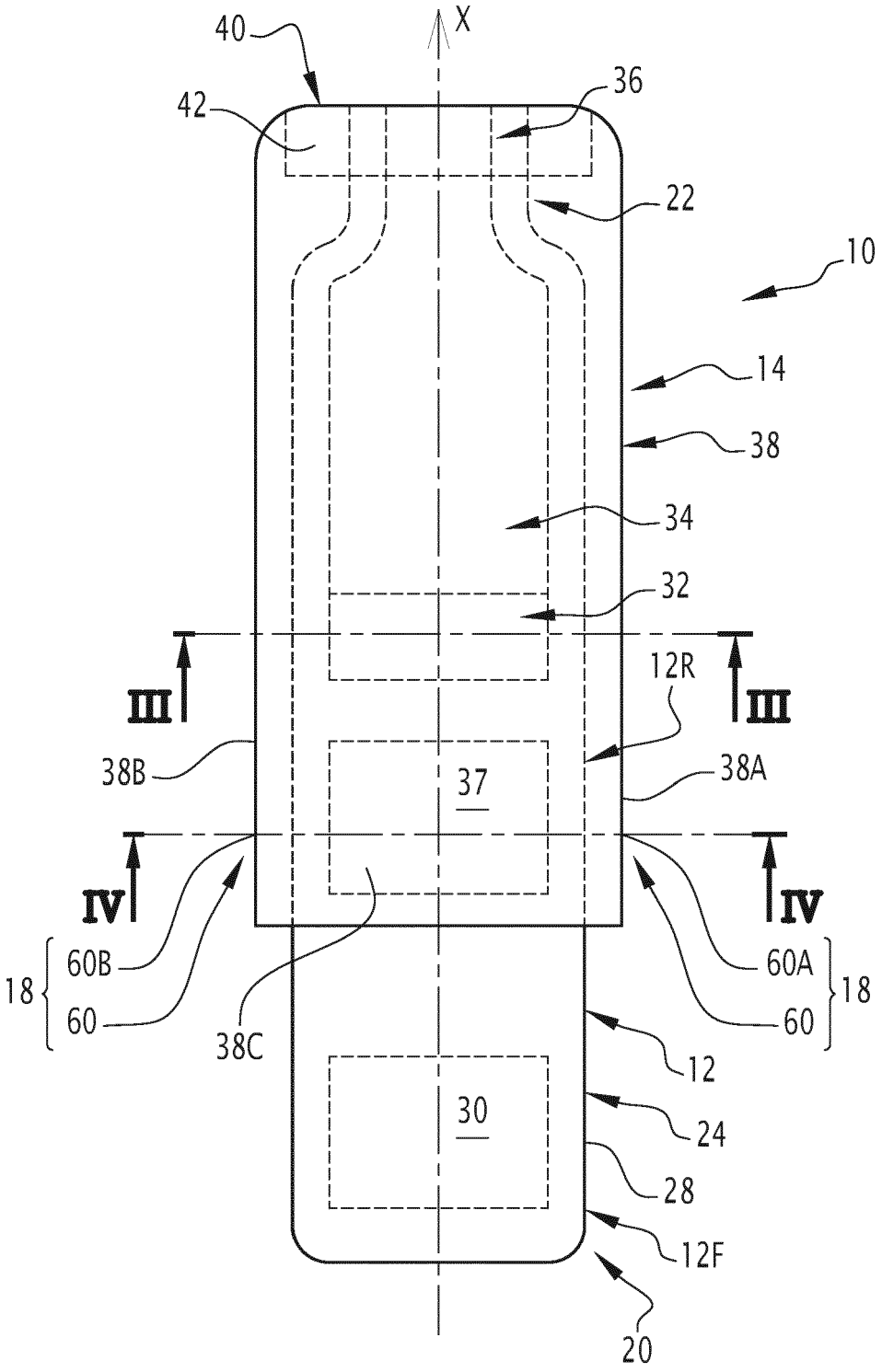
12. The aerosol generation assembly (10) according to any one of the preceding claims, wherein the aerosol generation device (12) further defines a cover fixing part (12F) adjacent to the battery end (20) and designed to receive at least partially and fix the cover (14) while using the aerosol generation device (12), the aerosol generation device (12) further comprising fixing means designed to fix the cover (14) on the cover fixing part (12F), wherein the fixing means are formed by the retaining means (16).

13. The aerosol generation assembly (10) according to any one of the preceding claims, wherein the cover (14) further comprises an absorbent element (42) for leakage capture from the aerosol generation device (12), in the locking position (PL1, PL2) of the retaining means (16), the mouthpiece (36) of the aerosol generation device (12) being adapted to be in contact with the absorbent element (42), the absorbent element (42) comprising preferably foam comprising an antimicrobial component, the foam comprising preferably Polyhexamethylene Biguanide (PHMB).

14. The aerosol generation assembly (10) according to any one of the preceding claims, wherein the mouthpiece (36) and/or the cover (14) are made of an antimicrobial material.

15. Method for using an aerosol generation assembly (10) according to any one of the preceding claims, when the cover (14) is inserted into the cover receiving part (12R) and the retaining means (16) are in the locking position, the method comprising a step of unlocking the retaining means (16), the step of unlocking comprising:

- moving the retaining means (16) from the locking position (PL1, PL2) to the intermediate position (PINT) by actuated the cover (14) according to the first predetermined movement; and
- actuating the unlocking means (18) according to the second predetermined movement to move the retaining means (16) from the intermediate position (PINT) to the unlocking position (PUNL).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X
42
36
22
10
14
38
34
32
III
III
12R
38B
37
38A
IV
IV
18
60B
60
38C
60A
60
18
12
30
24
28
12F
20

FIG.1

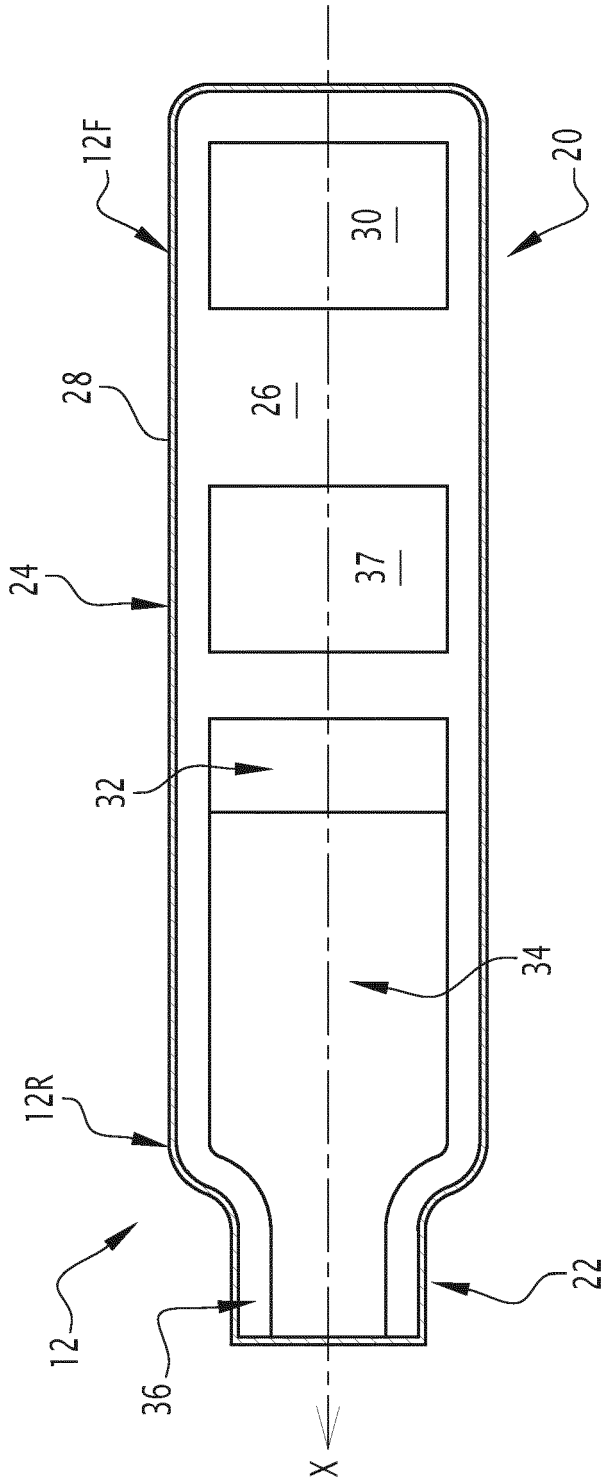
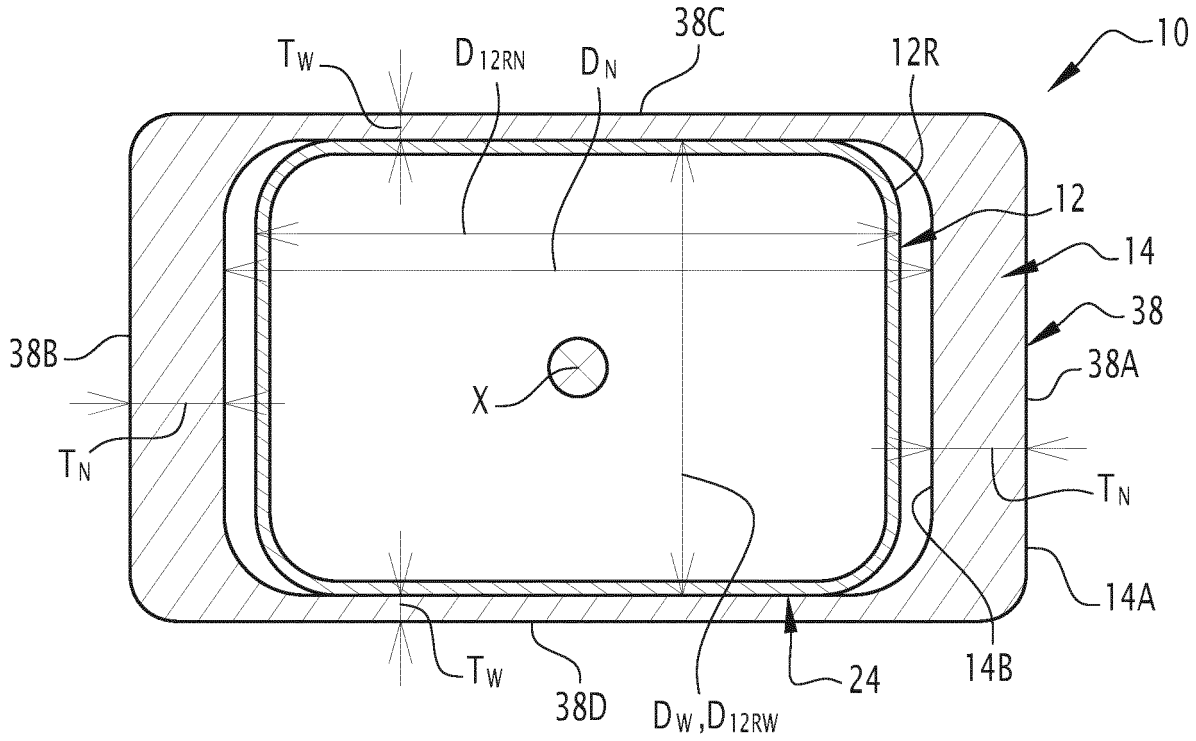


FIG.2


T_W
D_{12RN}
D_N
38C
12R
10
12
14
38
38A
38B
X
T_N
T_N
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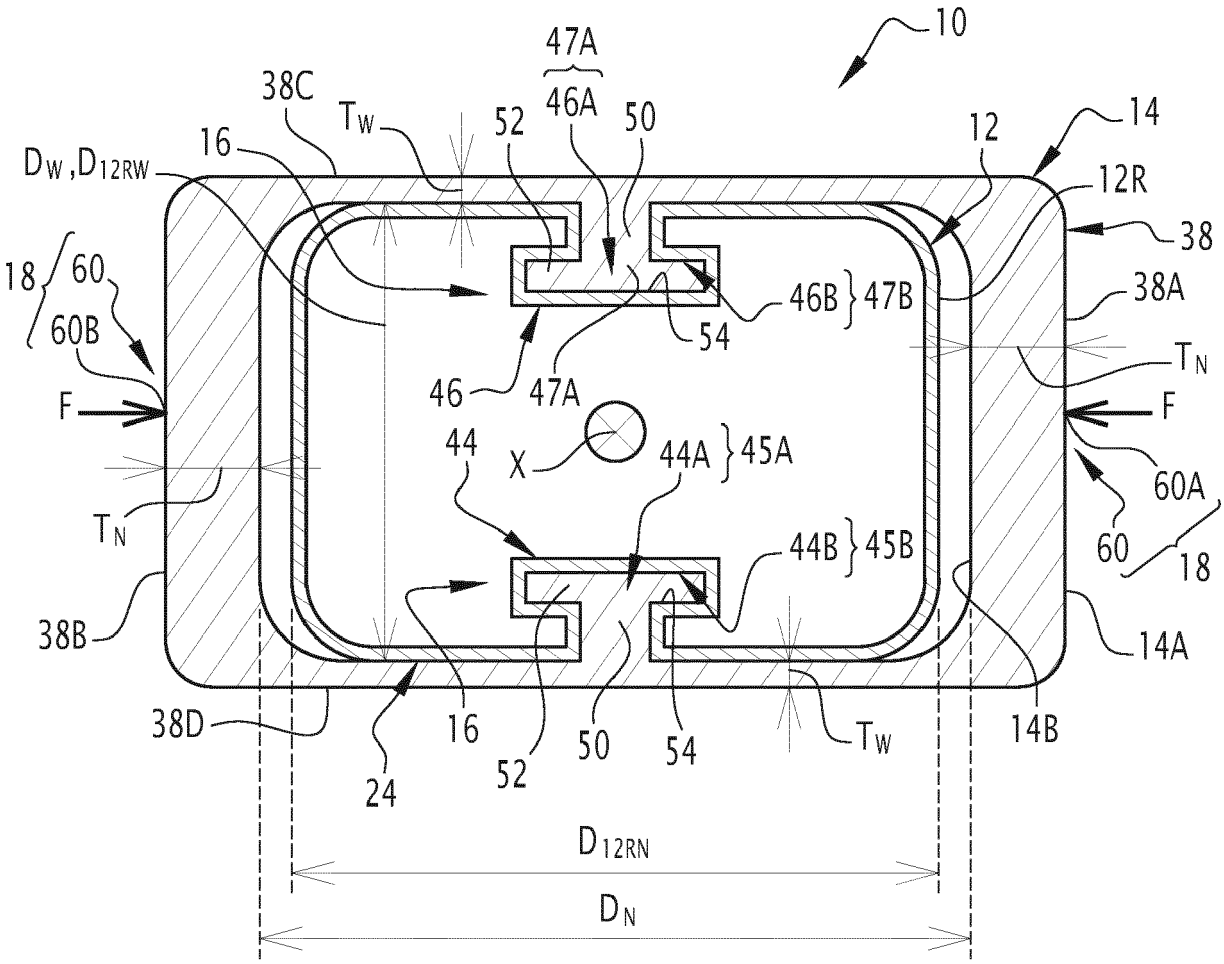
38D
D_W, D_{12RW}
24
14B

FIG.3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46A
38C
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52
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16
D_W ,D_{12RW}
12
14
12R
38
18
60
60B
F
46B
47B
38A
54
T_N
46
47A
F
44
X
44A
45A
60A
T_N
60
18
44B
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14A
38D
16
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50
54
T_W
14B
24
D_{12RN}
D_N

FIG.4

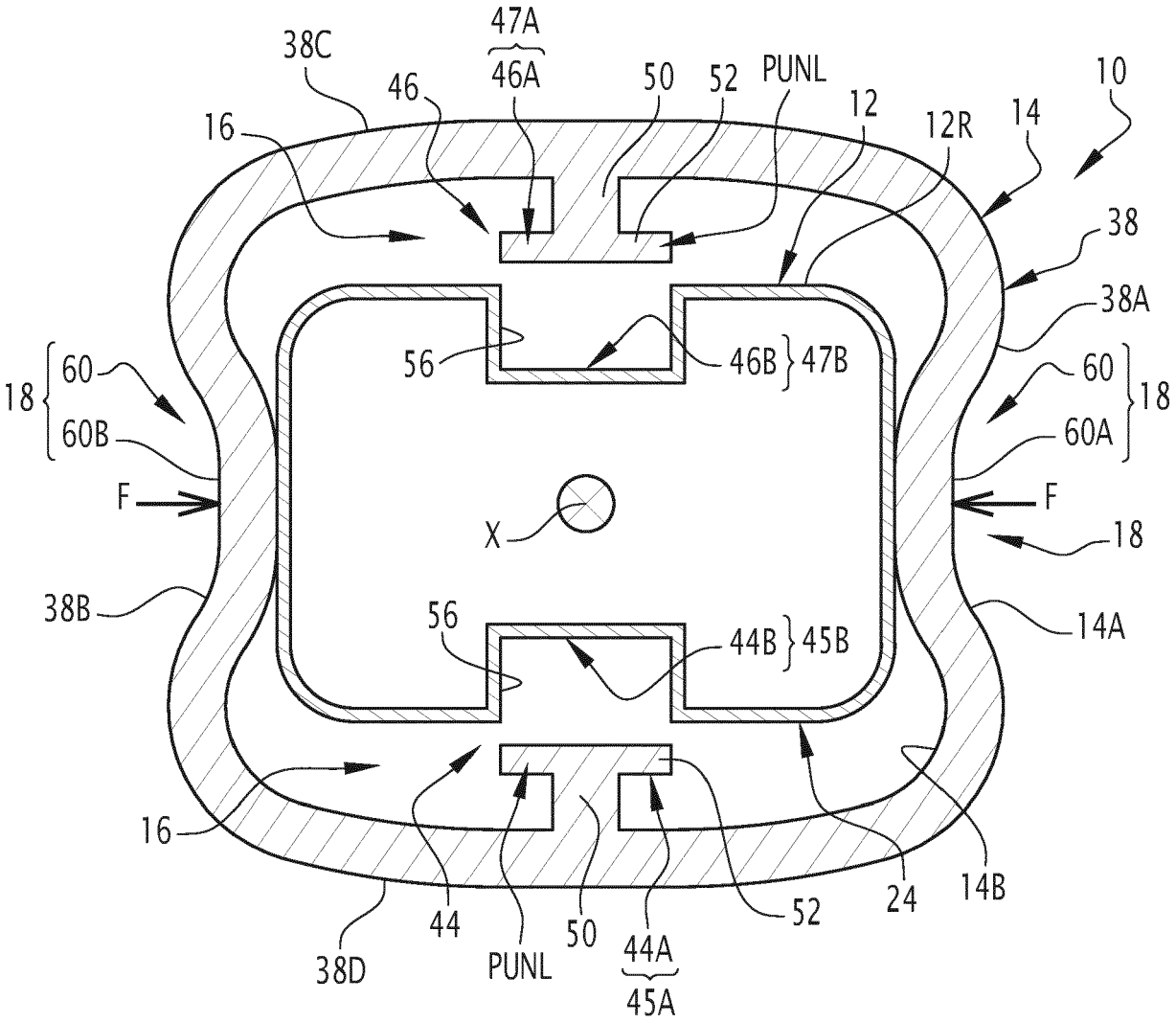
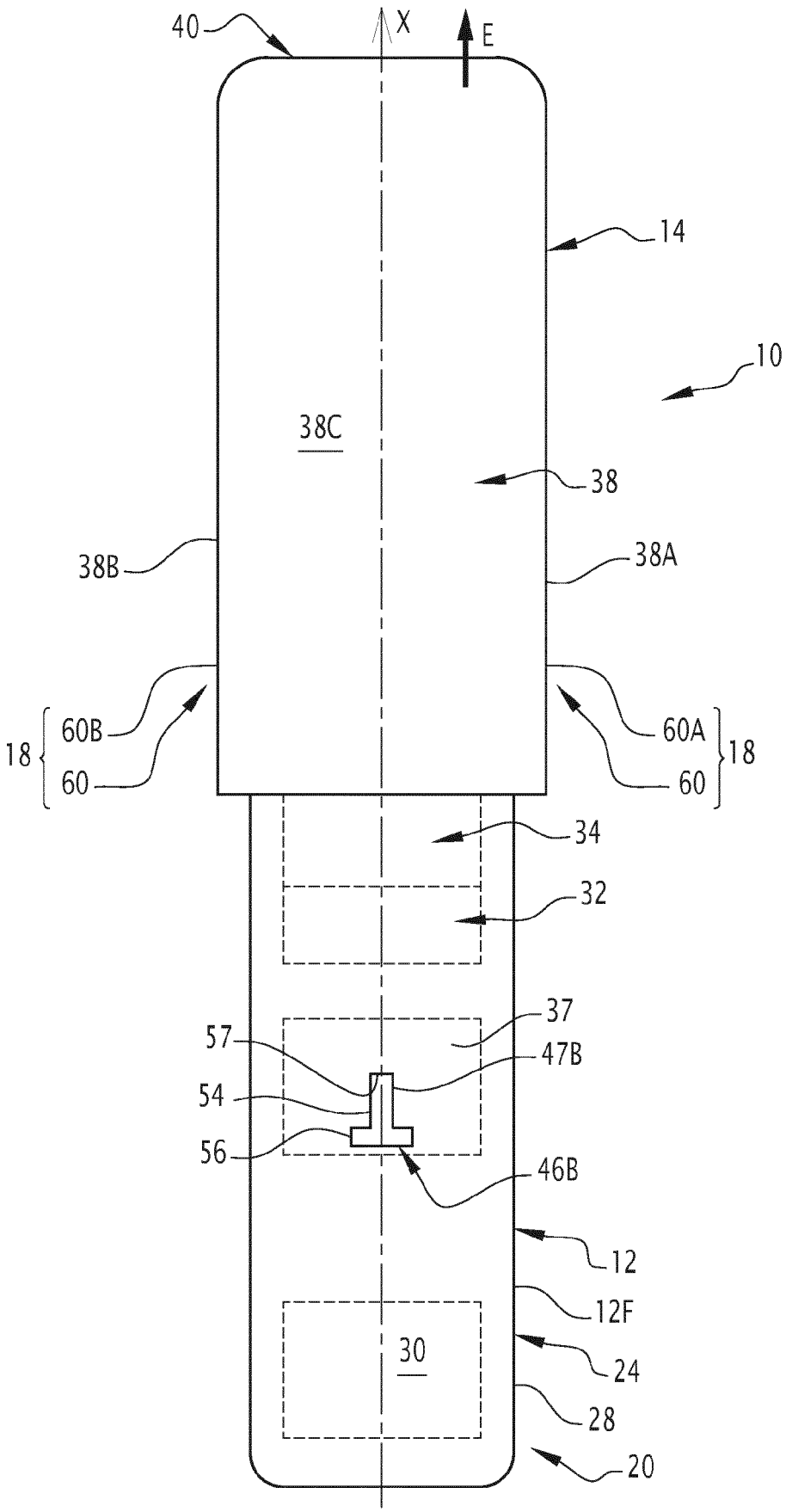

47A
46A
38C
46
16
50
52
PUNL
12
12R
14
10
38
38A
18
60
60B
56
46B
47B
60
60A
18
F
X
F
18
38B
56
44B
45B
14A
16
44
PUNL
50
44A
45A
52
24
14B
38D

FIG.5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E
14
10
38C
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38B
38A
18
60B
60
60A
60
18
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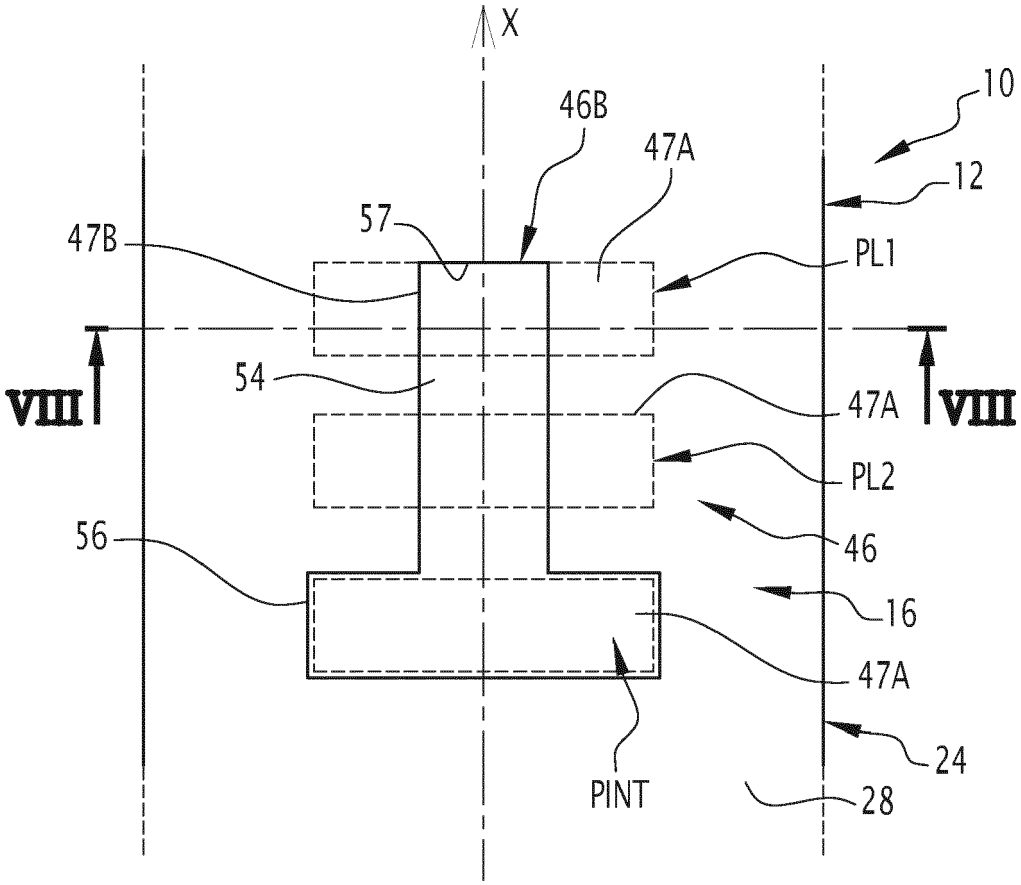
56
46B
12
12F
30
24
28
20

FIG.6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46B
47A
10
12
57
47B
PL1
VIII
VIII
54
47A
PL2
56
46
16
47A
24
PINT
28

FIG.7

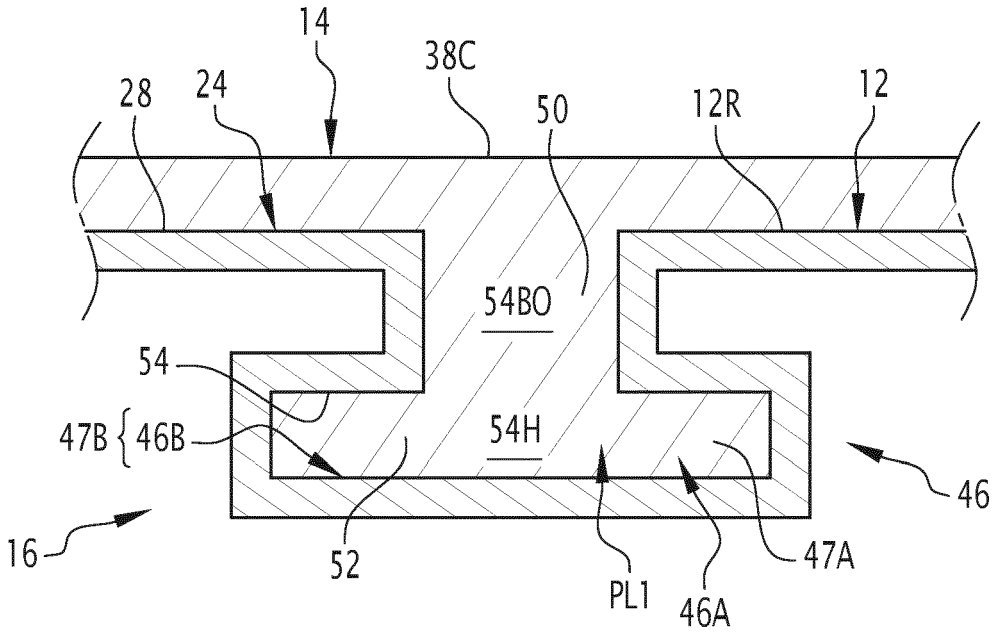
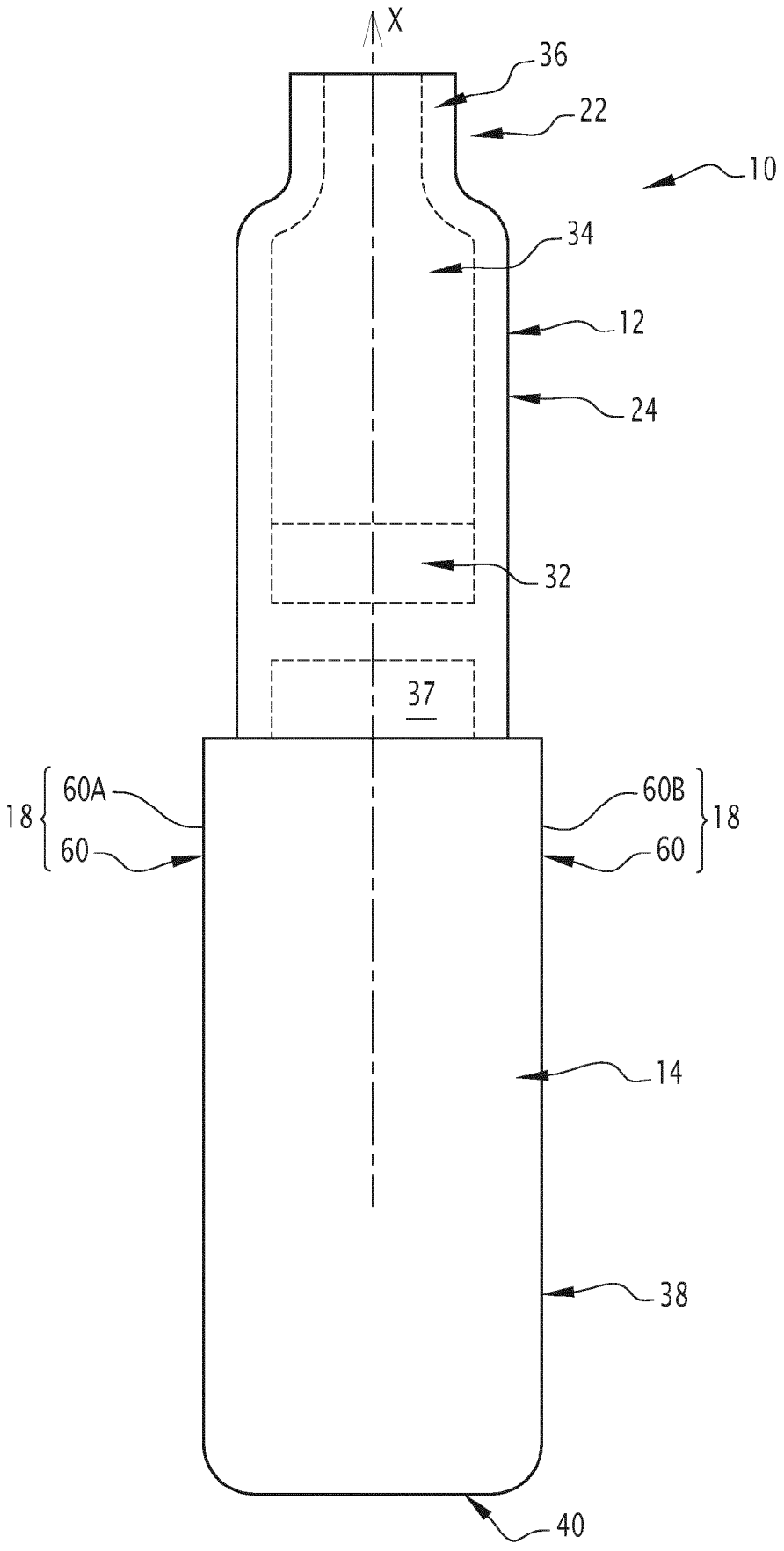


FIG.8

FIG.9



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Application Number
EP 21 15 0920

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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A	EP 3 639 682 A1 (CHANGZHOU PATENT ELECTRONIC TECH CO LTD [CN]) 22 April 2020 (2020-04-22) * paragraph [0006]; claims; figures * * paragraph [0029] - paragraph [0037] * -----	1-15	
A	CN 211 794 314 U (CHANGZHOU PAITENG ELECTRONIC TECH SERVICE CO LTD) 30 October 2020 (2020-10-30) * paragraph [0067] - paragraph [0068]; claims; figures 7-8 * -----	1-15	
			TECHNICAL FIELDS SEARCHED (IPC) A24F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	6 July 2021	Marzano Monterosso

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06-07-2021

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		WO 2018228132 A1	20-12-2018
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