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(54) **AEROSOL GENERATION DEVICE**

AEROSOLERZEUGUNGSVORRICHTUNG

DISPOSITIF DE GÉNÉRATION D'AÉROSOL

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Description

TECHNICAL FIELD

[0001] The invention relates to an aerosol generation device and an aerosol generation set comprising the device and a replaceable article comprising vaporizable material.

PRIOR ART

[0002] In recent years, aerosol generation devices, such as e-cigarettes have become popular as a replacement for conventional smoking articles. In such devices, a vaporizable material, such as tobacco, is heated. This can for example be effected by susceptors which are embedded in the vaporizable material and are heated by one or more coils surrounding a receptacle adapted to accommodate the replaceable article. In other words, susceptors are used in induction heating devices that are heated by eddy currents produced by surrounding coils and induced within the susceptors.

[0003] In this context, uniform heat distribution within the vaporizable material is an issue, as, firstly, cold air is continuously supplied from an air inlet. Secondly, the temperature is usually particularly high immediately around the susceptors, which are usually formed thin and generally extend in an airflow direction between the air inlet and an air outlet. This also holds true for other heating methods, such as those involving heating tracks, cups and/or blades. In these cases, the vaporizable material does not contain a heating element like a susceptor, but the above-described thermal gradient across the vaporizable material between inlet and outlet essentially remains the same.

[0004] EP 3 610 741 A1 discloses an aerosol generating device, which includes: a hollow casing comprising a path for accommodating a cigarette, an opening open to the outside at one end of the path such that the cigarette is inserted into the opening from the outside, a through hole connected to the other end of the path, and a protrusion protruding from the path to contact a portion of an outer surface of the cigarette; and a heater having one side end portion passing through the through hole and arranged inside the path to be inserted into the cigarette accommodated in the path, the heater being configured to heat the cigarette when electricity is applied.

[0005] WO 2020/074600 A1 discloses an aerosol generation device, which has a heating chamber for receiving a substrate carrier containing an aerosol substrate. The heating chamber comprises an open first end, a chamber side wall, and a base at a second end of the chamber side wall opposite the open first end, wherein the base comprises a platform extending from a portion of the base towards the open end from an interior surface of the base.

SUMMARY OF THE INVENTION.

[0006] In view of the above, it is an object underlying the invention to provide an aerosol generation device and set, by means of which heating of the vaporizable material can be made more uniform.

[0007] This is achieved by means of the aerosol generation device described in claim 1.

[0008] This is configured to operate with a replaceable article, such as a tobacco stick, comprising a storage compartment containing a vaporizable material, such as tobacco, the storage compartment defining an air flow path extending between an inlet and an air outlet through the vaporizable material. The aerosol generation device comprises a receptacle extending along a receptacle axis and defining a receptacle internal surface and being configured to receive the replaceable article in a space delimited by the receptacle internal surface so that the airflow path extends along the receptacle axis. Moreover, a heating system configured to heat the replaceable article received in the receptacle is provided.

[0009] According to the invention, the receptacle internal surface comprises at least one protrusion protruding from the receptacle internal surface and configured to reduce the cross-sectional area of the receptacle so as to compress a part of the airflow path of the storage compartment, when the article is received in the receptacle.

[0010] The or each protrusion defines a protrusion surface adjacent the receptacle internal surface forming an angle with the receptacle internal surface greater than 100 degrees along the entire protrusion in an airflow direction. Otherwise, the or each protrusion defines a protrusion surface adjacent the receptacle internal surface forming an angle with the receptacle internal surface greater than 100 degrees along at least an/the ascending portion of the protrusion in an airflow direction. This will avoid unwanted turbulences and recirculating eddies or vortices downstream of the protrusions, which are disadvantageous as vapor can be trapped in the vortices and condense. The smooth shape also helps to maintain good contact between the receptacle and the replaceable article, which is for example advantageous, when resistive heating is utilized at the wall of the receptacle. Preferred angle ranges at the point, as seen in a longitudinal cut view, where the protrusion emerges from the internal wall, are 100 to 175 degrees, with 130 to 170 degrees being preferred.

[0011] The feature that the protrusion surface forms an angle with the receptacle internal surface which is greater than 100 degrees along the entire protrusion in an airflow direction may mean that the value of the angle remains at values greater than 100 degrees along the entire protrusion in the airflow direction. For example, this feature may imply that the protrusion surface becomes shallower along the airflow direction compared to the angle at the point where the protrusion emerges from the internal wall, as long as the angle remains greater than 100 degrees along the entire protrusion in the airflow direc-

tion.

[0012] In particular, the feature that the protrusion surface forms an angle with the receptacle internal surface which is greater than 100 degrees along the entire protrusion in an airflow direction may mean that an angle between a straight line (tangent) at each point of the profile of the protrusion in a cross section of the protrusion along the airflow direction and the receptacle internal surface is greater than 100 degrees. For example, in case the protrusion has an ascending portion, a top portion, and a descending portion, an angle between a straight line at a point close to the top portion of the protrusion and the receptacle internal surface may be close to 180 degrees, and thus greater than 100 degrees, because the straight line may be close to parallel with the receptacle internal surface in this case, as seen along the airflow direction. Further aspects in connection with the feature regarding the angle between the protrusion surface and the receptacle internal surface will become apparent from the detailed description of preferred embodiments and the drawings.

[0013] In general, the airflow direction may be understood as the direction from the air inlet to the air outlet in which air flows during use of the aerosol generation device. The airflow direction may be parallel to the receptacle axis.

[0014] The described angle further provides a "smooth" shape of the protrusion, which for example allows the replaceable article to be inserted and removed from the receptacle without being damaged. Moreover, the effect, on which the present invention is based, is similar to that of a venturi tube, as the compression or reduction in cross-sectional area of the airflow path leads to an acceleration of the air flowing through the replaceable article. This will remove heat from, for example, particularly hot areas and transport the heat in the form of heated air to cooler areas. This will make heating more uniform, which is advantageous with regard to an effective usage of the vaporizable material. The protrusions additionally have the advantageous effect of securing the replaceable article in place. The protrusions can have a radially and/or axially and/or circumferentially identical or different dimensions and/or constant or varying heights and they can be provided at axially and/or circumferentially offset or staggered positions. Further, protrusions having a longitudinal extension can be oriented with this extension parallel to the receptacle axis or with an angle to this axis. It is currently expected that a maximum number of protrusions is 64. The shape of the protrusions can also be called aerodynamic.

[0015] Preferred embodiments are described in the further claims.

[0016] First simulations have shown that the desired effect of accelerating the flow while still promoting laminar or transitional flow can particularly be obtained, when the or each protrusion has a maximum height measured according to an axis perpendicular to the receptacle axis between 2 and 15% of the receptacle diameter, which is

according to the invention, with 5 to 10% of this diameter being preferred. In other words, the space available for the replaceable article, such as a tobacco stick, is decreased by the mentioned values, and the available cross-sectional area is constricted. In particular, the cross-sectional area can be reduced by 1 to 15%, preferably between 2 and 8%. The mentioned values appear particularly suitable for typical dimensions of the receptacle with a diameter of 7 to 7.5 mm, and in particular 7.1 mm, and a length of 37 to 38 mm, in particular 37.5 mm.

[0017] It is currently also expected to be advantageous, when the maximum length of the or each protrusion measured along the receptacle axis is between 5 and 75% of the receptacle length measured according to the receptacle axis, and preferably between 10 and 65% of this length, with 15 to 55% being further preferred. The most preferred lengths can be around 20% of said receptacle length.

[0018] The desired "smooth" shape of the or each protrusion can particularly be obtained when it has an ascending portion, top portion and a descending portion.

[0019] In this context, the or each protrusion can typically be symmetric, as regards the ascending and descending portion, with respect to the top portion. Nevertheless, also asymmetrical shapes can be chosen.

[0020] Moreover, an advantageous shape is expected for an ascending portion defining transversal dimensions gradually increasing from the receptacle internal surface until the top portion, and/or the descending portion defining transversal dimensions gradually decreasing from the top portion to the receptacle internal surface.

[0021] In particular, the shapes described in claim 7 are expected to show advantageous effects.

[0022] Although a single protrusion will already have the desired effect, and enhanced effects will be achieved, when a plurality of protrusions is provided, which are arranged on the receptacle internal surface axially and/or circumferentially.

[0023] In accordance with the observation, that the temperature is particularly high at the air outlet of the storage compartment, it is preferred for the or each protrusion to be arranged adjacent the air outlet.

[0024] Whereas the or each protrusion can be provided on the receptacle internal surface in a fixed manner, in particular integral with the receptacle wall, at least one protrusion can also be movable along the receptacle axis. Further, they can be clicked into place by the user, after the article has been inserted into the receptacle. This will help avoiding damage of the replaceable article, in particular a base of a stick-shaped article, which is inserted into the receptacle with the base in front.

[0025] Thus, the or each protrusion can also be movable along an axis perpendicular to the receptacle axis, in order to achieve the previously described effect. In any case, it is sufficient, if it protrudes from the receptacle internal surface. Typically, the protrusion will constitute portions of the internal surface and will be smoothly connected with it, i.e. avoiding sharp edges and implying

radii of curvature.

[0026] As indicated above, the invention is particularly useful in connection with an inductive heating system, wherein the storage compartment of the replaceable article comprises at least one susceptor. In this context, it is currently preferred, that the number of protrusions is equal to the number of susceptors.

[0027] Further, heating can be unified, when a top portion of the or each protrusion faces the downstream end and/or the hottest part of the corresponding susceptor, when the replaceable article is received in the receptacle.

[0028] Alternatively or additionally, the heating system may comprise one or more heating elements extending along at least a part of the receptacle internal surface and the contact surface of at least one protrusion.

[0029] Finally, the advantages described above can particularly be obtained, when the aerosol generation device described herein is combined with a replaceable article, with which the aerosol generation device is adapted to cooperate.

BRIEF DESCRIPTION OF THE DRAWINGS

[0030] Hereinafter, the invention will be described with reference to exemplary embodiments thereof shown in the drawings, in which

- Fig. 1 is a perspective cut view of a first embodiment;
- Fig. 2 is a cut side view of the first embodiment;
- Fig. 3 is a cut side view of a second embodiment;
- Fig. 4 is a cut side view of a third embodiment;
- Fig. 5A to 5G are side and plan views of further embodiments of protrusions;
- Fig. 6 is a cut side view of a further embodiment with a replaceable article inserted;
- Fig. 7 is a cut side view of a further embodiment similar to that of Fig. 6;
- Fig. 8 is a cut side view of yet another embodiment with further portions of an aerosol generation device shown; and
- Figs. 9A, 9B are side views of embodiments of protrusions in support of the meaning of the angle between the protrusion surface and the receptacle internal surface.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

[0031] As can be taken from Fig. 1, a receptacle 10 of an aerosol generation device is essentially tube-shaped and adapted to accommodate a replaceable article, such as a tobacco stick. As indicated by arrow A, air essentially flows through a tobacco stick along the receptacle axis, and will enter the receptacle 10 at an air inlet 12 in an essentially cold state. Along the airflow path, the tobacco stick includes susceptors adapted to cooperate with one or more induction coils (not shown) around the receptacle so as to be heated and transfer the heat to the surrounding tobacco. In the embodiment shown, two protrusions 14 are formed at the same position along the axial direction and at diametrically opposite positions along the circumferential direction. Similar to a Venturi tube, airflow in the area of the protrusions, where the tobacco stick is correspondingly constricted, is accelerated, so that heated air can be quickly transported away from the particularly hot area surrounding the susceptors.

[0032] As can particularly be taken from Fig. 2, the protrusions have a smooth cross-sectional geometry, so that no undesired turbulences are created, and a tobacco stick can be inserted, sliding between the protrusions without risking damage of the tobacco stick.

[0033] This also applies to the embodiment of Fig. 3, which differs from that of Fig. 1 and 2, with regard to both the shape and number of the protrusions. Firstly, the protrusions have an asymmetric shape with a steeper ascending portion, as viewed in the direction of flow, and a less steep descending portion. This particularly allows easy insertion of a tobacco stick in a direction opposite to the flow direction. Secondly, in contrast to Fig. 1 and 2, plural protrusions, for example 12 protrusions are provided equidistantly along the circumference of the receptacle. Further, transversal dimensions of the ascending portion increase with a gradient higher as seen in the flow direction, than the gradient, with which these dimensions decrease in the descending portion as can be seen in the center part of Fig. 3, similar to a drop-shape.

[0034] As shown in Fig. 4, plural protrusions can also be provided at different axial positions, which can be considered a staggered arrangement. Moreover, in the embodiment shown, protrusions at different axial positions are additionally offset in circumferential direction. It goes without saying that plural protrusions can also be provided at more than two axial positions, and that the distance between protrusion positions in the circumferential direction can be the same over the entire circumference or can vary. Moreover, any arrangement of protrusions shown in the figures can be chosen with symmetric protrusions as shown in Fig. 1, 2 and 4, as well as asymmetric protrusions as shown in Fig. 3, including any further shapes shown in Fig. 5. In this context, when plural protrusions are present, they can all have the same or different shapes.

[0035] As can be taken from Fig. 5, additional smooth

and/or aerodynamic shapes, such as that of a chevron (A) arrowhead (B), asymmetric fillet combined with a chamfer as ascending portion (C) symmetric fillet (D) asymmetric fillet (E), symmetric chamfer (F) and asymmetric chamfer (D) will be suitable. Chevron and arrowhead essentially have a point at one end thereof and their shape as seen in a plan view can be described as essentially triangular. In contrast to an arrowhead, which quite well corresponds to a triangular shape in a plan view, a chevron has a cut out as seen in a plan view, on the side opposite the point. A chamfer essentially has a flat, inclined surface as seen in a cross-sectional view, and a fillet is essentially oval or elliptic, as seen in a plan view. The flow direction will typically be from right to left in Fig. 5.

[0036] As shown in particular in Fig. 1 to 4, one or more protrusions can be formed by thickening the receptacle wall. Alternatively, the receptacle wall can have a uniform wall thickness, and one or more protrusions can be formed as a convex shape inside the receptacle corresponding to a concave shape on the outside thereof. As can be taken particularly from Fig. 2 to 5, each protrusion has a protrusion surface adjacent the receptacle internal surface which forms an angle α with the receptacle internal surface greater than 100° , especially in the embodiment of Fig. 2, 4 and 5, apart from 5B, this angle is significantly greater than 100° and remains that large along the entire protrusion as seen in an airflow direction. In other words, each protrusion lacks any surfaces extending "steep" towards the receptacle internal surface which would create unwanted turbulences.

[0037] The measurement and, respectively, determination of the angle α between the protrusion surface and the receptacle internal surface is illustrated in detail in Figs. 9A and 9B which illustrate two different configurations of the protrusion 14. In Fig. 9A, the protrusion 14 has a roof-like shape with a linearly ascending portion (portion comprising point A) and a linearly descending portion (portion comprising point B) along the airflow direction (indicated by the arrow). In Fig. 9B, the protrusion 14 has a semi-circular shape with an ascending portion becoming gradually shallower (portion comprising point A) and a descending portion becoming gradually steeper (portion comprising point B) along the airflow direction (indicated by the arrow). With reference to Figs. 9A and 9B, the feature that the protrusion surface forms an angle α with the receptacle internal surface which is greater than 100° (degrees) along the entire protrusion 14 in an airflow direction means that an angle between a straight line (tangent) at each point of the profile of the protrusion 14 in a cross section of the protrusion along the airflow direction and the receptacle internal surface is greater than 100° degrees. In Figs. 9A and 9B, such straight line (tangent) is exemplarily shown at points A and B by the dashed lines. In the ascending portions (portions comprising points A), the angle α is measured with respect to the receptacle internal surface upstream of the protrusion 14 with respect to the airflow direction. In the

descending portions (portions comprising points B), the angle α is measured with respect to the receptacle internal surface downstream of the protrusion 14 with respect to the airflow direction. While the angle α remains the same at each point of the protrusion 14 in the ascending portion in Fig. 9A, it changes, i.e. becomes greater, when going along the airflow direction in the ascending portion of the protrusion 14 shown in Fig. 9B.

[0038] Fig. 6 shows a receptacle 10 with two diametrically protrusions 14 similar to those of Fig. 5D or F. Fig. 6 additionally shows a replaceable article 16, such as a tobacco stick accommodated in the receptacle 10 and correspondingly compressed in the area of the protrusions 14. This compression, firstly, moves the tobacco strands 18 closer together in the area of the protrusions 14 and, secondly, bends susceptors 20 accommodated in the replaceable article 16. These susceptors 20 may have a curved, convex shape already in the original state, i.e. without being compressed by the protrusions 14. In particular, the convex shapes of two or more susceptors can face each other towards the center of the replaceable article 16. Alternatively or additionally, the convex shape shown in the figure can be caused by the compression in the area of the protrusions. 14.

[0039] In any case, as is better illustrated in Fig. 7, the cross-sectional area of the replaceable article 16 is smaller in the area of the protrusions 14, so that the flow velocity is increased, and heat is transported at a higher rate than in the area of the inlet and the outlet of the replaceable article shown. Whereas the location of the susceptors, which are typically thin strands of material heatable by a surrounding coil (not shown), can correspond to that of the protrusions 14 and can be essentially symmetrical thereto, as shown in Fig. 6, the susceptors can also be somewhat shifted towards the inlet 12. In the embodiment shown in Fig. 7, the inlet end of each susceptor is somewhat closer to the inlet 12 of the receptacle 10 than the inlet end of each protrusion 14, and the susceptors cover about two thirds of the longitudinal extension of the protrusions. As mentioned, in the embodiment of Fig. 6, the location of the susceptors 20 is symmetrical to that of the protrusion 14, and their inlet end is somewhat more remote from the inlet 12 of the receptacle than the inlet end of the protrusions 14, and their outlet end is somewhat more remote from the outlet of the receptacle than the outlet end of the protrusions 14.

[0040] Moreover, as indicated in Fig. 7, due to the asymmetrical position of the susceptors, these are closer together towards their outlet end, than at their inlet end.

[0041] The above-described effect of compressing the replaceable article 16 in order to quickly remove heat from particularly hot areas is also achieved by the embodiment of Fig. 8, in which protrusions 14 are provided at the outlet end of the receptacle and are formed as heating elements. In other words, unlike the previously described embodiments, the replaceable article 16 is not heated from within, such as by means of the susceptors 20, but from the receptacle walls. The principle underlying the

invention, i.e. providing protrusions so as to compress or constrict the airflow path remains the same. It should also be mentioned, that susceptors could be located in an area corresponding to the protrusions 14 shown in Fig. 8, when induction heating is used instead of external heating as in the embodiment of Fig. 8. For the sake of completeness, Fig. 8 also shows, downstream the outlet end of the receptacle 10, a support 22 having an airpath 24, as well as, downstream of the support 22, a filter 26.

Claims

1. An aerosol generation device configured to operate with a replaceable article (16) comprising a storage compartment containing a vaporizable material, the storage compartment defining an airflow path extending between an air inlet (12) and an air outlet through the vaporizable material;

the aerosol generation device comprising:

- a receptacle (10) extending along a receptacle axis (A), defining a receptacle internal surface and configured to receive the replaceable article (16) in a space delimited by the receptacle internal surface so as the airflow path extends along the receptacle axis (A);
- a heating system configured to heat the replaceable article (16) when it is received in the receptacle (10);

the aerosol generation device being **characterized in that** the receptacle internal surface comprises at least one protrusion (14) protruding from the receptacle internal surface and configured to reduce the cross-sectional area of the receptacle so as to compress a part of the airflow path of the storage compartment, when the replaceable article (16) is received in the receptacle (10);

the or each protrusion (14) defining a protrusion surface adjacent to the receptacle internal surface and forming an angle with the receptacle internal surface greater than 100° along the entire protrusion (14) in an airflow direction wherein the maximum height of the or each protrusion (14) measured according to an axis perpendicular to the receptacle axis (A) is comprised between 2% and 15% of the receptacle diameter.

2. The aerosol generation device according to claim 1, wherein the maximum height of the or each protrusion (14) measured according to an axis perpendicular to the receptacle axis (A) is comprised between 5% and 10% of the receptacle diameter.

3. The aerosol generation device according to claim 1 or 2, wherein the maximum length of the or each protrusion (14) measured according to the receptacle axis (A) is comprised between 5% and 75% of the receptacle length measured according to the receptacle axis (A), and preferably between 10% and 65% of said length.
4. The aerosol generation device according to any one of the preceding claims, wherein the or each protrusion (14) forms an ascending portion, a top portion and a descending portion; the ascending portion extends from the receptacle internal surface until the top portion and the descending portion extends from the top portion until the receptacle internal surface.
5. The aerosol generation device according to claim 4, wherein the ascending portion is symmetric to the descending portion with respect to the top portion.
6. The aerosol generation device according to claim 4 or 5, wherein the ascending portion defines transversal dimensions gradually increasing from the receptacle internal surface until the top portion, and/or the descending portion defines transversal dimensions gradually decreasing from the top portion until the receptacle internal surface.
7. The aerosol generation device according to any one of the preceding claims, wherein the shape of the or each protrusion (14) is chosen in the group consisting of:
 - chevron;
 - arrowhead;
 - asymmetric fillet and chamfer;
 - symmetric fillet;
 - asymmetric fillet;
 - symmetric chamfer;
 - asymmetric chamfer.
8. The aerosol generation device according to any one of the preceding claims, comprising a plurality of protrusions (14) arranged on the receptacle internal surface axially according to the receptacle axis (A) and/or circumferentially.
9. The aerosol generation device according to any one of the preceding claims, wherein the or each protrusion (14) is arranged to be adjacent to the air outlet of the storage compartment, when the replaceable article (16) is received in the receptacle (10).
10. The aerosol generation device according to any one of the preceding claims, wherein the or each protrusion (14) is moveable according to the receptacle axis (A).

11. The aerosol generation device according to any one of the preceding claims, wherein the or each protrusion (14) is moveable according to an axis perpendicular to the receptacle axis (A) between an engaged position and a disengaged position; the replaceable article (16) being freely moveable within the receptacle (10) according to the receptacle axis (A) when the or each protrusion (14) is in the disengaged position and being locked in the receptacle (10) when the or each protrusion (14) is in the engaged position.
12. The aerosol generation device according to any one of the preceding claims, wherein the heating system is an inductive heating system comprising a coil configured to create a magnetic field, the storage compartment of the replaceable article (16) comprising at least one susceptor (20) extending along the airflow path between an upstream end and a downstream end, and being able to generate heat when it is placed in the magnetic field created by the coil;
- the or each protrusion (14) is arranged to face at least partially a susceptor (20) of the storage compartment of the replaceable article (16), when the replaceable article (16) is received in the receptacle (10); preferably, the number of protrusions (14) being chosen equal to the number of the susceptors (20).
13. The aerosol generation device according to claim 12, wherein the or each protrusion (14) defines a top portion arranged to face the downstream end of the corresponding susceptor (20), when the replaceable article (16) is received in the receptacle (10).
14. The aerosol generation device according to any one of claims 1 to 11, wherein the heating system comprises one or several heating elements extending along at least a part of the receptacle internal surface and the contact surface of the or each protrusion (14).
15. An aerosol generation set comprising:
- a replaceable article (16) comprising a storage compartment containing a vaporizable material, the storage compartment defining an airflow path extending between an air inlet (12) and an air outlet through the vaporizable material;
 - an aerosol generation device according to any one of the preceding claims, configured to operate with the replaceable article (16).

Patentansprüche

1. Aerosolerzeugungsvorrichtung, die so konfiguriert ist, dass sie mit einem austauschbaren Gegenstand (16) betrieben werden kann, der ein Speicherfach umfasst, das ein verdampfbare Material enthält, wobei das Speicherfach einen Luftstromweg definiert, der sich zwischen einem Lufteinlass (12) und einem Luftauslass durch das verdampfbare Material erstreckt;

wobei die Aerosolerzeugungsvorrichtung Folgendes umfasst:

- einen Behälter (10), der sich entlang einer Behälterachse (A) erstreckt, eine Behälterinnenfläche definiert und so konfiguriert ist, dass er den austauschbaren Gegenstand (16) in einem Raum aufnimmt, der durch die Behälterinnenfläche begrenzt ist, sodass sich der Luftstromweg entlang der Behälterachse (A) erstreckt;
- ein Heizsystem, das so konfiguriert ist, dass es den austauschbaren Gegenstand (16) erwärmt, wenn er in dem Behälter (10) aufgenommen ist;

wobei die Aerosolerzeugungsvorrichtung **dadurch gekennzeichnet ist, dass** die Behälterinnenfläche mindestens einen Vorsprung (14) umfasst, der von der Behälterinnenfläche vorsteht und so konfiguriert ist, dass er die Querschnittsfläche des Behälters verringert, um einen Teil des Luftstromwegs des Speicherfachs zu komprimieren, wenn der austauschbare Gegenstand (16) in dem Behälter (10) aufgenommen ist;

wobei der oder jeder Vorsprung (14) eine Vorsprungsfläche angrenzend an die Behälterinnenfläche definiert und einen Winkel mit der Behälterinnenfläche von mehr als 100° entlang des gesamten Vorsprungs (14) in einer Luftstromrichtung bildet,

wobei die maximale Höhe des oder jedes Vorsprungs (14), gemessen gemäß einer Achse senkrecht zur Behälterachse (A), zwischen 2 % und 15 % des Behälterdurchmessers beträgt.

2. Aerosolerzeugungsvorrichtung nach Anspruch 1, wobei die maximale Höhe des oder jedes Vorsprungs (14), gemessen gemäß einer Achse senkrecht zur Behälterachse (A), zwischen 5 % und 10 % des Behälterdurchmessers beträgt.
3. Aerosolerzeugungsvorrichtung nach Anspruch 1 oder 2, wobei die maximale Länge des oder jedes Vorsprungs (14), gemessen gemäß der Behälterachse (A), zwischen 5 % und 75 % der Länge des

Behälters, gemessen gemäß der Behälterachse (A), und vorzugsweise zwischen 10 % und 65 % der Länge beträgt.

4. Aerosolerzeugungsvorrichtung nach einem der vorstehenden Ansprüche, wobei der oder jeder Vorsprung (14) einen aufsteigenden Abschnitt, einen oberen Abschnitt und einen absteigenden Abschnitt bildet;
wobei sich der aufsteigende Abschnitt von der Behälterinnenfläche bis zum oberen Abschnitt erstreckt und der absteigende Abschnitt sich vom oberen Abschnitt bis zur Behälterinnenfläche erstreckt. 5 10
5. Aerosolerzeugungsvorrichtung nach Anspruch 4, wobei der aufsteigende Abschnitt in Bezug auf den oberen Abschnitt symmetrisch zum absteigenden Abschnitt ist. 15
6. Aerosolerzeugungsvorrichtung nach Anspruch 4 oder 5, wobei der aufsteigende Abschnitt Querabmessungen definiert, die von der Behälterinnenfläche bis zum oberen Abschnitt allmählich zunehmen, und/oder der absteigende Abschnitt Querabmessungen definiert, die vom oberen Abschnitt bis zur Behälterinnenfläche allmählich abnehmen. 20 25
7. Aerosolerzeugungsvorrichtung nach einem der vorstehenden Ansprüche, wobei die Form des oder jedes Vorsprungs (14) ausgewählt wird aus der Gruppe bestehend aus: 30
 - Chevron;
 - Pfeilspitze;
 - asymmetrische Verrundung und Fase;
 - symmetrische Verrundung;
 - asymmetrische Verrundung;
 - symmetrische Fase;
 - asymmetrische Fase;
 35 40
8. Aerosolerzeugungsvorrichtung nach einem der vorstehenden Ansprüche, umfassend eine Vielzahl von Vorsprüngen (14), die auf der Behälterinnenfläche axial gemäß der Behälterachse (A) und/oder in Umfangsrichtung angeordnet sind. 45
9. Aerosolerzeugungsvorrichtung nach einem der vorstehenden Ansprüche, wobei der oder jeder Vorsprung (14) so angeordnet ist, dass er in der Nähe des Luftauslasses des Speicherfachs gelegen ist, wenn der austauschbare Gegenstand (16) in dem Behälter (10) aufgenommen ist. 50
10. Aerosolerzeugungsvorrichtung nach einem der vorstehenden Ansprüche, wobei der oder jeder Vorsprung (14) gemäß der Behälterachse (A) beweglich ist. 55

11. Aerosolerzeugungsvorrichtung nach einem der vorstehenden Ansprüche, wobei der oder jeder Vorsprung (14) gemäß einer Achse senkrecht zur Behälterachse (A) zwischen einer Eingriffsstellung und einer Freigabestellung beweglich ist; wobei der austauschbare Gegenstand (16) in dem Behälter (10) gemäß der Behälterachse (A) frei beweglich ist, wenn sich der oder jeder Vorsprung (14) in der Freigabestellung befindet, und in dem Behälter (10) verriegelt ist, wenn sich der oder jeder Vorsprung (14) in der Eingriffsstellung befindet.

12. Aerosolerzeugungsvorrichtung nach einem der vorstehenden Ansprüche, wobei das Heizsystem ein induktives Heizsystem ist, das eine Spule umfasst, die so konfiguriert ist, dass sie ein Magnetfeld erzeugt, wobei das Speicherfach des austauschbaren Gegenstands (16) mindestens einen Suszeptor (20) umfasst, der sich entlang des Luftstromwegs zwischen einem stromaufwärts gelegenen Ende und einem stromabwärts gelegenen Ende erstreckt und in der Lage ist, Wärme zu erzeugen, wenn er in dem von der Spule erzeugten Magnetfeld platziert ist;

der oder jeder Vorsprung (14) so angeordnet ist, dass er zumindest teilweise einem Suszeptor (20) des Speicherfachs des austauschbaren Gegenstands (16) zugewandt ist, wenn der austauschbare Gegenstand (16) in dem Behälter (10) aufgenommen ist; wobei die Anzahl der Vorsprünge (14) vorzugsweise gleich der Anzahl der Suszeptoren (20) gewählt wird.

13. Aerosolerzeugungsvorrichtung nach Anspruch 12, wobei der oder jeder Vorsprung (14) einen oberen Abschnitt definiert, der so angeordnet ist, dass er dem stromabwärts gelegenen Ende des entsprechenden Suszeptors (20) zugewandt ist, wenn der austauschbare Gegenstand (16) in dem Behälter (10) aufgenommen ist.

14. Aerosolerzeugungsvorrichtung nach einem der Ansprüche 1 bis 11, wobei das Heizsystem ein oder mehrere Heizelemente umfasst, die sich entlang mindestens eines Teils der Behälterinnenfläche und der Kontaktfläche des oder jedes Vorsprungs (14) erstrecken.

15. Aerosolerzeugungsset, das Folgendes umfasst:

- einen austauschbaren Gegenstand (16), der ein Speicherfach umfasst, das ein verdampfbare Material enthält, wobei das Speicherfach einen Luftstromweg definiert, der sich zwischen einem Lufteinlass (12) und einem Luftauslass durch das verdampfbare Material erstreckt;

- eine Aerosolerzeugungs Vorrichtung nach einem der vorstehenden Ansprüche, die so konfiguriert ist, dass sie mit dem austauschbaren Gegenstand (16) betrieben werden kann.

Revendications

1. Dispositif de génération d'aérosol configuré pour fonctionner avec un article remplaçable (16) comprenant un compartiment de stockage contenant un matériau vaporisable, le compartiment de stockage définissant une voie d'écoulement d'air s'étendant entre une entrée d'air (12) et une sortie d'air à travers le matériau vaporisable ;

le dispositif de génération d'aérosol comprenant :

- un contenant (10) s'étendant le long d'un axe (A) de contenant, définissant une surface interne de contenant et configuré pour recevoir l'article remplaçable (16) dans un espace délimité par la surface interne de contenant de façon à ce que la voie d'écoulement d'air s'étende le long de l'axe (A) de contenant ;
- un système de chauffage configuré pour chauffer l'article remplaçable (16) lorsqu'il est reçu dans le contenant (10) ;

le dispositif de génération d'aérosol étant **caractérisé en ce que** la surface interne de contenant comprend au moins une saillie (14) faisant saillie à partir de la surface interne de contenant et configurée pour réduire l'aire de section transversale du contenant de façon à comprimer une partie de la voie d'écoulement d'air du compartiment de stockage, lorsque l'article remplaçable (16) est reçu dans le contenant (10) ; la ou chaque saillie (14) définissant une surface de saillie adjacente à la surface interne de contenant et formant un angle avec la surface interne de contenant plus grand que 100° le long de la saillie (14) entière dans une direction d'écoulement d'air

dans lequel la hauteur maximale de la ou de chaque saillie (14) mesurée selon un axe perpendiculaire à l'axe (A) de contenant est comprise entre 2 % et 15 % du diamètre de réceptacle.

2. Dispositif de génération d'aérosol selon la revendication 1, dans lequel la hauteur maximale de la ou de chaque saillie (14) mesurée selon un axe perpendiculaire à l'axe (A) de contenant est comprise entre 5 % et 10 % du diamètre de contenant.

3. Dispositif de génération d'aérosol selon la revendication 1 ou 2, dans lequel la longueur maximale de la ou de chaque saillie (14) mesurée selon l'axe (A) de contenant est comprise entre 5 % et 75 % de la longueur de contenant mesurée selon l'axe (A) de contenant, et préférentiellement entre 10 % et 65 % de ladite longueur.

4. Dispositif de génération d'aérosol selon l'une quelconque des revendications précédentes, dans lequel la ou chaque saillie (14) forme une portion ascendante, une portion supérieure et une portion descendante ; la portion ascendante s'étend à partir de la surface interne de contenant jusqu'à la portion supérieure et la portion descendante s'étend à partir de la portion supérieure jusqu'à la surface interne de contenant.

5. Dispositif de génération d'aérosol selon la revendication 4, dans lequel la portion ascendante est symétrique à la portion descendante par rapport à la portion supérieure.

6. Dispositif de génération d'aérosol selon la revendication 4 ou 5, dans lequel la portion ascendante définit des dimensions transversales augmentant progressivement à partir de la surface interne de contenant jusqu'à la portion supérieure, et/ou la portion descendante définit des dimensions transversales diminuant progressivement à partir de la portion supérieure jusqu'à la surface interne de contenant.

7. Dispositif de génération d'aérosol selon l'une quelconque des revendications précédentes, dans lequel la forme de la ou de chaque saillie (14) est choisie dans le groupe consistant en :

- chevron ;
- pointe de flèche ;
- congé et chanfrein asymétriques ;
- congé symétrique ;
- congé asymétrique ;
- chanfrein symétrique ;
- chanfrein asymétrique.

8. Dispositif de génération d'aérosol selon l'une quelconque des revendications précédentes, comprenant une pluralité de saillies (14) agencées sur la surface interne de contenant axialement selon l'axe (A) de contenant et/ou circonférentiellement.

9. Dispositif de génération d'aérosol selon l'une quelconque des revendications précédentes, dans lequel la ou chaque saillie (14) est agencée pour être adjacente à la sortie d'air du compartiment de stockage, lorsque l'article remplaçable (16) est reçu dans le contenant (10).

10. Dispositif de génération d'aérosol selon l'une quelconque des revendications précédentes, dans lequel la ou chaque saillie (14) est mobile selon l'axe (A) de contenant. 5
11. Dispositif de génération d'aérosol selon l'une quelconque des revendications précédentes, dans lequel la ou chaque saillie (14) est mobile selon un axe perpendiculaire à l'axe (A) de contenant entre une position en prise et une position hors prise ; 10
l'article remplaçable (16) étant mobile librement à l'intérieur du contenant (10) selon l'axe (A) de contenant lorsque la ou chaque saillie (14) est dans la position hors prise et étant verrouillé dans le contenant (10) lorsque la ou chaque saillie (14) est dans la position en prise. 15
12. Dispositif de génération d'aérosol selon l'une quelconque des revendications précédentes, dans lequel le système de chauffage est un système de chauffage par induction comprenant une bobine configurée pour créer un champ magnétique, le compartiment de stockage de l'article remplaçable (16) comprenant au moins un suscepteur (20) s'étendant le long de la voie d'écoulement d'air entre 20
une extrémité en amont et une extrémité en aval, et étant apte à générer de la chaleur lorsqu'il est placé dans le champ magnétique créé par la bobine ; 25
- la ou chaque saillie (14) est agencée pour faire face au moins partiellement à un suscepteur (20) du compartiment de stockage de l'article remplaçable (16), lorsque l'article remplaçable (16) est reçu dans le contenant (10) ; 30
préférentiellement, le nombre de saillies (14) étant choisi égal au nombre des suscepteurs (20). 35
13. Dispositif de génération d'aérosol selon la revendication 12, dans lequel la ou chaque saillie (14) définit une portion supérieure agencée pour faire face à l'extrémité en aval du suscepteur (20) correspondant, lorsque l'article remplaçable (16) est reçu dans le contenant (10). 40
14. Dispositif de génération d'aérosol selon l'une quelconque des revendications 1 à 11, dans lequel le système de chauffage comprend un ou plusieurs éléments de chauffage s'étendant le long d'au moins une partie de la surface interne de contenant et de la surface de contact de la ou de chaque saillie (14). 45
50
15. Ensemble de génération d'aérosol comprenant : 55
- un article remplaçable (16) comprenant un compartiment de stockage contenant un matériau vaporisable, le compartiment de stockage définissant une voie d'écoulement d'air s'étendant entre une entrée d'air (12) et une sortie d'air

à travers le matériau vaporisable ;
- un dispositif de génération d'aérosol selon l'une quelconque des revendications précédentes, configuré pour fonctionner avec l'article remplaçable (16).

Fig. 1

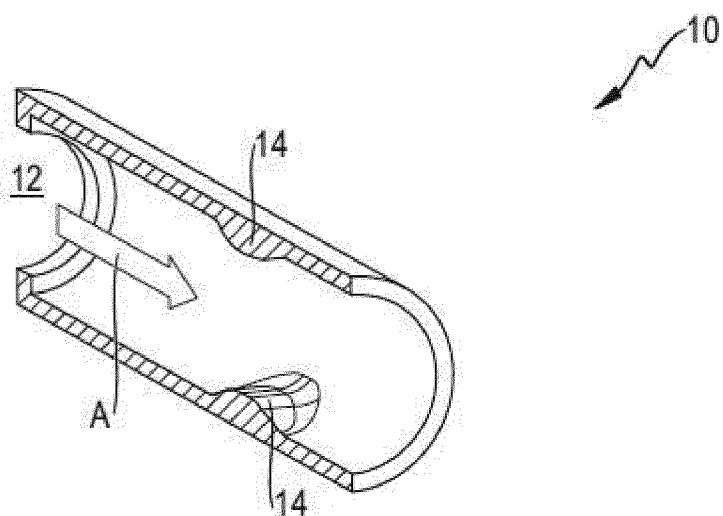


Fig. 2

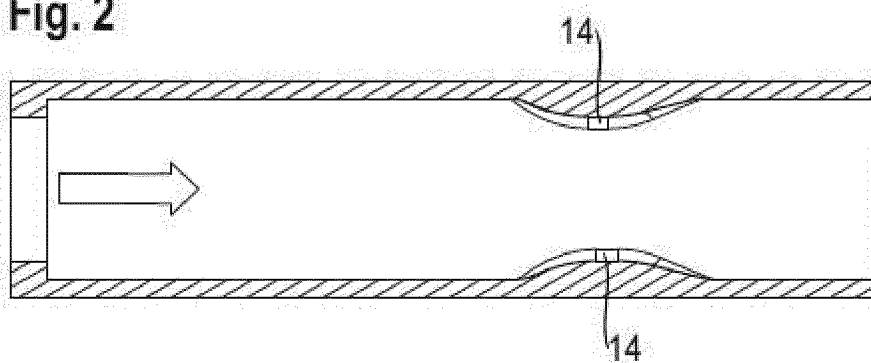


Fig. 3

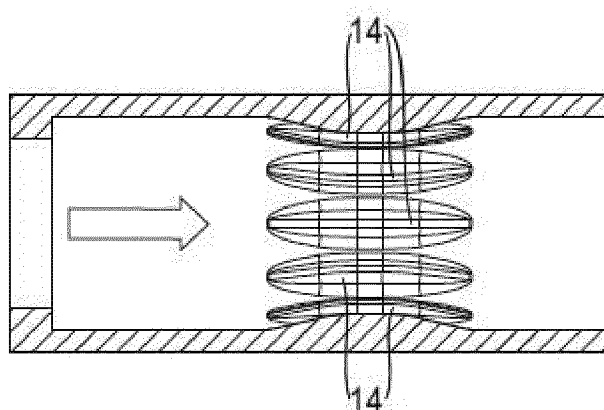


Fig. 4

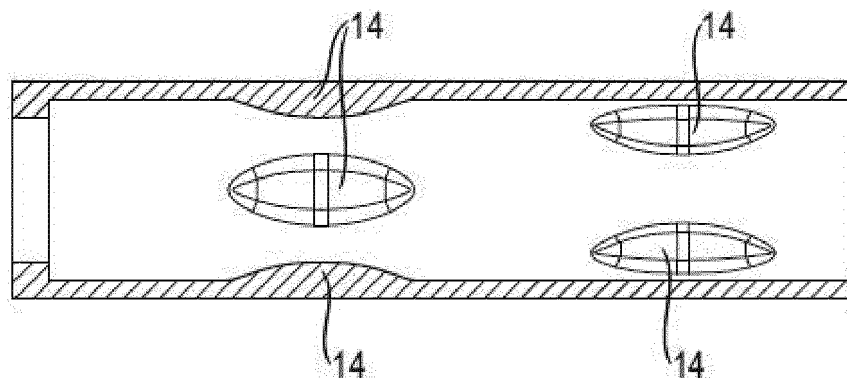


Fig. 5

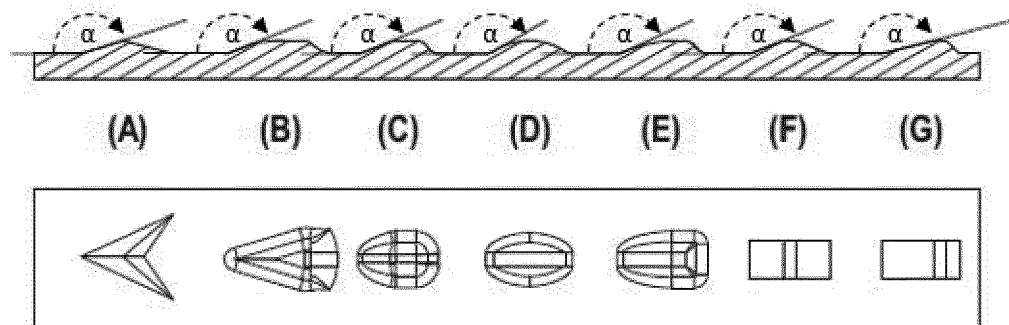


Fig. 6

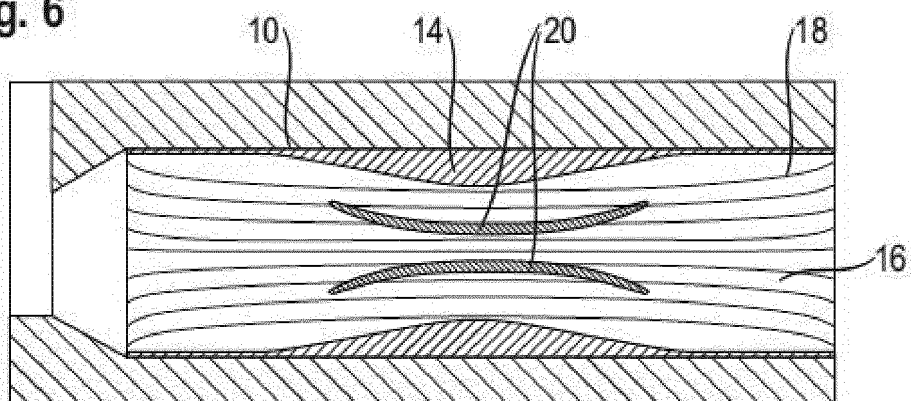


Fig. 7

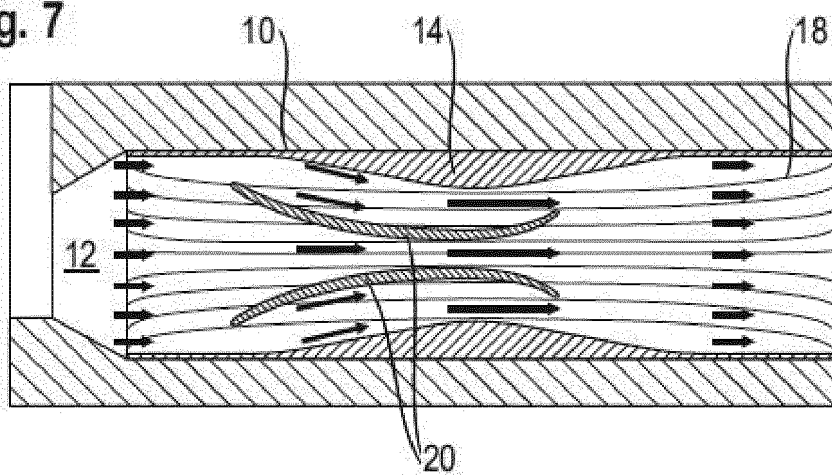
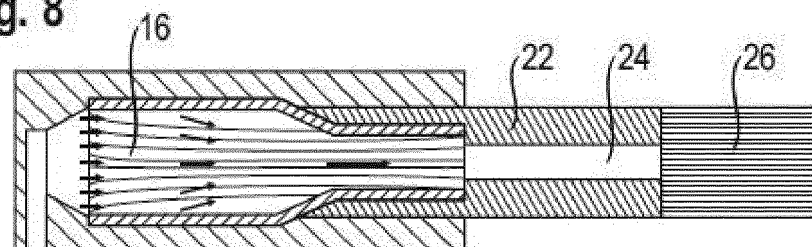
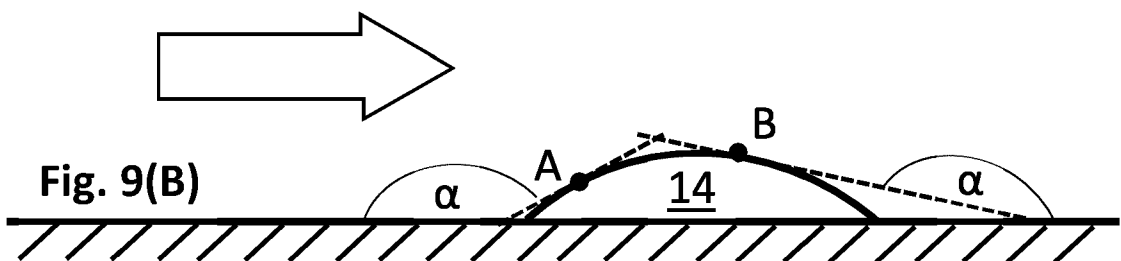
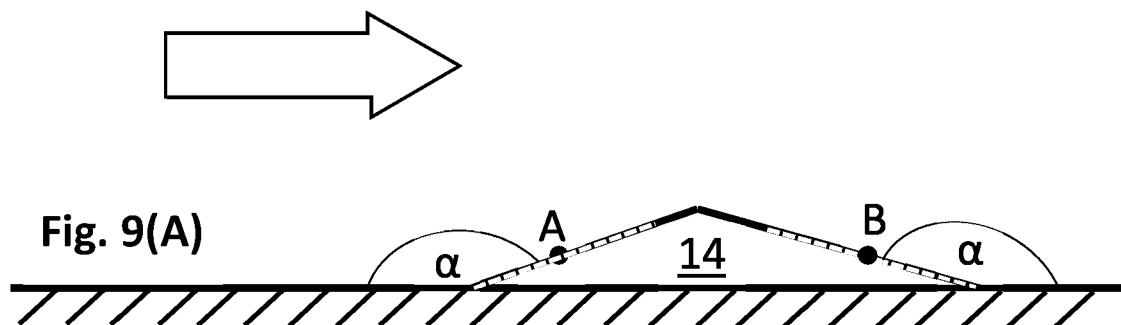


Fig. 8





REFERENCES CITED IN THE DESCRIPTION

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