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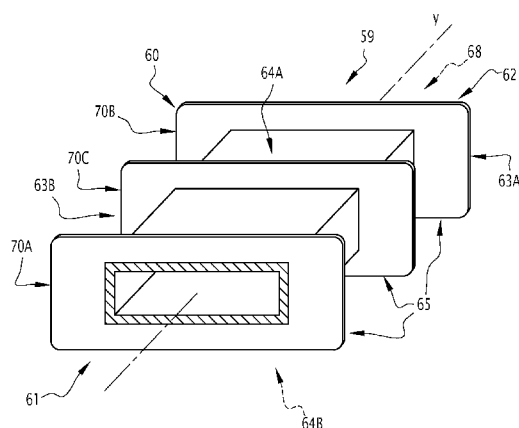
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(54) Title: AEROSOL GENERATING DEVICE COMPRISING A HEATING CUP



(57) Abstract: The present invention concerns an aerosol generating device (11) configured to operate with a flat-shaped aerosol generating article (12), the aerosol generating device (11) comprising: - a device body (40) extending along a device axis (Y); - a heating assembly (59) comprising a heating cup (60) configured to receive at least partially the aerosol generating article (12), defining a flat shape, extending along the device axis (Y) between a proximal end and a distal end and being attached to the device body (40) at at least one of its ends; the heating cup (60) being made from a single piece or at least one wall of the heating cup (60) being made from a single piece; the heating assembly (59) further comprising at least one intermediate brace (70C) extending transversally around the heating cup (60) and arranged between the distal and proximal ends.

FIG. 4



Aerosol generating device comprising a heating cup

FIELD OF THE INVENTION

5 The present invention concerns an aerosol generating device comprising a heating cup.

10 Particularly, the aerosol generating device according to the invention is configured to operate with a flat-shaped aerosol generating article, which comprises for example a solid substrate able to form aerosol when being heated. Thus, such type of aerosol generating devices, also known as heat-not-burn devices, is adapted to heat, rather than burn, the substrate by conduction, convection and/or radiation, to generate aerosol for inhalation.

BACKGROUND OF THE INVENTION

15 The popularity and use of reduced-risk or modified-risk devices (also known as vaporisers) has grown rapidly in the past few years as an aid to assist habitual smokers wishing to quit smoking traditional tobacco products such as cigarettes, cigars, cigarillos, and rolling tobacco. Various devices and systems are available that heat or warm vaporizable substances as opposed to burning tobacco in conventional tobacco products.

25 A commonly available reduced-risk or modified-risk device is the heated substrate aerosol generation device or heat-not-burn device. Devices of this type generate aerosol or vapour by heating an aerosol substrate that typically comprises moist leaf tobacco or other suitable vaporizable material to a temperature typically in the range 150°C to 350°C. Heating an aerosol substrate, but not combusting or burning it, releases aerosol that comprises the components sought by the user but not the toxic and carcinogenic by-products of combustion and burning. Furthermore, the aerosol produced by heating the tobacco or other vaporizable material does not typically comprise the burnt or bitter taste resulting from combustion and burning that can be unpleasant for the user and so the substrate does not therefore require the sugars and other additives that are typically added to such materials to make the smoke and/or vapour more palatable for the user.

35 Tobacco articles, usable with such type of aerosol generating devices can take various forms. Some of them can present an elongated stick or any other suitable shape, like for example a flat shape. Generally, such a tobacco article is received at least partially

in a heating chamber of the device which comprises one or several heaters to heat the tobacco article. In some devices, the heating chamber can be formed by a heating cup.

Heating efficiency by the heating chamber is thus an important operation parameter of the aerosol generating device. In some aerosol generating devices, heat generated by the heating chamber can be dissipated or lost due for example to imprecisions in positioning the aerosol generating article in respect with the heating chamber. These imprecisions can become more and more important with time. This can conduct to a poor user experience.

SUMMARY OF THE INVENTION

One of the aims of the invention is to propose an aerosol generating device providing an accurate positioning of the aerosol generating article inside the heating chamber that does not deteriorate with time. Thus, the device provides a better heating efficiency of an aerosol generating article and as a consequence, a better user experience.

For this purpose, the invention relates to an aerosol generating device configured to operate with a flat-shaped aerosol generating article, the aerosol generating device comprising:

- a device body extending along a device axis;
- a heating assembly comprising a heating cup configured to receive at least partially the aerosol generating article to heat it, the heating cup defining a flat shape, extending along the device axis between a proximal end and a distal end and being attached to the device body at at least one of its ends; the heating cup being made from a single piece or at least one wall of the heating cup being made from a single piece;

the heating assembly further comprising at least one intermediate brace extending transversally around the heating cup and arranged between the distal and proximal ends.

Thanks to these features, the heating cup can be firmly affixed to the device body in its intermediate portion. This perseveres the heating cup having a flat shape from bending or any other deviation from its original shape, notably when it is being heated. Particularly, without sufficient support in its intermediate portion, the thermal dilatation of the wall forming the heating cup would necessarily lead to its deformation in respect with its initial shape. Thus, the positioning of the aerosol generating article which is optimized to the shape of the heating cup, can be deteriorated and lead to heat loss. For example, a bended shape of the heating cup can deteriorate the contact between the walls of the heating cup and the aerosol

generating article that leads to heat loss. Additionally, since the heating cup is attached in its intermediate portion by a brace and not continuous support, thermal transfer to the device body can be minimized. This minimizes heat loss inside the heating cup and prevents the device body against overheating. Thus, the device can still been handled by the user without risk of burn despite an additional support added to preserve the shape of the flat-shaped heating cup.

According to some embodiments, the or each intermediate brace further attaches the heating cup to the device body. Particularly, the intermediate brace can be directly attached to an external wall of the device body (i.e. wall delimiting the device body) or to any other internal wall or support extending within the device body. For example, the intermediate brace can be attached to a chassis extending in the internal part of the device body and attached to this last.

Thanks to these features, it is possible to ensure a firm attachment of the heating cup in its intermediate portion and preserve thus its initial shape.

According to some embodiments, the or each intermediate brace defines a central opening fitting transversally an external surface of the heating cup. In other words, the central opening can fit tightly the external shape of the heating cup. This can preserve its initial shape even during thermal dilatations.

According to some embodiments, in case of a unique intermediate brace, it is spaced along the device axis evenly from each end of the heating cup. In case of a plurality of intermediate braces, they are spaced along the device axis evenly between them and in respect with each end of the heating cup. In this last case, for example two or three intermediate braces can be provided.

This allows an even distribution of the supporting effort along the device axis. Thus, it is possible to preserve the heating cup against bending or other type of deformation.

According to some embodiments, the thickness of the or each intermediate brace is comprised between 0,1 mm and 2 mm, advantageously between 0,2 mm and 1,5 mm. Thus, the or each intermediate brace can be made for example from one or several plates. In other words, the or each intermediate brace is particularly thin in comparison with other type of support. This minimizes heat transfer to the device body while preserving the

necessarily solidity of the brace to attach the intermediate portion of the heating cup to the device body and avoid its deformation.

According to some embodiments, the or each intermediate brace comprises or made of polyetheretherketone (PEEK) and/or stainless steel. These materials ensures the necessarily solidity to attach the intermediate portion of the heating cup to the device body while minimizing heat transfer to the device body.

According to some embodiments, the or each intermediate brace is made of a single piece able to be inserted over the heating cup from one of its ends.

Thanks to these features, the or each intermediate brace can be easily mounted on the heating cup.

According to some embodiments, the or each intermediate brace is made of two pieces able to be inserted over the heating cup from its opposite ends.

Thanks to these features, the or each intermediate brace can be easily mounted to on the heating cup when it is necessary to ensure its solidity by at least two separated pieces. These pieces can be symmetrical between them and can be attached one to the other for example by welding.

According to some embodiments, the heating cup is attached to the device body at each of its ends.

Thanks to these features, the heating cup can be firmly attached to the device body at least at three different points along the device axis. This allows persevering the initial shape of the heating cup even after long heating phases.

According to some embodiments, the heating cup is attached to the device body at at least one of its ends by a peripheral brace. Advantageously, the heating cup is attached to the device body at each of its ends by a peripheral brace. The or each peripheral brace can be similar to the or each intermediate brace explained above. Particularly, each of the features of the or each intermediate brace explained above can also be applied to the or each peripheral brace.

The braces (intermediate and peripheral) ensure a firm fixation of the heating cup to the device body to better preserve its initial shape.

According to some embodiments, the heating cup comprises a wall extending along the device axis and made from a heat conductive material. The thickness of said wall is comprised between 0,01 mm and 0,1 mm.

This thickness of the wall is particularly advantageous to efficiently transfer heat from an external heating element inside the heating cup. The heating element can for example be attached to this wall to minimize heat loss. Provided with this thickness, the wall of the heating cup would necessarily be deformed under the heating temperature, without the or each intermediate brace as previously explained.

According to some embodiments, the heating assembly further comprises a heating film attached to an external surface of said wall.

A heating film is can be particularly efficient to transfer heat to the heating cup since it can for example be glued to the external surface of said wall to ensure a better contact with it.

According to some embodiments, the heating cup has a cuboid shape extending along the device axis. This shape is advantageous since it is compact and ensures fast heating of the aerosol generating article.

According to some embodiments, each wall of the heating cup is made from a single piece. Preferably, none hole or gap is provided on such a wall. In other words, said wall forms a continuous surface.

BRIEF DESCRIPTION OF THE DRAWINGS

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

- Figure 1 is a perspective view of an aerosol generating assembly, the aerosol generating assembly comprising an aerosol generating device according to the invention and an aerosol generating article usable with the aerosol generating device;

5 - Figure 2 is a perspective view of the aerosol generating article of Figure 1;

- Figure 3 is a cross-sectional view of the aerosol generating assembly of Figure 1 according to plane III;

10 - Figure 4 is a perspective view of a heating assembly comprised in the aerosol generating device of Figure 1.

DETAILED DESCRIPTION OF THE INVENTION

15 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.

20 The expression “**substantially equal to**” is understood hereinafter as an equality at plus or minus 10% and preferably at plus or minus 5%.

As used herein, the term “**aerosol generating device**” or “**device**” may include a vaping device to deliver an aerosol to a user, including an aerosol for vaping, by means of a heater element explained in further detail below. 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 the heater element 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 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 vapour 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 aerosol generating substance (aerosol pre-cursor) to a specified target temperature and thereafter to maintain the temperature at the target temperature that enables efficient generation of aerosol.

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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 vapour. Aerosol may include one or more components of the vaporizable material.

As used herein, the term “**vaporizable material**” or “**precursor**” may refer to a smokable material which may for example comprise nicotine or tobacco and an aerosol former. Tobacco may take the form of various materials such as shredded tobacco, granulated tobacco, tobacco leaf and/or reconstituted tobacco. Suitable aerosol formers include: a polyol such as sorbitol, glycerol, and glycols like propylene glycol or triethylene glycol; a non-polyol such as monohydric alcohols, acids such as lactic acid, glycerol derivatives, esters such as triacetin, triethylene glycol diacetate, triethyl citrate, glycerin or vegetable glycerin. In some embodiments, the aerosol generating agent may be glycerol, propylene glycol, or a mixture of glycerol and propylene glycol. The substrate may also comprise at least one of a gelling agent, a binding agent, a stabilizing agent, and a humectant.

By “**flat shape**” of the aerosol generating article or the heating cup, it is understood that it extends between two first parallel longitudinal planes and two second parallel longitudinal planes perpendicular to the first parallel longitudinal planes, the distance between the second parallel longitudinal planes being at least 3 times, advantageously 5 times and preferably 10 times, greater than the distance between the first parallel longitudinal planes.

Figure 1 shows an aerosol generating assembly 10 comprising an aerosol generating device 11 and an aerosol generating article 12, also called tobacco article 12. The aerosol generating device 11 is intended to operate with the tobacco article 12 which is shown in more detail in Figure 2.

In the example of this Figure 2, the tobacco article 12 is a flat-shaped tobacco article presenting for example a flat-shaped cuboid extending along an article axis X and having external dimensions $L \times W \times D$. In a typical example, the length L of the article 12 according to the article axis X equals substantially to 33 mm while its width W and depth D are substantially equal respectively to 12 mm and 1,2 mm. According to different examples, the

values L, W and D can be selected within a range of +/- 40%, for example. The depth D of the tobacco article 12 is formed by a pair of parallel walls 13A, 13B, called hereinafter narrow walls 13A, 13B, and the width W of the tobacco article 12 is formed by a pair of parallel walls 14A, 14B, called hereinafter wide walls 14A, 14B. In some embodiments, the edges between the wide and narrow walls 13A, 13B, 14A, 14B can be rounded. According to other embodiments of the invention, the tobacco article 12 can have any other suitable flat shape and/or external dimensions.

The tobacco article 12 comprises a tobacco portion 15 and a mouthpiece portion 16 arranged along the article axis X. The tobacco portion 15 may for example be slightly longer than the mouthpiece portion 16. For example, the length L2 of the tobacco portion 15 according to the article axis X may be substantially equal to 18 mm. The width W2 of the tobacco portion 15 is substantially equal to the width W of the tobacco article 12. The length L3 of the mouthpiece portion 16 according to the article axis X may be substantially equal to 15 mm. As in the previous case, the values L2 and L3 can be selected within a range of +/- 40%, for example. The tobacco portion 15 defines an abutting end 18 of the article 12 and the mouthpiece portion 16 defines a mouth end 20 of the article 12. The tobacco portion 15 and the mouthpiece portion 16 may be fixed one to the other by a wrapper 21 extending around the substrate axis X. The wrapper 21 forms the narrow and wide walls 13A, 13B, 14A, 14B of the tobacco article 12. In some embodiments, the wrapper 21 is formed from a same wrapping sheet. In some other embodiments, the wrapper 21 is formed by separate wrapping sheets wrapping separately the portions 15, 16 and fixed one to the other by any other suitable mean. The wrapper 21 may, for example, comprise paper and/or non-woven fabric and/or aluminium foil. The wrapper 21 may be porous or air impermeable and forms a plurality of airflow channels extending inside the article 12 between the abutting end 18 and the mouth end 20.

The mouthpiece portion 16 comprises a core 27 intended to act for example as a cooler to cool slightly the vapour before it is inhaled by the user. The core 27 may comprise for this purpose for example corrugated paper. The core 27 may be formed through an extrusion and/or rolling process into a stable shape. Advantageously, the core 27 is arranged inside the mouthpiece portion 16 to be entirely in contact with the internal surface of the wrapper 21 delimiting this mouthpiece portion 16. Additionally or alternatively, the core 27 acts as a filter.

The tobacco portion 15 comprises a vaporizable material and is intended to be heated by a heating cup, as it will be explained in further detail below.

Referring again to Figure 1, the aerosol generating device 11 comprises a device body 40 extending along a device axis Y between an open end 41 and a closed end 42. The aerosol generating device 11 further comprises a mouthpiece 43 mounted on the open end 41 of the device body 40. According to the example described below, the mouthpiece 43 and the device body 40 form two different pieces. Particularly, according to this example, the mouthpiece 43 is designed to be fixed on a support 44 defined by the open end 41 of the device body 40, as it is shown in Figure 3. The support 44 defines for example a wall extending perpendicularly to the device axis Y and defining in its centre an opening to the heating cup as it will be explained in further detail below. The support 44 may particularly extend inwardly from lateral walls forming the device body 40.

Referring to Figure 3, the mouthpiece 43 comprises a contact part 46 and a support part 47. These parts 46, 47 are arranged successively according to the device axis Y and define a central hole 49 extending through each of these parts 46, 47. The contact part 46 protrudes from the support part 47, according to the device axis Y.

The support part 47 of the mouthpiece 43 forms for example a collar covering partially the open end 41 of the device body 40. The collar defines an external surface extending for example substantially perpendicularly to the device axis Y and an internal surface opposite to the external surface and facing the open end 41 of the device body 40. The support part 47 is designed to be fixed on the support 44 of the device body 40 using any suitable fixing means (not shown in Figure 3). In some examples, the fixing means may comprise a first magnetic element arranged at the periphery of the support 44 and a second magnetic element arranged for example on the internal surface of the support part 47 of the mouthpiece 43. It is clear that the fixing means can have any other appropriate structure suitable to fix the mouthpiece 43 to the device body 40.

The contact part 46 of the mouthpiece 43 is designed to be in contact with the user's lips and/or mouth. For this purpose, it can form an appropriate ergonomic shape. Advantageously, the contact part 46 has a narrowing shape from the support part 47 toward its top surface, along the device axis Y. For example, the contact part 46 can have a shape of truncated cone. On its top surface, the contact part 46 forms an air outlet extending the

central hole 49 and adapted to deliver aerosol formed in the heating cup as it will be explained in further detail below.

5 The central hole 49 is designed to receive at least a part of the tobacco article 12 to hold it inside a heating cup, as it is shown in Figure 3. Particularly, the central hole 49 is designed to receive at least a part of the mouthpiece portion 16 of the tobacco article 12, as it is shown in Figure 3. Advantageously, the central hole 49 is designed to receive entirely the mouthpiece portion 16 of the tobacco article 12. For this purpose, the cross-section of the central hole 49 is complementary to the external shape of the mouthpiece portion 16 of the tobacco article 12. Particularly, in case of a flat-shape tobacco article 12, the central hole 49 has also a flat shape, advantageously a rectangular flat shape.

10 The device body 40 delimits an internal space of the device 11 receiving various elements designed to carry out different functionalities of the device 11. This internal space can for example receive a battery for powering the device 11, a controller for controlling the operation of the device 11, a heating assembly 59 for heating the tobacco portion 15 of the tobacco article 12, etc. Among these elements, only the heating assembly 59 will be explained in further detail in reference to Figures 3 and 4.

20 Particularly, as it is shown in these Figures, the heating assembly 59 comprises a heating cup 60 (as previously mentioned) and a set of braces 65 extending transversally around the heating cup 60.

25 The heating cup 60 forms a heating chamber of the device 11 and has a flat shape extending along the device axis Y between a proximal end 61 and a distal end 62. Particularly, as the aerosol generating article 12, the heating cup 60 may also form a cuboid shape extending along the device axis Y and comprising a pair of parallel narrow walls 63A, 63B extending along the device axis Y, a pair of parallel wide walls 64A, 64B extending also along the device axis Y and a bottom wall 68 adjacent to each of said walls and extending perpendicularly to the device axis Y.

30 The bottom wall 68 forms thus the distal end 62 of the heating cup 60. Opposite to the bottom wall 68, the proximal end 61 of the heating cup 60 is configured to receive the tobacco article 12 so as the corresponding wide walls 14A, 14B of the tobacco article 12 face the corresponding wide walls 64A, 64B of the heating cup 60, the corresponding narrow walls 13A, 13B of the tobacco article 12 face the corresponding narrow walls 63A,

63B of the heating cup 60 and the abutting end 18 of the tobacco article 12 abuts against the bottom wall 68 or at least a rib extending from this bottom wall 68. Alternatively, the abutting end 18 faces the bottom wall 68 without being in contact with it. The flat-shaped heating cup 60 is thus configured to receive the tobacco article 12 so as the narrow wall 13A (respectively 13B) of the tobacco article 12 faces the narrow wall 63B (respectively 63A) of the heating cup 60, and the wide wall 14A (respectively 14B) of the tobacco article 12 faces the wide wall 64B (respectively 64A) of the heating cup 60. The facing wide walls 14A, 14B, 64A, 64B and the facing narrow walls 13A, 13B, 63A, 63B can be at least partially in contact one with the other or spaced one from the other. In the preferred example, the facing narrow walls 13A, 13B, 63A, 63B form a gap between them suitable for conducting an airflow.

In some embodiments, the heating cup 60 is made from a single piece. In this case, this means that all of the walls 63A, 63B, 64A, 64B, 68 of the heating cup 60 are formed from a single piece. Particularly, such a piece can be a plate folded in a manner to form the flat shape of the heating cup. According to other embodiments, only some walls of the heating cup 60 are formed from a single piece. For example, the narrow and wide walls 63A, 63B, 64A, 64B of the heating cup 68 can be made from a single piece. According to still other embodiments, at least one narrow or wide wall 63A, 63B, 64A, 64B, or advantageously each narrow and each wide wall 63A, 63B, 64A, 64B is formed from a single piece. Preferably, at least one narrow or wide wall 63A, 63B, 64A, 64B, or advantageously each narrow and each wide wall 63A, 63B, 64A, 64B presents a continuous surface, without holes or gaps. The thickness of each wall 63A, 63B, 64A, 64B of the heating cup 60 can be comprised for example 0,01 mm and 0,1 mm.

In some embodiments, the heating cup 60 further comprises at least one heating surface forming at least partially one of the wide walls 64A, 64B of the heating cup 60. Preferably, the heating cup 60 comprises two heating surfaces forming at least partially the opposite wide walls 64A, 64B of the heating cup 60. Particularly, each heating surface is designed to be in contact with or face the tobacco portion 15 of the tobacco article 12 when it is received at least partially in the heating cup 60. The or each heating surface can be formed by a plate forming the corresponding wide wall 64A, 64B of the heating cup 60. According to another embodiment, the or each heating surface is formed by a flexible heating film attached for example to a plate forming the corresponding wall 64A, 64B of the heating cup 60. According to still another embodiment, the or each heating surface is formed

by a long strip of flexible heater comprising two separate track patterns and wound around the heating cup.

The set of braces 65 attaches the heating cup 60 to the device body 40. Particularly, in the example of Figure 4, the set of braces 65 comprises a pair of peripheral braces 70A, 70B and at least one intermediate brace 70C. Each peripheral brace 70A, 70B attaches the heating cup 60 at one of its ends 61, 62 to the device body 40. Particularly, the peripheral brace 70A can attach the heating cup 60 at its proximal end 61 and the peripheral brace 70B can attach the heating cup 60 at its distal end 62. As shown in Figure 3, the peripheral brace 70A can attach the heating cup 60 to the support 44 whereas the peripheral brace 70B can attach the heating cup 60 to an external wall of the device body 40. The intermediate brace 70C is arranged between the peripheral braces 70A, 70B. For example, the intermediate brace 70C is spaced along the device axis Y evenly from each peripheral brace 70A, 70B. In some embodiments, the set of braces 65 comprises a plurality of the intermediate braces 70C. In this case, the intermediate braces 70C are spaced along the device axis Y evenly between them and in respect with each of the peripheral braces 70A, 70B. In some embodiments, no peripheral brace is provided. In this case, the heating cup 40 is attached at its ends 61, 62 using any other suitable mean.

Each brace 70A, 70B, 70C extends around the heating cup 60 and protrudes from the corresponding narrow and wide walls 63A, 63B, 64A, 64B of this cup. For example, each brace 70A, 70B, 70C can form a collar extending around the external surface of the heating cup 60. Each brace 70A, 70B, 70C can extend substantially perpendicularly to the device axis Y. Each brace 70A, 70B, 70C defines a central opening fitting transversally the external surface of the heating cup 60. In other words, the shape of the central opening of each brace 70A, 70B, 70C corresponds to the transversal shape of the heating cup 60. Additionally, each brace 70A, 70B, 70C can be affixed to the corresponding wall 63A, 63B, 64A, 64B of the heating cup 60 using any appropriate mean such as welding for example.

Each brace 70A, 70B, 70C can be formed from a plate with a thickness comprised for example between 0,1 mm and 2 mm, advantageously between 0,2 mm and 1,5 mm. Each plate comprises or made of polyetheretherketone (PEEK) and/or stainless steel. In some embodiments, each brace 70A, 70B, 70C or at least the intermediate brace 70C attaches the heating cup 60 directly to an external wall of device body 40 (as shown in the Figures). In this case, each brace 70A, 70B, 70C extends transversally between two opposite external walls of the device body 40. According to other embodiments, each brace 70A, 70B, 70C

or at least the intermediate brace 70C attaches the heating cup 60 to an internal wall or support of the device body 40. For example, the or at least one brace 70A, 70B, 70C can be attached to an internal chassis fixed to the device body 40.

5 In some embodiments, each brace 70A, 70B, 70C or at least the intermediate brace 70C is made of a single piece able to be inserted over the heating cup 60 from one of its ends 61, 62. In some other embodiments, each brace 70A, 70B, 70C or at least the intermediate brace 70C is made of two pieces able to be inserted over the heating cup 60 from its opposite ends 61, 62. In this last case, the separated pieces can be affixed one to
10 the other using any appropriate mean.

 A thermal insulator can be provided between the external walls of the device body 40 and the heating cup 60. In other words, space between the heating cup 60 and the device body 40 can be filled with the thermal insulator. This insulator can for example be arranged
15 between the braces 70A, 70B, 70C. In some embodiments, it can be supported by the braces 70A, 70B, 70C. This thermal insulator can be formed by vacuum or an air chamber, a sheet(s), powders, etc., and/or can comprise various materials such superwool, aerogel, etc.

CLAIMS

1. An aerosol generating device (11) configured to operate with a flat-shaped aerosol generating article (12), the aerosol generating device (11) comprising:

5 - a device body (40) extending along a device axis (Y);

10 - a heating assembly (59) comprising a heating cup (60) configured to receive at least partially the aerosol generating article (12) to heat it, the heating cup (60) defining a flat shape, extending along the device axis (Y) between a proximal end (61) and a distal end (62) and being attached to the device body (40) at at least one of its ends (61, 62); the heating cup (60) being made from a single piece or at least one wall (63A, 63B, 64A, 64B) of the heating cup (60) being made from a single piece;

15 the heating assembly (59) further comprising at least one intermediate brace (70C) extending transversally around the heating cup (60) and arranged between the distal and proximal ends (61, 62).

2. The aerosol generating device (11) according to claim 1, wherein the or each intermediate brace (70C) further attaches the heating cup (60) to the device body (40).

20 3. The aerosol generating device (11) according to claim 1 or 2, wherein the or each intermediate brace (70C) defines a central opening fitting transversally an external surface of the heating cup (60).

4. The aerosol generating device (11) according to any one of the preceding claims, wherein:

25 - in case of a unique intermediate brace (70C), it is spaced along the device axis (Y) evenly from each end (61, 62) of the heating cup (60);

 - in case of a plurality of intermediate braces (70C), they are spaced along the device axis (Y) evenly between them and in respect with each (61, 62) end of the heating cup (60).

30 5. The aerosol generating device (11) according to any one of the preceding claims, wherein the thickness of the or each intermediate brace (70C) is comprised between 0,1 mm and 2 mm, advantageously between 0,2 mm and 1,5 mm.

35 6. The aerosol generating device (11) according to any one of the preceding claims, wherein the or each intermediate brace (70C) comprises or made of polyetheretherketone (PEEK) and/or stainless steel.

7. The aerosol generating device (11) according to any one of the preceding claims, wherein the or each intermediate brace (70C) is made of a single piece able to be inserted over the heating cup (60) from one of its ends (61, 62).

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8. The aerosol generating device (11) according to any one of claims 1 to 6, wherein the or each intermediate brace (70C) is made of two pieces able to be inserted over the heating cup (60) from its opposite ends (61, 62).

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9. The aerosol generating device (11) according to any one of the preceding claims, wherein the heating cup (60) is attached to the device body (40) at each of its ends (61, 62).

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10. The aerosol generating device (11) according to any one of the preceding claims, wherein the heating cup (60) is attached to the device body (40) at at least one of its ends by a peripheral brace (70A, 70B).

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11. The aerosol generating device (11) according to any one of the preceding claims, wherein the heating cup (40) comprises a wall (63A, 63B, 64A, 64B) extending along the device axis (Y) and made from a heat conductive material.

12. The aerosol generating device (11) according to claim 11, wherein the thickness of said wall (63A, 63B, 64A, 64B) is comprised between 0,01 mm and 0,1 mm.

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13. The aerosol generating device (11) according to claim 11 or 12, wherein the heating assembly (59) further comprises a heating film attached to an external surface of said wall (63A, 63B, 64A, 64B).

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14. The aerosol generating device (11) according to any one of the preceding claims, wherein the heating cup (60) has a cuboid shape extending along the device axis (Y).

15. The aerosol generating device (11) according to any one of the preceding claims, wherein each wall (63A, 63B, 64A, 64B) of the heating cup (60) is made from a single piece.

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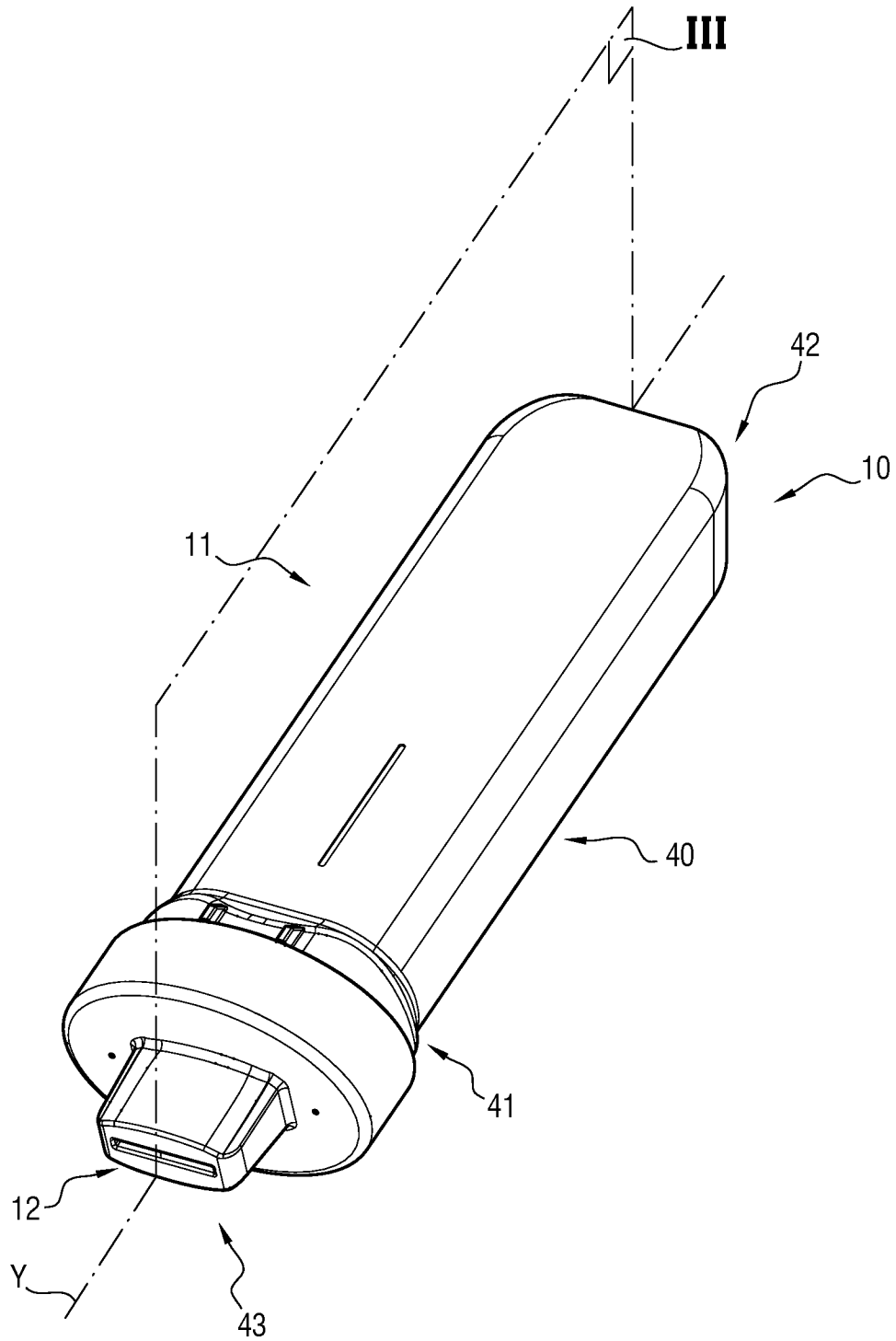


FIG.1

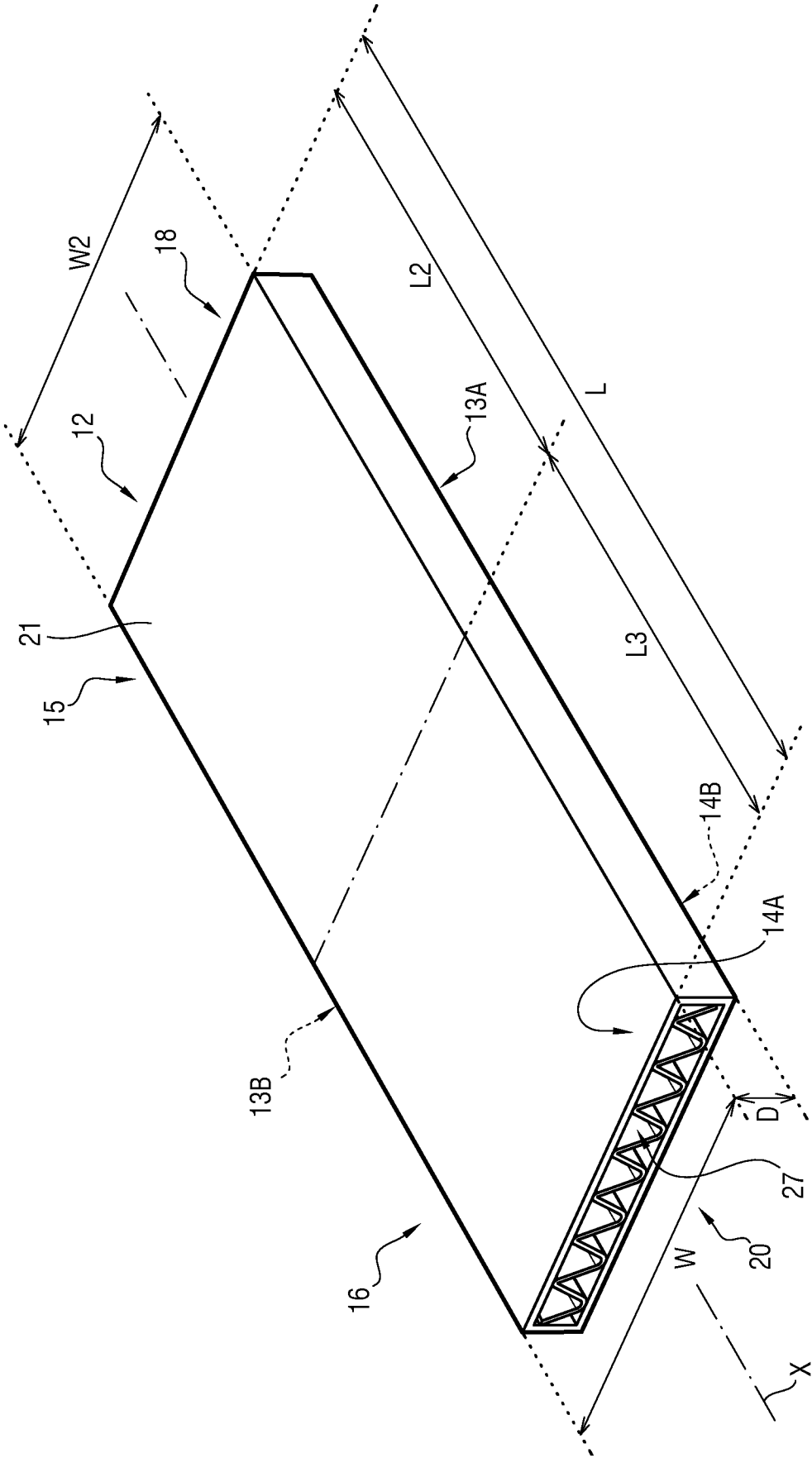


FIG. 2

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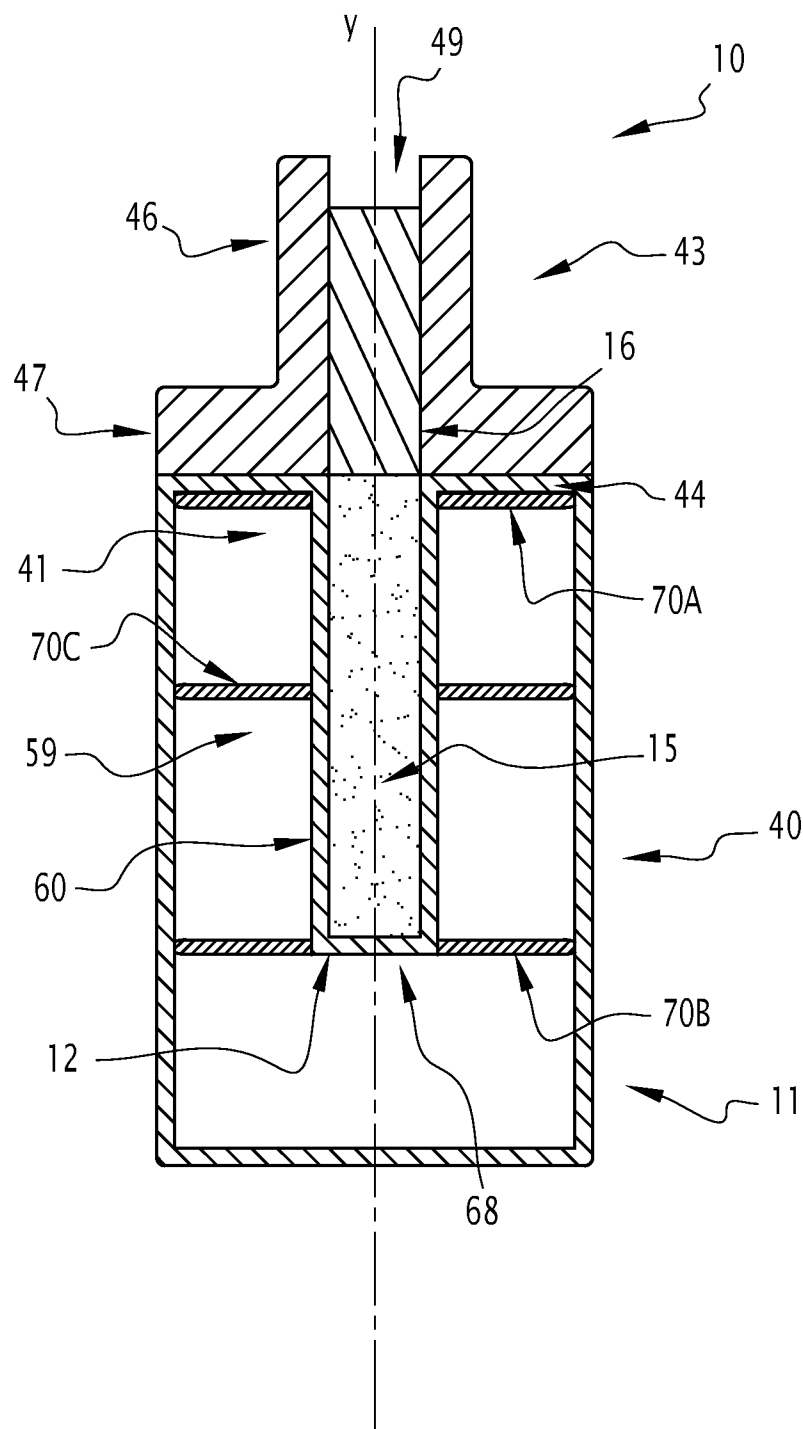
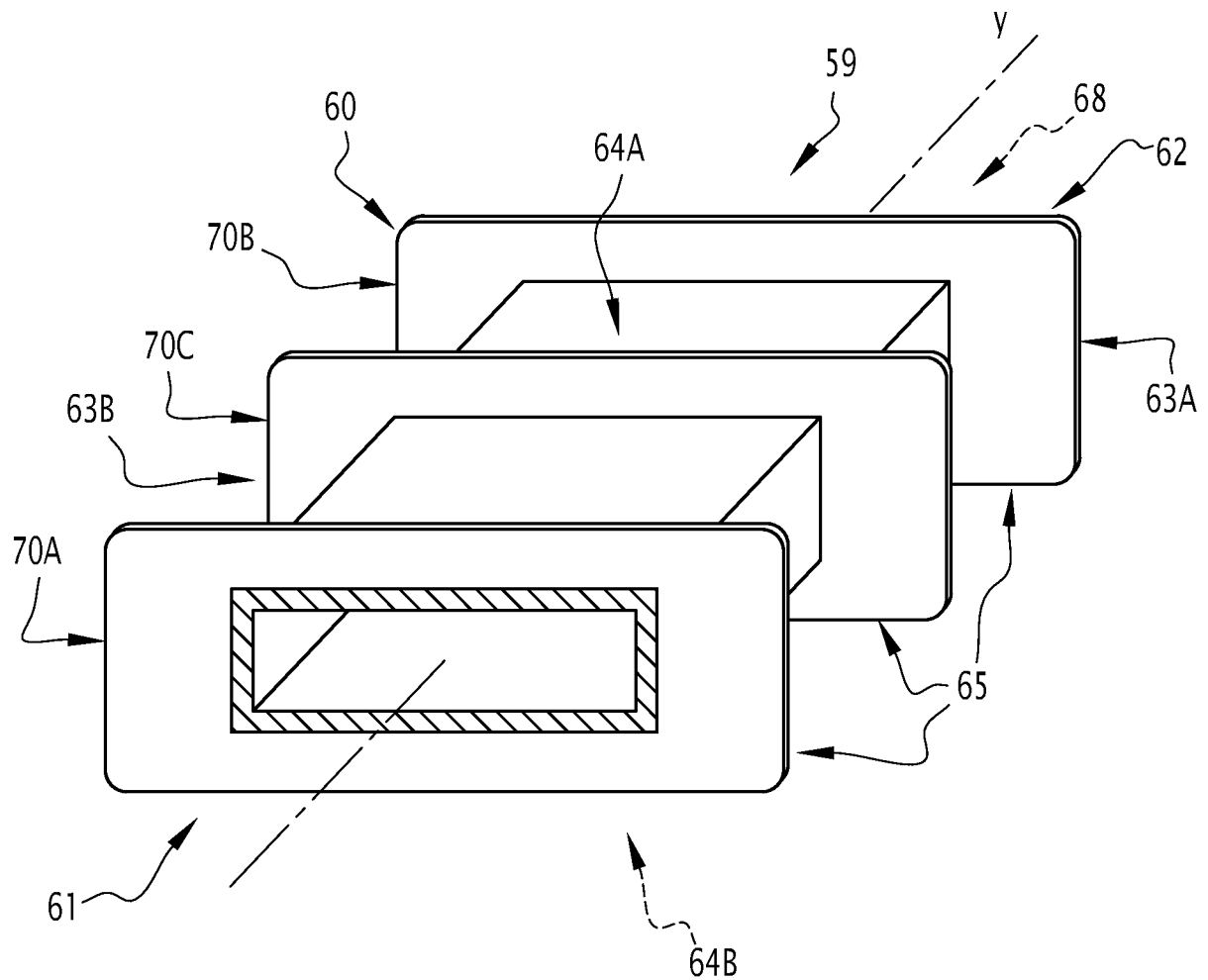


FIG.3

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FIG. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2024/068065

A. CLASSIFICATION OF SUBJECT MATTER INV. A24F40/46 ADD. According to International Patent Classification (IPC) or to both national classification and IPC		
B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) A24F Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) EPO-Internal		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 2022/238337 A1 (JT INT SA [CH]) 17 November 2022 (2022-11-17) abstract page 8, line 31 - page 14, line 31 figures 1-12 -----	1 - 15
X	WO 2023/072986 A1 (JT INT SA [CH]) 4 May 2023 (2023-05-04) abstract page 7, line 28 - page 16, line 2 figures 1-12 figures 1-7 -----	1 - 15
A	WO 2015/062983 A2 (BRITISH AMERICAN TOBACCO CO [GB]) 7 May 2015 (2015-05-07) abstract page 16, line 22 - page 17, line 27 figures 9,10 ----- - / - -	1 - 15
☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance;; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance;; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 24 September 2024		Date of mailing of the international search report 09/10/2024
Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016		Authorized officer Payr, Matthias

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International application No

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	WO 2021/001910 A1 (JAPAN TOBACCO INC [JP]) 7 January 2021 (2021-01-07) abstract paragraph [0035] figure 4 -----	1 - 15

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