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(54) **AEROSOL-GENERATING ARTICLE COMPRISING A DUAL-LAYER WRAPPING STRUCTURE**
AEROSOLERZEUGENDER ARTIKEL MIT EINER ZWEISCHICHTIGEN UMHÜLLUNGSSTRUKTUR
ARTICLE DE GÉNÉRATION D'AÉROSOL COMPRENANT UNE STRUCTURE D'EMBALLAGE
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(73) Proprietor: **Philip Morris Products S.A.**
2000 Neuchâtel (CH)

(72) Inventors:
• **LOUVET, Alexis Julien**
2000 Neuchâtel (CH)
• **UTHURRY, Jerome**
2000 Neuchâtel (CH)

(74) Representative: **Reddie & Grose LLP**
The White Chapel Building
10 Whitechapel High Street
London E1 8QS (GB)

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Description

[0001] The present invention relates to aerosol-generating articles comprising an aerosol-forming substrate. The aerosol-generating articles may be used for generating an inhalable aerosol when heated.

[0002] Aerosol-generating articles in which an aerosol-forming substrate, such as a tobacco containing substrate, is heated rather than combusted are known in the art. An aim of such heatable aerosol-generating articles is to reduce potentially harmful by-products produced by the combustion and pyrolytic degradation of tobacco in conventional cigarettes.

[0003] In heatable aerosol-generating articles, an inhalable aerosol is typically generated by the transfer of heat from a heater to an aerosol-forming substrate. During heating, volatile compounds are released from the aerosol-forming substrate and become entrained in air. For example, the volatile compounds may become entrained in air drawn through, over, around or otherwise within the vicinity of the aerosol-generating article. As the released volatile compounds cool, they condense to form an aerosol. The aerosol may be inhaled by a user. The aerosol may contain aromas, flavours, nicotine and other desired elements.

[0004] The heating element may be comprised in an aerosol-generating device. The combination of an aerosol-generating article and an aerosol-generating device may form an aerosol-generating system.

[0005] Heatable aerosol-generating articles may comprise one or more wrappers, circumscribing at least part of the aerosol-generating article. Advantageously, the one or more wrappers may prevent a user from handling the aerosol-forming substrate, which may help to maintain a high level of hygiene. The provision of one or more wrappers may also contribute to securing the components of the aerosol-generating article together.

[0006] When heatable aerosol-generating articles comprise two wrappers, the wrappers may form a dual-layer wrapping structure. Dual-layer wrapping structures may be useful to increase the mechanical strength of the aerosol-generating article.

[0007] However, such aerosol-generating articles comprising dual-layer wrapping structures may be more difficult to manufacture and may have a higher risk of being damaged upon handling or transportation compared to aerosol-generating articles comprising single-wrapper structures. It would therefore be desirable to provide an aerosol-generating article comprising a dual-layer wrapping structure which can be manufactured in an efficient manner and which has an improved robustness.

[0008] WO 2020/002165 A1 discusses an aerosol-generating article comprising an aerosol-forming substrate and a substantially incombustible wrapper. The substantially incombustible wrapper is formed of two layers, bonded together by a lamination process. The outer layer is a paper plug wrap of basis weight 45 grams

per square metre and 65 micrometres thickness. The inner layer is an aluminium foil of basis weight 17 grams per square metre and 6.3 micrometres thickness. The inner surface of the wrapper is textured by an embossing roller to form an embossed portion, which extends partially across the transverse width of the wrapper. To wrap an aerosol-forming substrate with the substantially incombustible wrapper, one edge of the substantially incombustible wrapper is folded onto the aerosol forming substrate, adhesive is applied by a glue applicator to the embossed portion on the inner surface of the opposite edge of the substantially incombustible wrapper, and the embossed portion is folded onto a portion of the outer paper surface of the substantially incombustible wrapper.

[0009] The invention is defined in the appended independent claims, to which attention is directed.

[0010] An aerosol-generating article is provided, the aerosol-generating article comprising:

an aerosol-forming substrate;
a dual-layer wrapping structure, comprising:

an inner wrapper that circumscribes the aerosol-forming substrate, the inner wrapper comprising an inner wrapper internal surface and an inner wrapper external surface opposite the inner wrapper internal surface;

an outer wrapper that circumscribes the inner wrapper, the outer wrapper comprising an outer wrapper internal surface and an outer wrapper external surface opposite the outer wrapper internal surface,
wherein the outer wrapper internal surface and the inner wrapper external surface are attached to one another by means of a first adhesive;

wherein the dual-layer wrapping structure defines an overlapping region in which the dual-layer wrapping structure overlaps itself, the overlapping region comprising a first section and a second section externally disposed on the first section;
wherein the first section and the second section are attached to one another by means of a second adhesive.

[0011] The term "aerosol-generating article" is used herein to denote an article wherein an aerosol-forming substrate may be heated to produce and deliver inhalable aerosol to a consumer. As used herein, the term "aerosol-forming substrate" relates to a substrate capable of releasing volatile compounds that can form an aerosol. Such volatile compounds may be released by heating the aerosol-forming substrate. An aerosol-forming substrate is typically part of an aerosol-generating article.

[0012] The aerosol-forming substrate may comprise nicotine. The nicotine-containing aerosol-forming substrate may be a nicotine salt matrix.

[0013] The aerosol-forming substrate may comprise a

liquid. The aerosol-forming substrate may comprise solid components and liquid components. Preferably, the aerosol-forming substrate may comprise a solid.

[0014] The aerosol-forming substrate may comprise plant-based material. The aerosol-forming substrate may comprise tobacco. The aerosol-forming substrate may comprise a tobacco-containing material including volatile tobacco flavour compounds which are released from the aerosol-forming substrate upon heating. The aerosol-forming substrate may comprise a non-tobacco material. The aerosol-forming substrate may comprise homogenised plant-based material.

[0015] As used herein, the term "aerosol-generating device" refers to a device comprising a heating element that interacts with the aerosol-forming substrate of the aerosol-generating article to generate an aerosol.

[0016] As used herein with reference to the present invention, the term "rod" is used to denote a generally cylindrical element of substantially circular, oval or elliptical cross-section.

[0017] As used herein, the term "longitudinal" refers to the direction corresponding to the main longitudinal axis of the aerosol-generating article, which extends between the upstream and downstream ends of the aerosol-generating article. As used herein, the terms "upstream" and "downstream" describe the relative positions of elements, or portions of elements, of the aerosol-generating article in relation to the direction in which the aerosol is transported through the aerosol-generating article during use.

[0018] During use, air is drawn through the aerosol-generating article in the longitudinal direction. The term "transverse" refers to the direction that is perpendicular to the longitudinal axis. Any reference to the "cross-section" of the aerosol-generating article or a component of the aerosol-generating article refers to the transverse cross-section unless stated otherwise.

[0019] The term "length" denotes the dimension of a component of the aerosol-generating article in the longitudinal direction.

[0020] By providing a dual-layer wrapping structure, the aerosol-generating article may have a higher longitudinal and transversal strength compared to those having a single-layer wrapper.

[0021] Likewise, the dual-layer wrapping structure may be beneficial to achieve an enhanced thermal insulation when the aerosol-forming substrate is heated.

[0022] The provision of an inner wrapper and an outer wrapper may be useful in that wrappers with different characteristics and functions may be combined. This may lead to more versatile aerosol-generating articles.

[0023] Since, typically in aerosol-generating articles, the amount of material in the aerosol-forming substrate is inversely proportional to the amount of wrapper material, the dual-layer wrapping structure may enable aerosol-generating articles to be less expensive (as they contain less aerosol-forming material) without affecting performance during use.

[0024] By providing a first adhesive between the outer wrapper internal surface and the inner wrapper external surface, the inner wrapper and the outer wrapper may form a robust and mechanically stable dual-layer wrapping structure.

[0025] Likewise, by providing a second adhesive between the first section and the second section, the overlapping region may contribute to a high mechanical stability of the aerosol-generating article.

[0026] The first adhesive and the second adhesive may be the same adhesive.

[0027] The outer wrapper has a basis weight between about 10 grams per square metre and 28 grams per square metre. Preferably, the outer wrapper may have a basis weight between about 10 grams per square metre and 16 grams per square metre.

[0028] The inner wrapper may have a basis weight between about 10 grams per square metre and 28 grams per square metre. Preferably, the inner wrapper may have a basis weight between about 10 grams per square metre and 16 grams per square metre.

[0029] Such ranges of basis weight may be beneficial in that they may facilitate manufacture of the aerosol-generating article relative to aerosol-generating articles comprising stiffer wrappers.

[0030] The outer wrapper may have a thickness between about 20 micrometres and about 100 micrometres, preferably between about 25 micrometres and about 75 micrometres, more preferably between 30 micrometres and about 50 micrometres.

[0031] The inner wrapper has a thickness between about 20 micrometres and about 100 micrometres. Preferably, the inner wrapper has thickness between about 25 micrometres and about 75 micrometres, more preferably between 30 micrometres and about 50 micrometres.

[0032] Wrapper thicknesses within such ranges may lead to a proper balance between the overall thickness of the overlapping region and the thickness in the remaining part of the wrapper. They may also result in a dual-layer wrapping structure having a suitable overall thickness.

[0033] The second adhesive may be disposed between the inner wrapper internal surface and the outer wrapper external surface. This may result in an overlapping region having a desirable mechanical stability.

[0034] The inner wrapper may comprise an embossed pattern. The outer wrapper may comprise an embossed pattern.

[0035] Embossed patterns may be desirable to improve the thermal insulation of the dual-layer wrapping structure. They may also contribute to an easier manufacture of the aerosol-generating article.

[0036] The embossed pattern may be disposed on the inner wrapper external surface. This configuration may advantageously lead to the formation of air cushions between the inner wrapper and the outer wrapper. Air cushions may enhance the thermal insulation of the dual-layer wrapping structure, which may improve the user's

experience, particularly in cold weather.

[0037] The embossed pattern may comprise diagonal lines.

[0038] The embossed pattern may be a crisscross embossed pattern in which intersecting lines are equally separated from each other.

[0039] The embossed pattern may be a crisscross embossed pattern which comprises vertical and horizontal bands. The intersecting lines are equally separated from each other within the same band, but the separation between lines in the adjacent band is different. Therefore, the bands form a check pattern or a grid pattern.

[0040] The embossed pattern may comprise dots.

[0041] The embossed pattern may comprise horizontal lines.

[0042] The embossed pattern may be a ridged pattern or a wave-shaped pattern.

[0043] The outer wrapper may have a porosity between about 30 and about 80 Coresta units, preferably between about 30 and about 50 Coresta units, most preferably between 30 and 40 Coresta units.

[0044] An outer wrapper having a permeability within such ranges has a low permeability, which may contribute to an optimised thermal insulation of the dual-layer wrapping structure.

[0045] The inner wrapper external surface, the inner wrapper internal surface or both the inner wrapper external surface and the inner wrapper internal surface have a roughness between about 50 Bekk seconds and about 1000 Bekk seconds, more preferably between about 100 Bekk seconds and about 200 Bekk seconds.

[0046] The roughness expressed in Bekk seconds is measured by means of a standard test using a BEKK Smoothness Tester, which creates a vacuum and measures the time it takes for the vacuum to drop from 50.66 kPa to 48.00 kPa. The test is recognised by the international standard ISO 5627.

[0047] These ranges of roughness may correspond to embossed patterns which are particularly advantageous to provide dual-layer wrapping structures. In particular, an inner wrapper external surface having an embossed pattern with such ranges of roughness may create thermally efficient air cushions.

[0048] The inner wrapper may comprise polyvinyl alcohol. Polyvinyl alcohol may be provided in the inner wrapper as a surface treatment.

[0049] An inner wrapper comprising polyvinyl alcohol may advantageously have hydrophobic properties.

[0050] The inner wrapper, the outer wrapper or both the inner wrapper and the outer wrapper may comprise paper. The inner wrapper, the outer wrapper or both the inner wrapper and the outer wrapper may comprise a starch-based formulation.

[0051] The inner wrapper, the outer wrapper or both the inner wrapper and the outer wrapper may comprise a flavouring agent.

[0052] The flavouring agent may include one or more of: herbal flavour and fluorescence components.

[0053] The selection of a certain flavouring agent and the fact that it can be comprised in the inner wrapper, the outer wrapper or both the inner wrapper and the outer wrapper may allow a greater versatility in the functions of the aerosol-generating article during use.

[0054] The first adhesive may comprise one or more of: gum Arabic, natural or synthetic resins, starch and varnish. The second adhesive may comprise one or more of: gum Arabic, natural or synthetic resins, starch and varnish. Such adhesives may be useful to provide a robust attachment in the overlapping region of the wrapper. They may also allow for a robust attachment between the inner wrapper and the outer wrapper.

[0055] A heating element may be embedded within the aerosol-forming substrate. An embedded heating element is an internal heating element. As used herein, the term "internal heating element" refers to a heating element configured to be inserted into or disposed within an aerosol-forming substrate or flavour substrate.

[0056] An aerosol-generating article comprising a heating element embedded within the aerosol-forming substrate may be advantageous in that an enhanced distribution of heat from the heating element to the aerosol-forming substrate, when the aerosol-generating article is in used, may be achieved.

[0057] The heating element may be a susceptor.

[0058] As used herein, the term "susceptor" refers to an element comprising a material that is capable of converting magnetic energy into heat. When a susceptor is located in a varying magnetic field, such as the varying magnetic field generated by an inductor coil, the susceptor is heated.

[0059] Heating of the susceptor may be the result of hysteresis losses and/or eddy currents induced in the susceptor, depending on the electrical and magnetic properties of the susceptor material. Hysteresis losses occur in ferromagnetic or ferrimagnetic susceptor materials due to magnetic domains within the material being switched under the influence of a varying electromagnetic field. Eddy currents may be induced if the susceptor material is electrically conductive. In case of an electrically conductive ferromagnetic or ferrimagnetic susceptor material, heat can be generated due to both eddy currents and hysteresis losses. Accordingly, the susceptor may be heatable due to at least one of hysteresis losses or eddy currents, depending on the electrical and magnetic properties of the susceptor material.

[0060] The heating element may be completely surrounded by the aerosol-forming substrate and extend along the entire length of the aerosol-forming substrate. This may provide an optimised distribution of heat within the aerosol-forming substrate when the heating element is heated.

[0061] The susceptor may have a thickness from about 35 micrometres to about 85 micrometres. The susceptor may have a thickness from about 45 micrometres to about 75 micrometres. The susceptor may have a thickness from about 55 micrometres to about 65 micro-

metres.

[0062] It has been found that, in an aerosol-generating article in which a susceptor having a thickness as described above is provided, the generation and distribution of heat throughout the aerosol-forming substrate may be achieved in an especially effective and efficient way. Without wishing to be bound by theory, it is believed that this may be because such susceptor is adapted to provide optimal heat generation and heat transfer, by virtue of susceptor surface area and inductive power. By contrast, a thinner susceptor may be too easy to deform and may not maintain the desired shape and orientation within the aerosol-forming substrate during manufacture of the aerosol-generating article, which may result in a less homogenous and less finely tuned heat distribution during use. At the same time, a thicker susceptor may be more difficult to cut to length with precision and consistency, and this may also impact how precisely the susceptor can be provided in longitudinal alignment within the aerosol-forming substrate, thus also potentially impacting the homogeneity of heat distribution within the aerosol-forming substrate. These advantageous effects are felt especially when the susceptor extends all the way to the downstream end of the aerosol-forming substrate. This is thought to be because the resistance-to-draw (RTD) downstream of the susceptor can thus basically be minimised, as there is no aerosol-forming substrate within the aerosol-forming substrate at a location downstream of the susceptor that can contribute to the RTD.

[0063] The susceptor may be an elongate susceptor arranged substantially longitudinally within the aerosol-forming substrate.

[0064] When used for describing the susceptor, the term "elongate" denotes that the susceptor has a length dimension that is greater than its width dimension or its thickness dimension, for example greater than twice its width dimension or its thickness dimension.

[0065] The susceptor may be arranged substantially longitudinally within the aerosol-forming substrate. This means that the length dimension of the elongate susceptor is arranged to be approximately parallel to the longitudinal direction of the aerosol-forming substrate, for example within plus or minus 10 degrees of parallel to the longitudinal direction of the aerosol-forming substrate. The elongate susceptor may be positioned in a radially central position within the aerosol-forming substrate and extend along the longitudinal axis of the aerosol-forming substrate.

[0066] The susceptor may substantially have the same length as the aerosol-forming substrate.

[0067] The susceptor may be in the form of a pin, rod, strip or blade.

[0068] The susceptor may have a length from about 5 millimetres to about 15 millimetres, for example from about 6 millimetres to about 12 millimetres, more preferably from about 8 millimetres to about 10 millimetres.

[0069] The susceptor may have a width of at least about 1 millimetres, more preferably at least about 2

millimetres. Typically, the susceptor may have a width of up to 8 millimetres, preferably of less than or equal to about 6 millimetres.

[0070] When the susceptor has a constant cross-section, for example a circular cross-section, it may have a width or diameter from about 1 millimetre to about 5 millimetres.

[0071] When the susceptor has the form of a strip or blade, the strip or blade may have a rectangular cross-section having a width of preferably from about 2 millimetres to about 8 millimetres, more preferably from about 3 millimetres to about 6 millimetres. A susceptor in the form of a strip of blade may have a width of about 4 millimetres.

[0072] The elongate susceptor may have a thickness from about 57 micrometres to about 63 micrometres. Even more preferably, the elongate susceptor may have a thickness from about 58 micrometres to about 62 micrometres. Most preferably, the elongate susceptor has a thickness of about 60 micrometres.

[0073] The diameter of the aerosol-generating article may be between about 3 mm and about 8 mm.

[0074] The aerosol-forming substrate may comprise one or more of: tobacco, nicotine, a gel composition and a flavour agent.

[0075] Advantageously, a gel composition may be solid at room temperature. "Solid" in this context means that the gel has a stable size and shape and does not flow. Room temperature in this context means 25 degrees Celsius. A gel may be defined as a substantially dilute cross-linked system, which exhibits no flow when in the steady-state. By weight, gels may be mostly liquid, yet they behave like solids due to a three-dimensional cross-linked network within the liquid. It is the crosslinking within the fluid that gives a gel its structure (hardness). In this way gels may be a dispersion of molecules of a liquid within a solid in which liquid particles are dispersed in the solid medium.

[0076] The aerosol-generating may comprise a filter disposed downstream of the aerosol-forming substrate in the longitudinal direction.

[0077] The term "filter" is used to indicate a section of the aerosol-generating article that is configured to remove at least partially gas phase or particulate phase constituents or both gas phase and particulate phase constituents from the mainstream aerosol drawn through the filter.

[0078] The length of the aerosol-generating article may be between about 30 mm and about 100 mm.

[0079] The aerosol-generating article may comprise a support element disposed downstream of the aerosol-forming substrate.

[0080] The support element is often provided in the form of an annular shaped tube of filtration material, often referred to as a hollow acetate tube. Such hollow tubular support element is configured to resist downstream movement of the aerosol-forming substrate during handling of the aerosol-generating article, for example during

insertion of the heating element into the aerosol-forming substrate. The empty space within the hollow tubular support element may provide an opening for aerosol to flow from the aerosol-forming substrate towards a mouth end of the aerosol-generating article.

[0081] The support element may be disposed immediately downstream of the aerosol-forming substrate.

[0082] When the aerosol-generating article comprises a filter and a support element, the filter may be disposed downstream of the support element in the longitudinal direction.

[0083] The filter may be disposed immediately downstream of the support element in the longitudinal direction.

[0084] As the support element may be useful and sufficient to provide a customisation of the formed aerosol in accordance with a user's preference, the filter may be disposed immediately downstream of the support element, that is, without intermediate parts such as an aerosol-cooling element. Hence, the aerosol-generating article may achieve a reduction of gas and particulate phase constituents while needing less production steps and allowing a more consistent experience.

[0085] However, the aerosol-generating article may comprise an aerosol-cooling element downstream of the support element. Preferably, the aerosol-cooling element may be disposed between the support element and the filter.

[0086] As used herein, "aerosol-cooling element" refers to a component of an aerosol-generating article located downstream of the aerosol-forming substrate such that, in use, an aerosol formed by volatile compounds released from the aerosol-forming substrate passes through and is cooled by the aerosol-cooling element before being inhaled by the consumer. Preferably, the aerosol-cooling element is positioned between the aerosol-forming substrate and a mouthpiece. An aerosol cooling element has a large surface area, but causes a low pressure drop. Filters and other mouthpieces that produce a high pressure drop, for example filters formed from bundles of fibres, are not considered to be aerosol-cooling elements. Chambers and cavities within an aerosol-generating article are not considered to be aerosol cooling elements.

[0087] The support element may comprise a first hollow tubular segment. The aerosol-cooling element may comprise a second hollow tubular segment.

[0088] The aerosol-generating article may comprise a mouthpiece disposed on the downstream end of the aerosol-generating article. The provision of a mouthpiece may be desirable to facilitate the inhalation of aerosol by a user.

[0089] The aerosol-generating article may comprise an upstream element disposed on the upstream end of the aerosol-generating article. This may ensure that the consumer cannot accidentally contact the heated susceptor after use, when the aerosol-generating article comprises a susceptor. When the aerosol-generating

article comprises a susceptor, the provision of an upstream element may advantageously prevent the susceptor from being dislodged.

[0090] The aerosol-forming substrate may have any suitable transverse cross-section. For example, the substrate may have a circular, oval, stadium shaped, rectangular or triangular transverse cross-sectional shape. Preferably, the substrate has a circular transverse cross-sectional shape.

[0091] The solid aerosol-forming substrate may comprise a plug of tobacco. The plug of tobacco may comprise, for example, one or more of: powder, granules, pellets, shreds, strands, strips or sheets containing one or more of: herb leaf, tobacco leaf, tobacco ribs, expanded tobacco and homogenised tobacco. As used herein, the term 'homogenised tobacco material' denotes a material formed by agglomerating particulate tobacco. Providing homogenised tobacco material may improve aerosol generation, the nicotine content and the flavour profile of the aerosol generated during heating of the aerosol-generating article. Specifically, the process of making homogenised tobacco involves grinding tobacco leaf, which more effectively enables the release of nicotine and flavours upon heating. Where the tobacco plug comprises homogenised tobacco material, the homogenised tobacco material may be in the form of a sheet. As used herein, the term 'sheet' denotes a laminar element having a width and length substantially greater than the thickness thereof.

[0092] The solid aerosol-forming substrate may comprise homogenised tobacco material. The solid aerosol-forming material may comprise shreds, strands or strips of homogenised tobacco material. The solid aerosol-forming substrate may comprise a sheet of homogenised tobacco material.

[0093] The aerosol-forming substrate may have a substantially homogenous composition. The aerosol-forming substrate may have a substantially homogeneous composition in at least the longitudinal direction.

[0094] A sheet of homogenised tobacco material may be formed by agglomerating particulate tobacco obtained by grinding or otherwise comminuting one or both of tobacco leaf lamina and tobacco leaf stems. A sheet of homogenised tobacco material may comprise one or more of tobacco dust, tobacco fines and other particulate tobacco by-products formed during, for example, the treating, handling and shipping of tobacco. A sheet of homogenised tobacco material is preferably formed by a casting process of the type generally comprising casting a slurry comprising particulate tobacco and one or more binders onto a conveyor belt or other support surface, drying the cast slurry to form a sheet of homogenised tobacco material and removing the sheet of homogenised tobacco material from the support surface.

[0095] The solid aerosol-forming substrate may comprise a gathered sheet of homogenised tobacco material. As used herein, the term 'gathered' is used to describe a sheet that is convoluted, folded, or otherwise com-

pressed or constricted substantially transversely to a longitudinal axis of the aerosol-generating article.

[0096] The aerosol-forming substrate comprises a gathered textured sheet of homogenised tobacco material. As used herein, the term 'textured sheet' denotes a sheet that has been crimped, embossed, debossed, perforated or otherwise deformed. Use of a textured sheet of homogenised tobacco material may advantageously facilitate gathering of the sheet of homogenised tobacco material to form the aerosol-forming substrate. The aerosol-forming substrate may comprise a gathered textured sheet of homogenised tobacco material comprising a plurality of spaced-apart indentations, protrusions, perforations or a combination thereof.

[0097] Preferably, the aerosol-forming substrate comprises a gathered crimped sheet of homogenised tobacco material. As used herein, the term 'crimped sheet' denotes a sheet having a plurality of substantially parallel ridges or corrugations. Preferably, the substantially parallel ridges or corrugations extend along or parallel to a longitudinal axis of the aerosol-generating article. This advantageously facilitates gathering of the crimped sheet of homogenised tobacco material to form the aerosol-generating article. However, it will be appreciated that crimped sheets of homogenised tobacco material for inclusion in the aerosol-generating article may have a plurality of substantially parallel ridges or corrugations that are disposed at an acute or obtuse angle to the longitudinal axis of the aerosol-generating article.

[0098] The aerosol-forming substrate may comprise tobacco-containing material and non-tobacco containing material.

[0099] The aerosol-forming substrate may comprise an aerosol former. The aerosol-forming substrate may comprise a single aerosol former or a combination of two or more aerosol formers. As used herein, the term "aerosol former" is used to describe any suitable known compound or mixture of compounds that, in use, facilitates formation of an aerosol and that is substantially resistant to thermal degradation at the operating temperature of the aerosol-generating article. Suitable aerosol-formers include, but are not limited to: polyhydric alcohols, such as propylene glycol, triethylene glycol, 1,3-butanediol and glycerine; esters of polyhydric alcohols, such as glycerol mono-, di- or triacetate; and aliphatic esters of mono-, di- or polycarboxylic acids, such as dimethyl dodecanedioate and dimethyl tetradecanedioate. Preferred aerosol formers are polyhydric alcohols or mixtures thereof, such as propylene glycol, triethylene glycol, 1,3-butanediol and, most preferred, glycerine. The aerosol-forming substrate may have an aerosol former content of greater than 5 percent on a dry weight basis. The aerosol-forming substrate may have an aerosol former content of between about 5 percent and about 30 percent on a dry weight basis. The aerosol-forming substrate may have an aerosol former content of about 20 percent on a dry weight basis.

[0100] The aerosol-forming substrate may comprise

homogenised tobacco material, an aerosol-former and water.

[0101] The homogenised tobacco material may be provided in sheets which are one of folded, crimped or cut into strips. The sheets may be cut into strips having a width of between about 0.2 millimetres and about 2 millimetres, more preferably between about 0.4 millimetres and about 1.2 millimetres. The width of the strips may be about 0.9 millimetres.

[0102] The aerosol-forming substrate may comprise an inner cavity. In other words, the aerosol-forming substrate may be a tubular substrate. The aerosol-forming substrate may comprise a substrate inner surface having a substrate inner diameter, the substrate inner surface delimiting an inner cavity extending in the longitudinal direction within the aerosol-forming substrate. Providing an inner cavity into the aerosol-forming substrate may enable a heating element to be inserted into the aerosol-forming substrate, in the cavity, without piercing the substrate and altering the structure of the substrate. The provision of an inner cavity may also be beneficial to further reduce the thickness of the aerosol-forming substrate, enhancing the heat transfer advantages explained above.

[0103] When the aerosol-forming substrate comprises a substrate inner surface delimiting an inner cavity, the substrate inner surface may have the same transverse cross-sectional shape as the substrate outer surface. In particular, the substrate inner surface may have a substantially circular, oval or stadium shaped transverse cross-section.

[0104] The aerosol-generating article may comprise a layer of thermally conductive material. The layer of thermally conductive material may cover at least part of at least an otherwise exposed aerosol-forming substrate. The layer of thermally conductive material may be disposed on at least the substrate outer surface. The layer of thermally conductive material may be disposed on at least the substrate inner surface. The layer of thermally conductive material may be disposed on at least the substrate inner surface and on the substrate outer surface. Providing a layer of thermally conductive material on an otherwise exposed substrate surface may enable heat from a heating element to be received by or engaged with the substrate to be distributed over a broader area of the aerosol-forming substrate, improving heat transfer efficiency between a heating element and the aerosol-forming substrate. The layer of thermally conductive material may also create a physical separation between a heating element received in the inner cavity and the aerosol-forming substrate, which may reduce the risk of overheating the aerosol-forming substrate in regions of the substrate close to the heating element. The layer of thermally conductive material may also increase the robustness of the tubular aerosol-forming substrate, which may have been reduced by the reduction in the thickness of the substrate by the provision of the inner cavity.

[0105] As used herein, "thermally conductive" refers to a material having a thermal conductivity of at least 10 W/m.k, preferably at least 40 W/m.k, more preferably at least 100 W/m.k at 23 degrees Celsius and a relative humidity of 50%. Preferably, the layer of thermally conductive material may comprise material having a thermal conductivity of at least 40 W/m.k, preferably at least 100 W/m.k, more preferably at least 150 W/m.k, and even more preferably at least 200 W/m.k at 23 degrees Celsius and a relative humidity of 50%.

[0106] Examples of suitable conductive materials include, but are not limited to, aluminium, copper, zinc, nickel, silver, and combinations thereof.

[0107] The aerosol-forming substrate may have a rod comprising a plurality of elongate tube-like elements. The elongate tube-like elements may contain tobacco material. The plurality of elongate tube-like elements comprised in the aerosol-forming substrate must not be mistaken for the tubular element disposed downstream of the aerosol-forming substrate.

[0108] By adjusting the number, equivalent diameter and thickness of the elongate tube-like elements in the rod, it may be advantageously possible to adjust the density and porosity of the rod. In general, aerosol-forming substrates comprising a plurality of elongate tube-like elements of homogenised tobacco may advantageously exhibit more uniform densities than aerosol-forming substrates comprising shreds of tobacco material. The geometry of the elongate tube-like elements may be such that particularly stable channels are provided for airflow along the rod. This may advantageously allow a consistent fine tuning of RTD, such that aerosol-forming substrates having a predetermined RTD may be manufactured consistently and with great precision.

[0109] The weight of an aerosol-forming substrate comprising elongate tube-like elements of homogenised tobacco may be determined by the number, size, density and spacing of the tube-like elements. This may reduce inconsistencies in weight between aerosol-forming substrates of the same dimensions, and so result in lower rejection rate of aerosol-forming substrates whose weight falls outside of a selected acceptance range compared to aerosol-forming substrate comprising shreds of tobacco material.

[0110] Variations in the thickness of the elongate tube-like elements in the rod may also be advantageously used to adjust the content of homogenised tobacco in the rod. For example, in an elongate tube-like element formed from a rolled strip of homogenised tobacco web an adjustment of the thickness of the elongate tube-like element may be achieved by varying the number of convolutions of the strip about the longitudinal axis or by varying the thickness of the homogenised tobacco web itself. This may impart an increased design flexibility compared with aerosol-generating articles comprising shreds of tobacco material.

[0111] The size, geometry and arrangement of the elongate tube-like elements in the rod may be readily

adapted to facilitate the insertion of a heating element in the rods of aerosol-generating articles. Because the elongate tube-like elements lie substantially straight within the rod and extend longitudinally, insertion of a longitudinally extending internal heating element, such as a heater blade, may be facilitated. The regular arrangement of the elongate tube-like elements in the rod can also advantageously favour optimisation of heat transfer from the heating element through the rod.

[0112] The insertion (and removal) of a heater of an aerosol-generating device into (from) an aerosol-forming substrate comprising shreds of tobacco material may tend to dislodge shreds of tobacco material from the aerosol-forming substrate. This can result in the need for more frequent cleaning of the heater element and other parts of the aerosol-generating device in order to remove the dislodged shreds. In contrast, insertion and removal of a heater of an aerosol-generating device into and from an aerosol-forming substrate comprising a plurality of elongate tube-like elements of homogenised tobacco material may advantageously have a significantly reduced tendency to dislodge material.

[0113] Rods comprising a plurality of elongate tube-like elements may be made in a continuous process which can be efficiently carried out at high speed and can be conveniently incorporated into existing production lines for the manufacture of aerosol-generating articles.

[0114] The rod of aerosol-forming substrate may preferably have an external diameter that is approximately equal to the external diameter of the aerosol-generating article.

[0115] The rod of aerosol-forming substrate may have an external diameter of at least 5 millimetres. The rod of aerosol-forming substrate may have an external diameter of between about 5 millimetres and about 12 millimetres, for example of between about 5 millimetres and about 10 millimetres or of between about 6 millimetres and about 8 millimetres. Preferably, the rod of aerosol-forming substrate may have an external diameter of 7.2 millimetres, to within 10 percent.

[0116] The rod of aerosol-forming substrate may have a length of between about 5 millimetres and about 100 mm. Preferably, the rod of aerosol generating substrate may have a length of at least about 5 millimetres, more preferably at least about 7 millimetres. The rod of aerosol generating substrate preferably may have a length of less than about 80 millimetres, more preferably less than about 65 millimetres, even more preferably less than about 50 millimetres. Preferably, the rod of aerosol generating substrate may have a length of less than about 35 millimetres, more preferably less than 25 millimetres, even more preferably less than about 20 millimetres. The rod of aerosol-forming substrate may have a length of about 10 millimetres; the rod of aerosol-forming substrate may have a length of about 12 millimetres.

[0117] The rod of aerosol-forming substrate may have a substantially uniform cross-section along the length of the rod. The rod of aerosol-forming substrate may pre-

ferably have a substantially circular cross-section.

[0118] The rod comprising elongate tube-like elements may be circumscribed by a wrapper. The elongate tube-like elements may be assembled such that the elongate tube-like elements extend in the longitudinal direction.

[0119] The plurality of elongate tube-like elements of the rod of aerosol-generating articles according to the invention may be formed of a homogenous tobacco material, which may comprise particulate tobacco obtained by grinding. The plurality of elongate tube-like elements may all have substantially the same composition as each other. Likewise, the plurality of elongate tube-like elements may include tube-like elements of at least two different compositions.

[0120] At least one elongate tube-like element in the rod may comprise a rolled strip cut from a sheet or web of homogenised tobacco material.

[0121] The sheets or webs of homogenised tobacco material may have a tobacco content of at least about 40 percent by weight on a dry weight basis, more preferably of at least about 60 percent by weight on a dry weight basis, more preferably or at least about 70 percent by weight on a dry basis and most preferably at least about 90 percent by weight on a dry weight basis.

[0122] The sheets or webs of homogenised tobacco material for use in the aerosol-forming substrate may comprise one or more intrinsic binders, that is, tobacco endogenous binders, one or more extrinsic binders, that is, tobacco exogenous binders, or a combination thereof to help agglomerate the particulate tobacco. Sheets of homogenised tobacco material for use in the aerosol-forming substrate may comprise other additives including, but not limited to, tobacco and non-tobacco fibres, aerosol formers, humectants, plasticisers, flavourants, fillers, aqueous and non-aqueous solvents and combinations thereof.

[0123] Suitable extrinsic binders for inclusion in sheets or webs of homogenised tobacco material for use in the aerosol-forming substrate are known in the art and include, but are not limited to: gums such as, for example, guar gum, xanthan gum, arabic gum and locust bean gum; cellulosic binders such as, for example, hydroxypropyl cellulose, carboxymethyl cellulose, hydroxyethyl cellulose, methyl cellulose and ethyl cellulose; polysaccharides such as, for example, starches, organic acids, such as alginic acid, conjugate base salts of organic acids, such as sodium-alginate, agar and pectins; and combinations thereof.

[0124] Suitable non-tobacco fibres for inclusion in sheets or webs of homogenised tobacco material for use in the aerosol-forming substrate are known in the art and include, but are not limited to: cellulose fibers; soft-wood fibres; hard-wood fibres; jute fibres and combinations thereof. Prior to inclusion in sheets of homogenised tobacco material for use in the aerosol-forming substrate, non-tobacco fibres may be treated by suitable processes known in the art including, but not limited to: mechanical pulping; refining; chemical pulping; bleach-

ing; sulfate pulping; and combinations thereof.

[0125] The sheets or webs of homogenised tobacco material may comprise the aerosol former.

[0126] The sheets or webs of homogenised tobacco for use in the aerosol-generating article of the present invention may be made by methods known in the art, for example the methods disclosed in international patent application WO-A-2012/164009 A2. The sheets of homogenised tobacco material for use in the aerosol-generating article may be formed from a slurry comprising particulate tobacco, guar gum, cellulose fibres and glycerine by a casting process.

[0127] Likewise, elongate tube-like elements of homogenised tobacco material for use in an aerosol-forming substrate in accordance with the invention may be formed by extrusion. By way of example, a slurry comprising particulate tobacco obtained by grinding or otherwise comminuting tobacco leaf lamina may be pushed through a die of the desired cross-section. Moreover, additive manufacturing may also be used for manufacturing tube-like elements of homogenised tobacco material.

[0128] The elongate tube-like element may have an equivalent diameter from about 0.03 millimetres to about 3 millimetres. Preferably, the elongate tube-like element may have an equivalent diameter of at least about 0.1 millimetres. More preferably, the elongate tube-like element may have an equivalent diameter of at least about 0.3 millimetres.

[0129] Likewise, the elongate tube-like element preferably may have an equivalent diameter of less than about 2 millimetres. More preferably, the elongate tube-like element may have an equivalent diameter of less than about 1 millimetre.

[0130] The elongate tube-like element may have an equivalent diameter from about 0.7 millimetres to about 2.7 millimetres; the elongate tube-like element may have an equivalent diameter from about 0.3 millimetres to about 1.1 millimetres.

[0131] Where the elongate tube-like element is formed by rolling a strip of homogenised tobacco material, the strip may have a width of at least about 1 millimetre. Preferably, the strip of homogenised tobacco material may have a width of at least about 2 millimetres. More preferably, the strip of homogenised material may have a width of at least about 3 millimetres.

[0132] The strip of homogenised tobacco material may have a width from about 1 millimetre to about 3.5 millimetres; the strip of homogenised tobacco material may have a width from about 2.4 millimetres to about 8.2 millimetres.

[0133] The strip of homogenised tobacco material may cut from a sheet or web having a thickness of at least about 40 microns, more preferably at least about 60 microns, more preferably at least about 80 microns and most preferably at least about 100 microns. Likewise, the strip of homogenised tobacco material may be cut from a sheet or web having a thickness of no more than about 5000 microns, more preferably no more than

about 2000 microns, more preferably no more than about 1000 microns and most preferably no more than about 500 microns. For example, the thickness of the sheet or web may be between about 40 microns and about 5000 microns, more preferably between about 60 microns and about 2000 microns, more preferably between about 80 microns and about 1000 microns and most preferably by between about 100 microns and about 500 microns.

[0134] A thickness of the elongate tube-like element may be at least about 40 microns, more preferably at least about 80 microns, more preferably at least about 120 microns and most preferably at least about 160 microns. Likewise, a thickness of the elongate tube-like element may be less than about 5000 microns, more preferably less than about 2500 microns and most preferably less than about 1000 microns.

[0135] The elongate tube-like elements may be formed of a porous tobacco material, such that air flows through the wall of the tube-like element; that is, airflow along a substantially radial direction in the rod is not impeded. Where the elongate tube-like element is formed by rolling a strip of homogenised tobacco material the strip itself may be formed of a porous tobacco material.

[0136] As used herein with reference to a homogenised tobacco material, the term "porous" may indicate that the tobacco material has been produced within an inherent porosity so that sufficient pores or interstices are provided within the structure of a sheet or web such as to enable the flow of air through the sheet or web in a direction transverse to a surface of the sheet or web. Likewise, the term "porous" may indicate that each sheet or web of tobacco material comprises a plurality of air flow holes to provide the desired porosity. For example, a sheet of tobacco material may be punctured with a pattern of air flow holes prior to undergoing the rolling operation that produces the elongate tube-like elements of the rod of aerosol-forming substrate. The air flow holes may be punctured randomly or uniformly over the sheet. The pattern of air flow holes may cover substantially the full surface of the sheet, or may cover one or more specific areas of the sheet, with the remaining areas being free from air flow holes.

[0137] The strip of homogenised tobacco material from which the elongate tube-like element may be formed may be textured. For example, the sheet or web from which the strip is cut may comprise a plurality of spaced-apart indentations, protrusions, perforations or a combination thereof. Texture may be provided on one side of each sheet, or on both sides of each sheet.

[0138] The inclusion of one or more elongate tube-like elements formed from a crimped strip may help to provide and retain some spacing between adjacent tube-like elements within the rod.

[0139] An additive may be applied to at least a part of a surface of at least one of the plurality of tube-like elements. The additive may be a solid additive, a liquid additive, or a combination of a solid additive and a liquid additive. Suitable solid and liquid additives for use in the

invention are known in the art and include, but are not limited to: flavourants, such as for example menthol; adsorbents, such as for example activated carbon; fillers, such as for example calcium carbonate; and botanical additives.

[0140] To form a substantially elongate tube-like element, the strip of homogenised tobacco material may be wound about the longitudinal axis by at least about 345 degrees. Preferably, the strip of homogenised tobacco material may be wound about the longitudinal axis by at least about 360 degrees. More preferably, the strip of homogenised tobacco material may be wound about the longitudinal axis by at least about 540 degrees. Likewise, the strip of homogenised tobacco material may preferably be wound about the longitudinal axis by less than about 1800 degrees. More preferably, the strip of homogenised tobacco material may be wound about the longitudinal axis by less than about 900 degrees. Preferably, the strip of homogenised tobacco material may be wound about the longitudinal axis by from about 345 to about 540 degrees.

[0141] Each elongate tube-like element may have a length substantially equal to the length of the rod of aerosol-forming substrate. Each elongate tube-like element may have a length of about 10 millimetres; each elongate tube-like element may a length of about 12 millimetres.

[0142] The rod of aerosol-forming substrate may comprise less than about 200 elongate tube-like elements of homogenised tobacco material. More preferably, the rod of aerosol-forming substrate may comprise less than about 150 elongate tube-like elements. Even more preferably, the rod of aerosol-forming substrate may comprise less than about 100 elongate tube-like elements.

[0143] Likewise, the rod of aerosol-forming substrate may comprise at least about 15 elongate tube-like elements of homogenised tobacco material. More preferably, the rod of aerosol-forming substrate may comprise at least about 30 elongate tube-like elements. Even more preferably, the rod of aerosol-forming substrate may comprise at least about 40 elongate tube-like elements. The rod of aerosol-forming substrate may comprise from about 15 to about 100 strands of non-tobacco material.

[0144] In the rod of the aerosol-forming substrate the elongate tube-like elements may be aligned substantially parallel to one another.

[0145] The elongate tube-like elements of homogenised tobacco material may have substantially oval cross-section; they may have a substantially elliptical transverse cross-section; they may a substantially circular transverse cross-section. As described above, elongate tube-like elements for use in aerosol-generating articles may effectively be formed by winding a strip of homogenised tobacco material about its longitudinal axis by slightly less than 360 degrees. This results in an element having effectively a C-shaped cross-section, wherein a slit extends longitudinally over the entire length of the elongate tube-like element.

[0146] An aerosol-generating system may be provided. The aerosol-generating system may comprise any of the aerosol-generating articles disclosed above and an aerosol-generating device. The aerosol-generating device may comprise a heating element, or part of a heating element, for heating the aerosol-generating article.

[0147] As used herein, the term "aerosol-generating system" refers to the combination of an aerosol-generating device and an aerosol-generating article.

[0148] Since the aerosol-generating system of this disclosure comprises an aerosol-generating article according to the previous disclosures, the advantages specified above for the aerosol-generating articles also apply to the system itself.

[0149] The heating element may be any suitable type of heating element. The heating element may be an internal heating element. The heating element may be an elongate heating element. The elongate heating element may be blade-shaped. The elongate heating element may be pin-shaped. The elongate heating element may have a tapered shape, or at least a tapered end. The elongate heating element may have a pointed end. The heating element may be cone-shaped. The elongate heating element may be have any suitable shape arranged to facilitate insertion of the heating element into the aerosol-forming substrate. Advantageously, an elongate heating element may provide easier engagement or easier disengagement or both easier engagement and easier disengagement of the aerosol-generating article with the heating element of the device.

[0150] The heating element may be an external heating element. As used herein, the term "external heating element" refers to a heating element configured to heat an outer surface of an aerosol-forming substrate. The external heating element may at least partially circumscribe a cavity for receiving the aerosol-forming substrate.

[0151] The heating element may comprise at least one resistive heating element.

[0152] The at least one resistive heating element may comprise an electrically insulating substrate and one or more electrically conductive tracks on the electrically insulating substrate.

[0153] The electrically insulating substrate may be stable at an operating temperature of the at least one heating element. The electrically insulating substrate may be stable at temperatures of up to about 400 degrees Celsius, more preferably about 500 degrees Celsius, more preferably about 600 degrees Celsius, more preferably about 700 degrees Celsius, most preferably about 800 degrees Celsius.

[0154] The operating temperature of the at least one resistive heating element during use may be at least about 200 degrees Celsius. The operating temperature of the at least one resistive heating element during use may be less than about 700 degrees Celsius. The operating temperature of the at least one resistive heating

element during use may be less than about 600 degrees Celsius. The operating temperature of the at least one resistive heating element during use may be less than about 500 degrees Celsius. The operating temperature of the at least one resistive heating element during use may be less than about 400 degrees Celsius.

[0155] The electrically insulating substrate may comprise any suitable material. For example, the electrically insulating substrate may comprise one or more of: paper, glass, ceramic, anodized metal, coated metal, and Polyimide. The ceramic may comprise mica, Alumina (Al_2O_3) or Zirconia (ZrO_2). The electrically insulating substrate may have a thermal conductivity of less than or equal to about 40 Watts per metre Kelvin, preferably less than or equal to about 20 Watts per metre Kelvin and ideally less than or equal to about 2 Watts per metre Kelvin.

[0156] Suitable materials for forming the resistive heating element, and in particular the one or more electrically conductive tracks, may include but are not limited to: semiconductors such as doped ceramics, electrically "conductive" ceramics (such as, for example, molybdenum disilicide), carbon, graphite, metals, metal alloys and composite materials made of a ceramic material and a metallic material. Such composite materials may comprise doped or undoped ceramics. Examples of suitable doped ceramics include doped silicon carbides. Examples of suitable metals include titanium, zirconium, tantalum and metals from the platinum group. Examples of suitable metal alloys include stainless steel, nickel-, cobalt-, chromium-, aluminium-, titanium-, zirconium-, hafnium-, niobium-, molybdenum-, tantalum-, tungsten-, tin-, gallium-, manganese- and iron-containing alloys, and super-alloys based on nickel, iron, cobalt, stainless steel, Timetal[®] and iron-manganese-aluminium based alloys.

[0157] The resistive heating element may comprise one or more stamped portions of electrically resistive material, such as stainless steel. The at least one resistive heating element may comprise a heating wire or filament, for example a Ni-Cr (Nickel-Chromium), platinum, tungsten or alloy wire.

[0158] The heating element may comprise at least one inductive heating arrangement.

[0159] The at least one inductive heating arrangement may comprise at least one inductor coil. The inductor coil is arranged to generate a varying magnetic field on receiving a varying current from a power supply. Such varying current may be between about 5 kilohertz and about 500 kilohertz. The varying current may be a high frequency varying current. As used herein, the term "high frequency varying current" means a varying current having a frequency of between about 500 kilohertz and about 30 megahertz. The high frequency varying current may have a frequency of between about 1 megahertz and about 30 megahertz, such as between about 1 megahertz and about 10 megahertz, or such as between about 5 megahertz and about 8 megahertz. The varying current may be an alternating current which generates an alter-

nating magnetic field.

[0160] The inductor coil may have any suitable form. For example, the inductor coil may be a flat inductor coil. The flat inductor coil may be wound in a spiral, substantially in a plane. Preferably, the inductor coil may be a tubular inductor coil. Typically, the tubular inductor coil may be helically wound about a longitudinal axis. The inductor coil may be elongate. Particularly preferably, the inductor coil may be an elongate tubular inductor coil. The inductor coil may have any suitable transverse cross-section. The inductor coil may have a circular, elliptical, square, rectangular, triangular or other polygonal transverse cross-section.

[0161] The inductor coil may be formed from any suitable material. The inductor coil may be formed from an electrically conductive material. Preferably, the inductor coil may be formed from a metal or a metal alloy.

[0162] As used herein, "electrically conductive" refers to materials having an electrical resistivity of less than or equal to 1×10^{-4} ohm metres ($\Omega \cdot m$), at twenty degrees Celsius.

[0163] The at least one inductive heating arrangement may comprise at least one susceptor. As discussed above, the susceptor may also be comprised in the aerosol-generating article.

[0164] The susceptor is arranged such that, when the aerosol-generating article is received in the aerosol-generating device, the oscillating electromagnetic field generated by the inductor coil may induce a current in the susceptor, causing the susceptor to heat up. The aerosol-generating device may preferably be capable of generating a fluctuating electromagnetic field having a magnetic field strength (H-field strength) of between 1 and 5 kilo amperes per metre (kA/m), preferably between 2 and 3 kA/m, for example about 2.5 kA/m. The aerosol-generating device may preferably be capable of generating a fluctuating electromagnetic field having a frequency of between 1 and 30 MHz, for example between 1 and 10 MHz, for example between 5 and 7 MHz.

[0165] The susceptor may comprise any suitable material. The susceptor may be formed from any material that can be inductively heated to a temperature sufficient to release volatile compounds from the aerosol-forming substrate or the flavour substrate. Preferred susceptors may be heated to a temperature in excess of about 250 degrees Celsius. Preferred susceptors may be formed from an electrically conductive material. Suitable materials for the susceptor include graphite, molybdenum, silicon carbide, stainless steels, niobium, aluminium, nickel, nickel containing compounds, titanium, and composites of metallic materials. Preferred susceptors may comprise a metal or carbon. Some preferred susceptors may comprise a ferromagnetic material, for example, ferritic iron, a ferromagnetic alloy, such as ferromagnetic steel or stainless steel, ferromagnetic particles, and ferrite. Some preferred susceptors may consist of a ferromagnetic material. The suitable susceptor may comprise aluminium. The suitable susceptor may consist of alumi-

nium. The susceptor may comprise at least about 5 percent, at least about 20 percent, at least about 50 percent or at least about 90 percent of ferromagnetic or paramagnetic materials.

[0166] The susceptor may be formed from a material that is substantially impermeable to gases. In other words, preferably, the susceptor may be formed from a material that is not gas permeable.

[0167] The susceptor may have any suitable form. For example, the susceptor may be elongate. The susceptor may have any suitable transverse cross-section. For example, the susceptor may have a circular, elliptical, square, rectangular, triangular or other polygonal transverse cross-section. The susceptor may be tubular.

[0168] The susceptor may comprise a susceptor layer provided on a support body. Arranging the susceptor in a varying magnetic field may induce eddy currents in close proximity to the susceptor surface, in an effect that is referred to as the skin effect. Accordingly, it is possible to form the susceptor from a relatively thin layer of susceptor material, while ensuring the susceptor is effectively heated in the presence of a varying magnetic field. Making the susceptor from a support body and a relatively thin susceptor layer may facilitate manufacture of an aerosol-generating article that is simple, inexpensive and robust.

[0169] The support body may be formed from a material that is not susceptible to inductive heating. Advantageously, this may reduce heating of surfaces of the susceptor that are not in contact with an aerosol-forming substrate, where surfaces of the support body form surfaces of the susceptor that are not in contact with an aerosol-forming substrate.

[0170] The support body may comprise an electrically insulative material. As used herein, "electrically insulating" refers to materials having an electrical resistivity of at least 1×10^4 ohm metres (Ωm), at twenty degrees Celsius.

[0171] Forming the support body from a thermally insulative material may provide a thermally insulative barrier between the susceptor layer and other components of an inductive heating arrangement, such as an inductor coil circumscribing the inductive heating element. Advantageously, this may reduce heat transfer between the susceptor and other components of an inductive heating system.

[0172] The thermally insulative material may also have a bulk thermal diffusivity of less than or equal to about 0.01 square centimetres per second (cm^2/s) as measured using the laser flash method. Providing a support body having such a thermal diffusivity may result in a support body with a high thermal inertia, which may reduce heat transfer between the susceptor layer and the support body, and reduce variations in the temperature of the support body.

[0173] The susceptor may be provided with a protective outer layer, for example a protective ceramic layer or protective glass layer. A protective outer layer may improve the durability of the susceptor and facilitate clean-

ing of the susceptor. The protective outer layer may substantially surround the susceptor. The susceptor may comprise a protective coating formed from a glass, a ceramic, or an inert metal.

[0174] When the susceptor is comprised in the aerosol-generating device, the susceptor may be located in a device cavity. The susceptor may extend into the device cavity in the longitudinal direction of the device cavity. The susceptor may be elongate. The elongate susceptor may be blade-shaped. The elongate susceptor may be pin-shaped. The elongate susceptor may have a tapered shape, or at least a tapered end. The elongate susceptor may have a pointed end. The elongate element may be cone-shaped.

[0175] When the susceptor is comprised in the aerosol-generating device, the susceptor may be an internal heating element configured to be at least partially inserted into the aerosol-forming substrate of the aerosol-generating article when the aerosol-generating article is received in the device cavity. Where the aerosol-forming substrate comprises an inner cavity, the susceptor may be configured to be at least partially inserted into the inner cavity of the aerosol-forming substrate when the aerosol-generating article is received in the device cavity.

[0176] The aerosol-generating device may comprise a power supply. The power supply may be a DC voltage source. The power supply may be a battery. For example, the power supply may be a nickel-metal hydride battery, a nickel cadmium battery, or a lithium based battery, for example a lithium-cobalt, a lithium-iron-phosphate or a lithium-polymer battery. The power supply may be another form of charge storage device such as a capacitor. The power supply may require recharging and may have a capacity that allows for the storage of enough energy for use of the aerosol-generating device.

[0177] The power supply may be electrically connected to the heater for supplying power to the heating elements, such as the substrate heating element and the downstream heating element. When the heating element receives electrical power from the power supply, the heating element may generate heat. The power supply may be configured to supply sufficient power to the heating element to heat the aerosol-forming substrate to a temperature at which volatile compounds are released from the aerosol-forming substrate.

[0178] The aerosol-generating device may comprise a housing. The housing may at least partially define the cavity for receiving an aerosol-generating article.

[0179] The aerosol-generating device may comprise at least one device air inlet in fluid communication with the cavity. When the aerosol-generating device comprises a housing, the housing may at least partially define the at least one device air inlet. The device air inlet may be desirable to enable ambient air to be drawn into the upstream end of the aerosol-forming substrate.

[0180] The aerosol-generating device may comprise a controller. The controller may be configured to control the supply of power from the power supply to the heating

element. The controller may be any suitable controller. The controller may comprise any suitable electrical circuitry and electrical components. The controller may comprise a processor and a memory. The controller may comprise a microprocessor, which may be a programmable microprocessor.

[0181] The aerosol-generating device may comprise a sensor to detect airflow indicative of a user taking a puff. The air flow sensor may be an electro-mechanical device. The airflow sensor may be any of: a mechanical device, an optical device, an opto-mechanical device and a micro electro-mechanical systems (MEMS) based sensor. The aerosol-generating device may comprise a manually operable switch for a user to initiate a puff.

[0182] The aerosol-generating device may comprise an indicator for indicating when the at least one heating element is activated. The indicator may comprise a light, activated when the at least one heating element is activated.

[0183] The aerosol-generating device may comprise at least one electrical connector. The at least one electrical connector may be configured to charge the power supply. The at least one electrical connector may be configured to be connected to another electrical device.

The at least one electrical connector may comprise an external plug or socket comprising at least one external electrical contact allowing the aerosol-generating device to be connected to another electrical device. For example, the aerosol-generating device may comprise a USB plug or a USB socket to allow connection of the aerosol-generating device to another USB enabled device. For example, the USB plug or socket may allow connection of the aerosol-generating device to a USB charging device to charge a rechargeable power supply within the aerosol-generating device. The USB plug or socket may support the transfer of data to or from, or both to and from, the aerosol-generating device. Likewise, the aerosol-generating device may be connected to a computer to transfer data to the device, such as new heating profiles for new aerosol-generating articles.

[0184] When the aerosol-generating device comprises a USB plug or socket, the aerosol-generating device may further comprise a removable cover that covers the USB plug or socket when not in use. When the USB plug or socket is a USB plug, the USB plug may be selectively retractable within the device.

[0185] A method of manufacturing any of the aerosol-generating articles disclosed in this specification is provided, the method comprising the steps of:

providing an aerosol-forming substrate;
transferring an inner wrapper from a first bobbin to a gluing machine;
transferring an outer wrapper from a second bobbin to the gluing machine;
attaching an outer wrapper internal surface and an inner wrapper external surface by means of a first adhesive, such that the inner wrapper and the outer

wrapper form a dual-layer wrapping structure;
 disposing the dual-layer wrapping structure such
 that the inner wrapper circumscribes the aerosol-
 forming substrate and the outer wrapper circum-
 scribes the inner wrapper;
 defining an overlapping region in which the dual-
 layer wrapping structure overlaps itself, the overlap-
 ping region thus comprising a first section and a
 second section externally disposed on the first sec-
 tion, wherein the first section and the second section
 are attached to one another by means of a second
 adhesive.

[0186] This method allows for an efficient manufactur-
 ing of aerosol-generating articles that may be have at
 least some of the advantages detailed above in this
 specification.

[0187] The invention is defined in the claims.

[0188] The features and advantages of the invention
 will become more evident in the light of the following
 detailed description of preferred embodiments, given
 only by way of illustrative and non-limiting example, in
 reference to the attached figures:

Figure 1 depicts a longitudinal section of an aerosol-
 generating article comprising an embedded suscep-
 tor and a dual-layer wrapping structure.

Figure 2a illustrates a cross section of the aerosol-
 generating article of figure 1.

Figure 2b shows a cross section of an overlapping
 region defined by the dual-layer wrapping structure
 of the aerosol-generating article circled in figure 2a.
 Figure 3 shows a longitudinal section of an aerosol-
 generating article comprising a tubular element and
 a filter.

Figure 4 illustrates a longitudinal section of an aero-
 sol-generating article comprising an upstream ele-
 ment and an aerosol-cooling element.

Figure 5 depicts several examples of wrappers com-
 prising an embossed pattern.

Figure 6 shows a schematic representation of a
 method of manufacturing an aerosol-generating ar-
 ticle.

Figure 7 represents a longitudinal section of an
 aerosol-generating system comprising an aerosol-
 generating device and any of the aerosol-generating
 articles of figures 1 to 4.

Figure 8 depicts an external view of the aerosol-
 generating system of figure 7.

[0189] Figure 1 depicts a longitudinal section of an
 aerosol-generating article 10 having an upstream end
 13 and a downstream end 14, the aerosol-generating
 article 10 defining a longitudinal direction between the
 upstream end 13 and the downstream end 14. The article
 10 comprises an aerosol-forming substrate 11 and a
 dual-layer wrapping structure 30 circumscribing the aero-
 sol-forming substrate 11.

[0190] The dual-layer wrapping structure 30 com-
 prises an inner wrapper 31 and an outer wrapper 32.
 An outer wrapper internal surface and an inner wrapper
 external surface are attached to one another by means of
 a first adhesive 51.

[0191] In the embodiment of figure 1, a heating element
 40 is embedded within the aerosol-forming substrate 11.
 The heating element 40 is a susceptor 40. The susceptor
 40 extends along the entire length of the aerosol-forming
 substrate 11.

[0192] Figure 2a illustrates a cross-section of the aero-
 sol-generating article 10 of figure 1. This figure shows
 that the dual-layer wrapping structure 30 defines an
 overlapping region 41 in which the dual-layer wrapping
 structure 30 overlaps itself. The overlapping region 41
 comprises a first section 42 and a second section 43
 externally disposed on the first section 42. A second
 adhesive 52 is disposed between the first section 42
 and the second section 43.

[0193] The overlapping region of figure 2a is repre-
 sented in greater detail in figure 2b, for the sake of clarity.

[0194] Figure 3 shows an aerosol-generating article
 which, similarly to that of figures 1 and 2, comprises an
 aerosol-forming substrate 11 and a dual-layer wrapping
 structure 30. The aerosol-generating article 10 addition-
 ally comprises a support element 12 disposed immedi-
 ately downstream of the aerosol-forming substrate 11.
 The support element 12 defines an opening extending in
 the longitudinal direction and adapted for substrate aero-
 sol to flow towards the downstream end 14. Put another
 way, the support element 12 comprises a hollow tubular
 segment. In the embodiment of figure 3, a filter 17 is
 disposed immediately downstream of the support ele-
 ment 12 in the longitudinal direction. The wrapper 30 is
 identical to that of the aerosol-generating article 10 of
 figures 1 and 2. A susceptor 40 extends along the entire
 length of the aerosol-forming substrate 11.

[0195] Figure 4 shows an aerosol-generating article 10
 comprising the dual-layer wrapping structure 30 of fig-
 ures 1, 2 and 3. The aerosol-generating article 10 of
 figure 4 will be described below insofar as it differs from
 the aerosol-generating articles 10 of figures 1, 2 and 3.

[0196] The aerosol-generating article 10 of figure 4
 comprises a support element 12 located immediately
 downstream of an aerosol-forming substrate 11. In the
 embodiment of figure 4, the upstream end of the support
 element 12 abuts the downstream end of the aerosol-
 forming substrate 11. In addition, the aerosol-generating
 article 10 comprises an aerosol-cooling element 15 lo-
 cated immediately downstream of the support element
 12. In the embodiment of figure 4, the upstream end of the
 aerosol-cooling element 15 abuts the downstream end of
 the support element 12.

[0197] The support element 12 comprises a first hollow
 tubular segment. The aerosol-cooling element 15 com-
 prises a second hollow tubular segment. The hollow
 tubular segments are provided in the form of a hollow
 cylindrical tube made of cellulose acetate. Other config-

urations in which the support element, the aerosol-cooling element or both do not comprise a hollow tubular segment are also compatible with the embodiment of figure 4.

[0198] In figure 4, the support element 12 and the aerosol-cooling element 15 together define an intermediate hollow section of the aerosol-generating article 10. As a whole, the intermediate hollow section is adapted for substrate aerosol to flow towards the downstream end 14 and does not substantially contribute to the overall resistance-to-draw of the aerosol-generating article 10.

[0199] In the embodiment of figure 4, a filter 17 is disposed immediately downstream of the aerosol-cooling element 15 in the longitudinal direction. As shown in figure 4, an upstream end of the filter 17 abuts the downstream end of the aerosol-cooling element 15.

[0200] The filter 17 is provided in the form of a cylindrical plug of low-density cellulose acetate.

[0201] In figure 4, the aerosol-generating article 10 comprises an upstream element 16. The upstream element 16 abuts the upstream end of the aerosol-forming substrate 11. This advantageously prevents the susceptor 40 from being dislodged. Further, this ensures that the consumer cannot accidentally contact the heated susceptor 40 after use.

[0202] The upstream element 16 is provided in the form of a cylindrical plug of cellulose acetate.

[0203] In some non-represented examples of the embodiments of figures 3 and 4, the aerosol-generating article 10 comprises a mouthpiece disposed immediately downstream of the filter 17.

[0204] Figure 5 depicts examples of embossed patterns which may be comprised in the inner wrapper 31 and the outer wrapper 32 of any of the above embodiments.

[0205] The embossed pattern of figure 5a comprises diagonal lines.

[0206] Figure 5b shows a crisscross embossed pattern in which intersecting lines are equally separated from each other.

[0207] Figure 5c shows a crisscross embossed pattern comprises vertical horizontal bands. The intersecting lines are equally separated from each other within the same band, but the separation between lines in the adjacent band is different. Therefore, the bands form a check pattern.

[0208] The embossed pattern of figure 5d comprises dots.

[0209] The embossed pattern of figure 5e comprises horizontal lines.

[0210] Figure 5b shows a ridged pattern.

[0211] Figure 6 illustrates the manufacturing of an aerosol-generating article 10 comprising a dual-layer wrapping structure 30.

[0212] An inner wrapper 31 is transferred from a first bobbin 62 to a gluing machine 70. An outer wrapper 32 is transferred from a second bobbin 61 to the gluing machine 70.

[0213] In the gluing machine 70, an outer wrapper internal surface and an inner wrapper external surface are attached by means of a first adhesive 51, such that the inner wrapper and the outer wrapper form the dual-layer wrapping structure 30.

[0214] Once the dual-layer wrapping structure 30 is formed, it is disposed around an aerosol-forming substrate 11 using a funnel 80. Thus, the inner wrapper 31 circumscribes the aerosol-forming substrate 11 and the outer wrapper 32 circumscribes the inner wrapper 31.

[0215] Upon extending the dual-layer wrapping structure around the aerosol-forming substrate 11, an overlapping region 41 is defined as shown in figures 2a and 2b.

[0216] Figure 7 shows a schematic longitudinal section of an aerosol-generating system comprising an aerosol-generating device 200 and an aerosol-generating article 10. The aerosol-generating article 10 may be any of the articles of figures 1 to 4.

[0217] The aerosol-generating device 200 comprises a substantially cylindrical device housing 207, with a shape and size similar to a conventional cigar.

[0218] The aerosol-generating device 200 further comprises a power supply 201, in the form of a rechargeable nickel-cadmium battery, a controller 202 in the form of a printed circuit board including a microprocessor, an electrical connector 203 and a heating element 204. The heating element 204 is configured to heat the aerosol-forming substrate 11.

[0219] In the embodiment of figure 7, the heating element 204 is an inductive heating arrangement 204 comprising at least one inductor coil 206 intended to cooperate with the susceptor 40 of the aerosol-generating article 10. However, other forms of heating elements, such as resistive heating elements, may be used. Likewise, the inductive heating arrangement 204 may comprise a susceptor. The latter arrangement is preferable for use together with aerosol-generating articles which do not include a susceptor.

[0220] The power supply 201, the controller 202 and the inductor coil 206 are all housed within the device housing 207. The inductor coil 206 of the aerosol-generating device 200 is arranged at the proximal end of the device 200. The electrical connector 203 is arranged at a distal end of the device housing 207.

[0221] As used herein, the term "proximal" refers to a user end, or mouth end of the aerosol-generating device or aerosol-generating article. The proximal end of a component of an aerosol-generating device or an aerosol-generating article is the end of the component closest to the user end, or mouth end of the aerosol-generating device or the aerosol-generating article. As used herein, the term "distal" refers to the end opposite the proximal end.

[0222] The controller 202 is configured to control the supply of power from the power supply 201 to the inductor coil 206. The controller 202 further comprises a DC/AC inverter, including a Class-D power amplifier. The con-

troller 202 is also configured to control recharging of the power supply 201 from the electrical connector 203. The controller 202 further comprises a puff sensor (not shown) configured to sense when a user is drawing on an aerosol-generating article received in a device cavity 208.

[0223] The inductor coil 206 is connected to the controller 202 and the power supply 201, and the controller 202 is configured to supply a varying electric current to the substrate inductor coil 206. When the varying electric current is supplied to the inductor coil 206, it generates a varying magnetic field, which heats the susceptor 40 by induction.

[0224] As represented in figure 8, the device housing 207 also defines a device air inlet 213 in close proximity to the distal end of the cavity 208 for receiving the aerosol-generating article 10. The device air inlet 213 is configured to enable ambient air to be drawn into the device housing 207 towards the aerosol-forming substrate 11.

Claims

1. An aerosol-generating article (10) comprising:

an aerosol-forming substrate (11);
a dual-layer wrapping structure (30), comprising:

an inner wrapper (31) that circumscribes the aerosol-forming substrate (11), the inner wrapper (31) comprising an inner wrapper internal surface and an inner wrapper external surface opposite the inner wrapper internal surface;

an outer wrapper (32) that circumscribes the inner wrapper (31), the outer wrapper (32) comprising an outer wrapper internal surface and an outer wrapper external surface opposite the outer wrapper internal surface,

wherein the outer wrapper internal surface and the inner wrapper external surface are attached to one another by means of a first adhesive (51);

wherein the dual-layer wrapping structure (30) defines an overlapping region (41) in which the dual-layer wrapping structure (30) overlaps itself, the overlapping region (41) comprising a first section (42) and a second section (43) externally disposed on the first section (42);

wherein the first section (42) and the second section (43) are attached to one another by means of a second adhesive (52);

wherein the outer wrapper (32) has a basis weight between about 10 grams per square metre and 28 grams per square metre; and

wherein the inner wrapper (31) has a thickness between about 20 micrometres and about 100 micrometres.

2. The aerosol-generating article of claim 1, wherein the inner wrapper (31) has a basis weight between about 10 grams per square metre and 28 grams per square metre; more preferably the inner wrapper (31), the outer wrapper (32) or both the inner wrapper (31) and the outer wrapper (32) have a basis weight between about 10 grams per square metre and 16 grams per square metre.

3. The aerosol-generating article of any one of the preceding claims, further comprising a heating element (40) embedded within the aerosol-forming substrate (11).

4. The aerosol-generating article of claim 3, wherein the heating element (40) is a susceptor.

5. The aerosol-generating article of any one of the preceding claims, wherein the outer wrapper (32) has a thickness between about 20 micrometres and about 100 micrometres; preferably the inner wrapper (31), the outer wrapper (32) or both the inner wrapper (31) and the outer wrapper (32) have a thickness between about 25 micrometres and about 75 micrometres; more preferably the inner wrapper (31), the outer wrapper (32) or both the inner wrapper (31) and the outer wrapper (32) have a thickness between about 30 micrometres and about 50 micrometres.

6. The aerosol-generating article of any one of the preceding claims, wherein the inner wrapper (31), the outer wrapper (32) or both the inner wrapper (31) and the outer wrapper (32) comprise an embossed pattern.

7. The aerosol-generating article of any one of the preceding claims, wherein the outer wrapper (32) has a porosity between about 30 and about 80 Coresta units, preferably between about 30 and about 50 Coresta units, most preferably between 30 and 40 Coresta units.

8. The aerosol-generating article of any one of the preceding claims, wherein the inner wrapper external surface, the inner wrapper internal surface or both the inner wrapper external surface and the inner wrapper internal surface have a roughness between about 50 Bekk seconds and about 1000 Bekk seconds, more preferably between about 100 Bekk seconds and about 200 Bekk seconds.

9. The aerosol-generating article of any one of the preceding claims, wherein the diameter of the aerosol-generating article (10) is between about 3 mm

and about 8 mm.

10. The aerosol-generating article of any one of the preceding claims, further comprising a filter (17) disposed downstream of the aerosol-forming substrate (11). 5
11. The aerosol-generating article of any one of the preceding claims, wherein the length of the aerosol-generating article (10) is between about 30 mm and about 100 mm. 10
12. An aerosol-generating system comprising:
the aerosol-generating article (10) of any one of claims 1 to 11; and 15
an aerosol-generating device.
13. The aerosol-generating system of claim 12, wherein the aerosol-generating device comprises a resistive heating element. 20
14. The aerosol-generating system of any one of claims 12 to 13, wherein the aerosol-generating device comprises an inductive heating arrangement (204). 25
15. A method of manufacturing the aerosol-generating article of any one of claims 1 to 11, the method comprising the steps of: 30
providing an aerosol-forming substrate (11);
transferring an inner wrapper (31) from a first bobbin (62) to a gluing machine (70);
transferring an outer wrapper (32) from a second bobbin (61) to the gluing machine (70), wherein the outer wrapper (32) has a basis weight between about 10 grams per square metre and 28 grams per square metre, and wherein the inner wrapper (31) has a thickness between about 20 micrometres and about 100 micrometres; 35
attaching an outer wrapper internal surface and an inner wrapper external surface by means of a first adhesive (51), such that the inner wrapper (31) and the outer wrapper (32) form a dual-layer wrapping structure (30); 40
disposing the dual-layer wrapping structure (30) such that the inner wrapper (31) circumscribes the aerosol-forming substrate (11) and the outer wrapper (32) circumscribes the inner wrapper (31); 50
defining an overlapping region (41) in which the dual-layer wrapping structure (30) overlaps itself, the overlapping region (41) thus comprising a first section (42) and a second section (43) externally disposed on the first section (42), wherein the first section (42) and the second section (43) are attached to one another by means of a second adhesive (52). 55

Patentansprüche

1. Aerosolerzeugender Artikel (10), aufweisend:

ein aerosolbildendes Substrat (11);
eine zweischichtige Umhüllungsstruktur (30), umfassend:

eine innere Umhüllung (31), die das aerosolbildende Substrat (11) umhüllt, die innere Umhüllung (31) umfassend eine Innenfläche der inneren Umhüllung und eine Außenfläche der inneren Umhüllung gegenüber der Innenfläche der inneren Umhüllung;
eine äußere Umhüllung (32), die die innere Umhüllung (31) umhüllt, die äußere Umhüllung (32) umfassend eine Innenfläche der äußeren Umhüllung und eine Außenfläche der äußeren Umhüllung gegenüber der Innenfläche der äußeren Umhüllung, wobei die Innenfläche der äußeren Umhüllung und die Außenfläche der inneren Umhüllung mittels eines ersten Klebstoffs (51) aneinander befestigt sind;

wobei die zweischichtige Umhüllungsstruktur (30) eine Überlappungsregion (41) definiert, in der sich die zweischichtige Umhüllungsstruktur (30) selbst überlappt, die Überlappungsregion (41) einen ersten Teilbereich (42) und einen zweiten Teilbereich (43) umfassend, der außen an dem ersten Teilbereich (42) angeordnet ist; wobei der erste Teilbereich (42) und der zweite Teilbereich (43) mittels eines zweiten Klebstoffs (52) aneinander befestigt sind; wobei die äußere Umhüllung (32) ein Flächengewicht zwischen etwa 10 Gramm pro Quadratmeter und 28 Gramm pro Quadratmeter aufweist; und wobei die innere Umhüllung (31) eine Dicke zwischen etwa 20 Mikrometer und etwa 100 Mikrometer aufweist.

2. Aerosolerzeugender Artikel nach Anspruch 1, wobei die innere Umhüllung (31) ein Flächengewicht zwischen etwa 10 Gramm pro Quadratmeter und 28 Gramm pro Quadratmeter aufweist; noch bevorzugter die innere Umhüllung (31), die äußere Umhüllung (32) oder sowohl die innere Umhüllung (31) als auch die äußere Umhüllung (32) ein Flächengewicht zwischen etwa 10 Gramm pro Quadratmeter und 16 Gramm pro Quadratmeter aufweisen.
3. Aerosolerzeugender Artikel nach einem beliebigen der vorhergehenden Ansprüche, ferner umfassend ein Heizelement (40), das innerhalb des aerosolbildenden Substrats (11) eingebettet ist.

4. Aerosolerzeugender Artikel nach Anspruch 3, wobei das Heizelement (40) ein Suszeptor ist.
5. Aerosolerzeugender Artikel nach einem beliebigen der vorhergehenden Ansprüche, wobei die äußere Umhüllung (32) eine Dicke zwischen etwa 20 Mikrometer und etwa 100 Mikrometer aufweist; bevorzugt die innere Umhüllung (31), die äußere Umhüllung (32) oder sowohl die innere Umhüllung (31) als auch die äußere Umhüllung (32) eine Dicke zwischen etwa 25 Mikrometer und etwa 75 Mikrometern aufweisen; noch bevorzugter die innere Umhüllung (31), die äußere Umhüllung (32) oder sowohl die innere Umhüllung (31) als auch die äußere Umhüllung (32) eine Dicke zwischen etwa 30 Mikrometer und etwa 50 Mikrometer aufweisen.
6. Aerosolerzeugender Artikel nach einem beliebigen der vorhergehenden Ansprüche, wobei die innere Umhüllung (31), die äußere Umhüllung (32) oder sowohl die innere Umhüllung (31) als auch die äußere Umhüllung (32) ein eingepprägtes Muster umfasst.
7. Aerosolerzeugender Artikel nach einem beliebigen der vorhergehenden Ansprüche, wobei die äußere Umhüllung (32) eine Porosität zwischen etwa 30 und etwa 80 Coresta-Einheiten, bevorzugt zwischen etwa 30 und etwa 50 Coresta-Einheiten, am meisten bevorzugt zwischen 30 und 40 Coresta-Einheiten aufweist.
8. Aerosolerzeugender Artikel nach einem beliebigen der vorhergehenden Ansprüche, wobei die Außenfläche der inneren Umhüllung, die Innenfläche der inneren Umhüllung oder sowohl die Außenfläche der inneren Umhüllung als auch die Innenfläche der inneren Umhüllung eine Rauigkeit zwischen etwa 50 Bekk-Sekunden und etwa 1000 Bekk-Sekunden, bevorzugt zwischen etwa 100 Bekk-Sekunden und etwa 200 Bekk-Sekunden aufweisen.
9. Aerosolerzeugender Artikel nach einem beliebigen der vorhergehenden Ansprüche, wobei der Durchmesser des aerosolerzeugenden Artikels (10) zwischen etwa 3 mm und etwa 8 mm beträgt.
10. Aerosolerzeugender Artikel nach einem beliebigen der vorhergehenden Ansprüche, ferner umfassend einen Filter (17), der dem aerosolbildenden Substrat (11) nachgelagert angeordnet ist.
11. Aerosolerzeugender Artikel nach einem beliebigen der vorhergehenden Ansprüche, wobei die Länge des aerosolerzeugenden Artikels (10) zwischen etwa 30 mm und etwa 100 mm beträgt.
12. Aerosolerzeugungssystem, umfassend:

den aerosolerzeugenden Artikel (10) nach einem beliebigen der Ansprüche 1 bis 11; und eine Aerosolerzeugungsvorrichtung.

13. Aerosolerzeugungssystem nach Anspruch 12, wobei die Aerosolerzeugungsvorrichtung ein Widerstandsheizelement umfasst.
14. Aerosolerzeugungssystem nach einem beliebigen der Ansprüche 12 bis 13, wobei die Aerosolerzeugungsvorrichtung eine induktive Erwärmungsanordnung (204) aufweist.
15. Verfahren für ein Herstellen des aerosolerzeugenden Artikels nach einem beliebigen der Ansprüche 1 bis 11, das Verfahren die folgenden Schritte umfassend:

Vorsehen eines aerosolbildenden Substrats (11);
 Überführen einer inneren Umhüllung (31) von einer ersten Spule (62) zu einer Klebemaschine (70);
 Überführen einer äußeren Umhüllung (32) von einer zweiten Spule (61) zu der Klebemaschine (70), wobei die äußere Umhüllung (32) ein Flächengewicht zwischen etwa 10 Gramm pro Quadratmeter und 28 Gramm pro Quadratmeter aufweist, und wobei die innere Umhüllung (31) eine Dicke zwischen etwa 20 Mikrometer und etwa 100 Mikrometer aufweist;
 Anbringen einer Innenfläche der äußeren Umhüllung und einer Außenfläche der inneren Umhüllung mittels eines ersten Klebstoffes (51), sodass die innere Umhüllung (31) und die äußere Umhüllung (32) eine zweilagige Umhüllungsstruktur (30) bilden;
 Anordnen der zweischichtigen Umhüllungsstruktur (30) sodass die innere Umhüllung (31) das aerosolbildende Substrat (11) umhüllt und die äußere Umhüllung (32) die innere Umhüllung (31) umhüllt;
 Definieren einer Überlappungsregion (41), in der sich die zweischichtige Umhüllungsstruktur (30) selbst überlappt, die Überlappungsregion (41) somit einen ersten Teilbereich (42) und einen zweiten Teilbereich (43) umfassend, der außen an dem ersten Teilbereich (42) angeordnet ist, wobei der erste Teilbereich (42) und der zweite Teilbereich (43) mittels eines zweiten Klebstoffs (52) aneinander befestigt sind.

Revendications

1. Article de génération d'aérosol (10) comprenant :
 un substrat formant aérosol (11) ;

une structure d'enveloppement à double couche (30), comprenant :

une enveloppe intérieure (31) qui entoure le substrat formant aérosol (11), l'enveloppe intérieure (31) comprenant une surface interne d'enveloppe intérieure et une surface externe d'enveloppe intérieure opposée à la surface interne d'enveloppe intérieure ; une enveloppe extérieure (32) qui entoure l'enveloppe intérieure (31), l'enveloppe extérieure (32) comprenant une surface interne d'enveloppe extérieure et une surface externe d'enveloppe extérieure opposée à la surface interne d'enveloppe extérieure, dans lequel la surface interne d'enveloppe intérieure et la surface externe d'enveloppe intérieure sont fixées l'une à l'autre au moyen d'un premier adhésif (51) ;

dans lequel la structure d'enveloppement à double couche (30) définit une région de chevauchement (41) dans laquelle la structure d'enveloppement à double couche (30) se chevauche elle-même, la région de chevauchement (41) comprenant une première section (42) et une deuxième section (43) disposée extérieurement sur la première section (42) ; dans lequel la première section (42) et la deuxième section (43) sont fixées l'une à l'autre au moyen d'un deuxième adhésif (52) ; dans lequel l'enveloppe extérieure (32) a un grammage entre environ 10 grammes par mètre carré et 28 grammes par mètre carré ; et dans lequel l'enveloppe intérieure (31) a une épaisseur entre environ 20 micromètres et environ 100 micromètres.

2. Article de génération d'aérosol selon la revendication 1, dans lequel l'enveloppe intérieure (31) a un grammage entre environ 10 grammes par mètre carré et 28 grammes par mètre carré ; de manière davantage préférée l'enveloppe intérieure (31), l'enveloppe extérieure (32) ou à la fois l'enveloppe intérieure (31) et l'enveloppe extérieure (32) ont un grammage entre environ 10 grammes par mètre carré et 16 grammes par mètre carré.
3. Article de génération d'aérosol selon l'une quelconque des revendications précédentes, comprenant en outre un élément de chauffage (40) intégré au sein du substrat formant aérosol (11).
4. Article de génération d'aérosol selon la revendication 3, dans lequel l'élément de chauffage (40) est un susceptible.
5. Article de génération d'aérosol selon l'une quel-

conque des revendications précédentes, dans lequel l'enveloppe extérieure (32) a une épaisseur entre environ 20 micromètres et environ 100 micromètres ; de préférence l'enveloppe intérieure (31), l'enveloppe extérieure (32) ou à la fois l'enveloppe intérieure (31) et l'enveloppe extérieure (32) ont une épaisseur entre environ 25 micromètres et environ 75 micromètres ; de manière davantage préférée l'enveloppe intérieure (31), l'enveloppe extérieure (32) ou à la fois l'enveloppe intérieure (31) et l'enveloppe extérieure (32) ont une épaisseur entre environ 30 micromètres et environ 50 micromètres.

6. Article de génération d'aérosol selon l'une quelconque des revendications précédentes, dans lequel l'enveloppe intérieure (31), l'enveloppe extérieure (32) ou à la fois l'enveloppe intérieure (31) et l'enveloppe extérieure (32) comprennent un motif gaufré.
7. Article de génération d'aérosol selon l'une quelconque des revendications précédentes, dans lequel l'enveloppe extérieure (32) a une porosité entre environ 30 et environ 80 unités Coresta, de préférence entre environ 30 et environ 50 unités Coresta, de manière préférée entre toutes entre 30 et 40 unités Coresta.
8. Article de génération d'aérosol selon l'une quelconque des revendications précédentes, dans lequel la surface externe d'enveloppe intérieure, la surface interne d'enveloppe intérieure ou à la fois la surface externe d'enveloppe intérieure et la surface interne d'enveloppe intérieure ont une rugosité entre environ 50 secondes Bekk et environ 1 000 secondes Bekk, de préférence entre environ 100 secondes Bekk et environ 200 secondes Bekk.
9. Article de génération d'aérosol selon l'une quelconque des revendications précédentes, dans lequel le diamètre de l'article de génération d'aérosol (10) est entre environ 3 mm et environ 8 mm.
10. Article de génération d'aérosol selon l'une quelconque des revendications précédentes, comprenant en outre un filtre (17) disposé en aval du substrat formant aérosol (11).
11. Article de génération d'aérosol selon l'une quelconque des revendications précédentes, dans lequel la longueur de l'article de génération d'aérosol (10) est entre environ 30 mm et environ 100 mm.
12. Système de génération d'aérosol comprenant :
l'article de génération d'aérosol (10) selon l'une quelconque des revendications 1 à 11 ; et un dispositif de génération d'aérosol.

13. Système de génération d'aérosol selon la revendication 12, dans lequel le dispositif de génération d'aérosol comprend un élément de chauffage résistif.

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14. Système de génération d'aérosol selon l'une quelconque des revendications 12 et 13, dans lequel le dispositif de génération d'aérosol comprend un agencement de chauffage par induction (204).

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15. Procédé de fabrication de l'article de génération d'aérosol selon l'une quelconque des revendications 1 à 11, le procédé comprenant les étapes suivantes :

la fourniture d'un substrat formant aérosol (11) ; 15
le transfert d'une enveloppe intérieure (31) d'une première bobine (62) à une machine de collage (70) ;

le transfert d'une enveloppe extérieure (32) d'une deuxième bobine (61) à la machine de collage (70), dans lequel l'enveloppe extérieure (32) a un grammage entre environ 10 grammes par mètre carré et 28 grammes par mètre carré, et dans lequel l'enveloppe intérieure (31) a une épaisseur entre environ 20 micromètres et environ 100 micromètres ; 25

la fixation d'une surface interne d'enveloppe extérieure et d'une surface externe d'enveloppe intérieure au moyen d'un premier adhésif (51), de sorte que l'enveloppe intérieure (31) et l'enveloppe extérieure (32) forment une structure d'enveloppement à double couche (30) ; 30

la disposition de la structure d'enveloppement à double couche (30) de sorte que l'enveloppe intérieure (31) entoure le substrat formant aérosol (11) et l'enveloppe extérieure (32) entoure l'enveloppe intérieure (31) ; 35

la définition d'une région de chevauchement (41) dans laquelle la structure d'enveloppement à double couche (30) se chevauche elle-même, la région de chevauchement (41) comprenant ainsi une première section (42) et une deuxième section (43) disposées extérieurement sur la première section (42), dans lequel la première section (42) et la deuxième section (43) sont fixées l'une à l'autre au moyen d'un deuxième adhésif (52). 40 45

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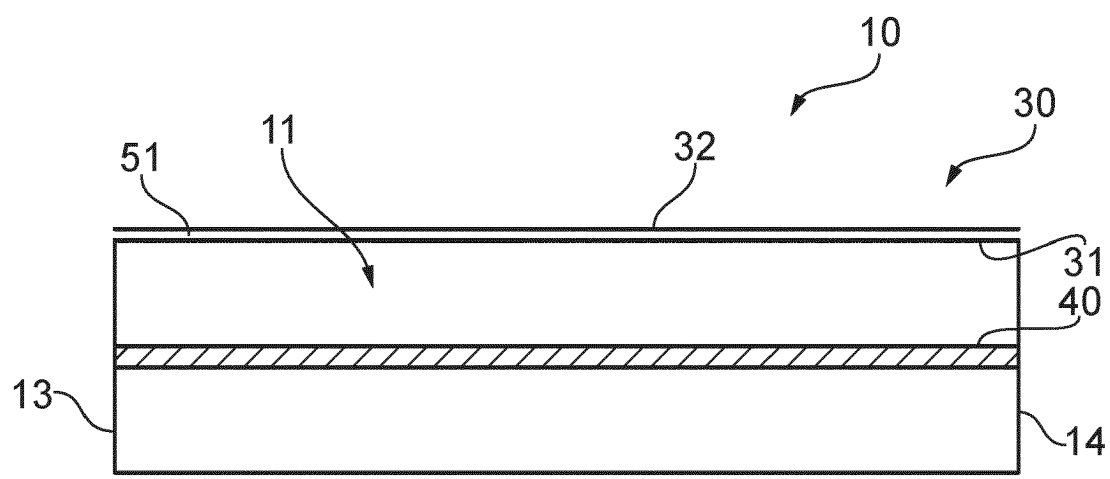


FIG. 1

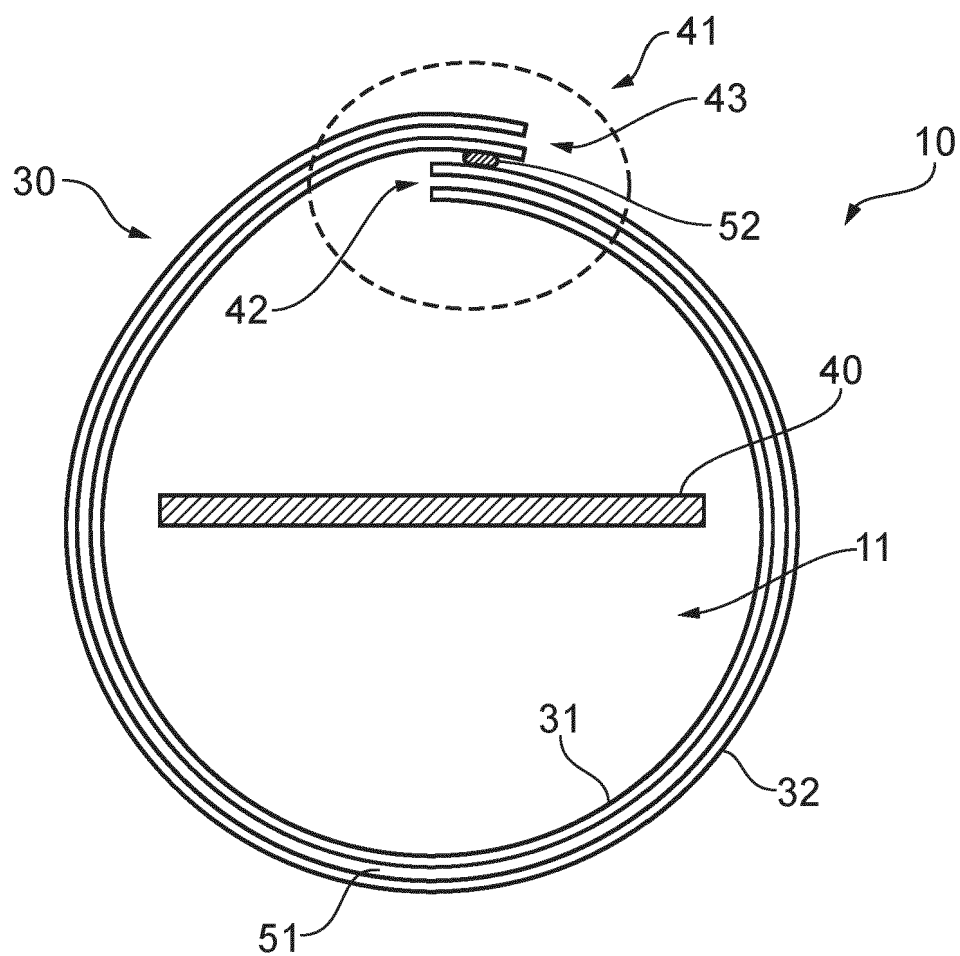


FIG. 2a

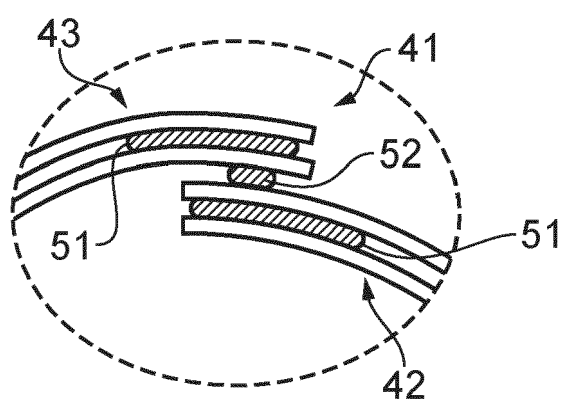


FIG. 2b

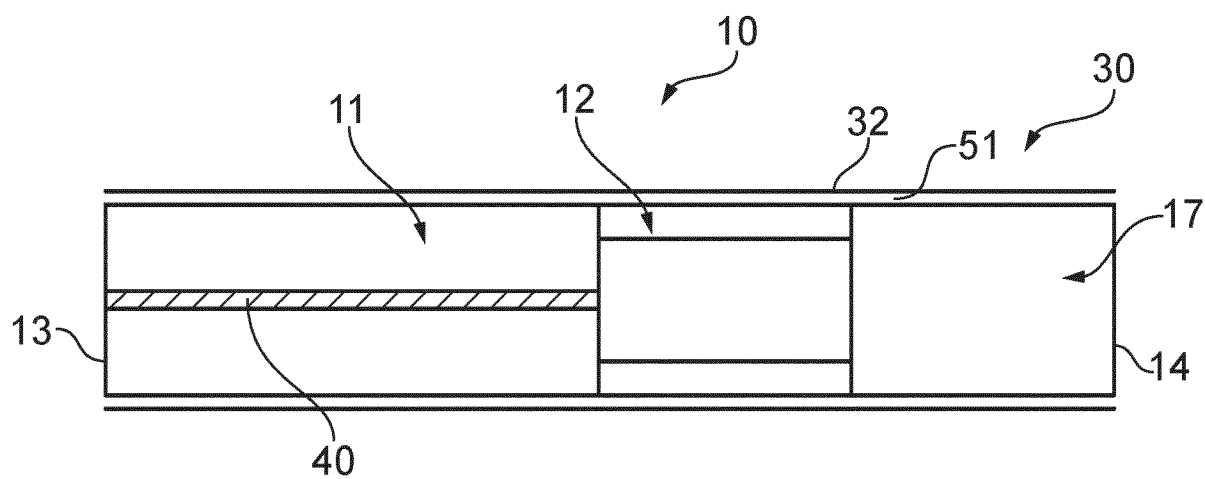


FIG. 3

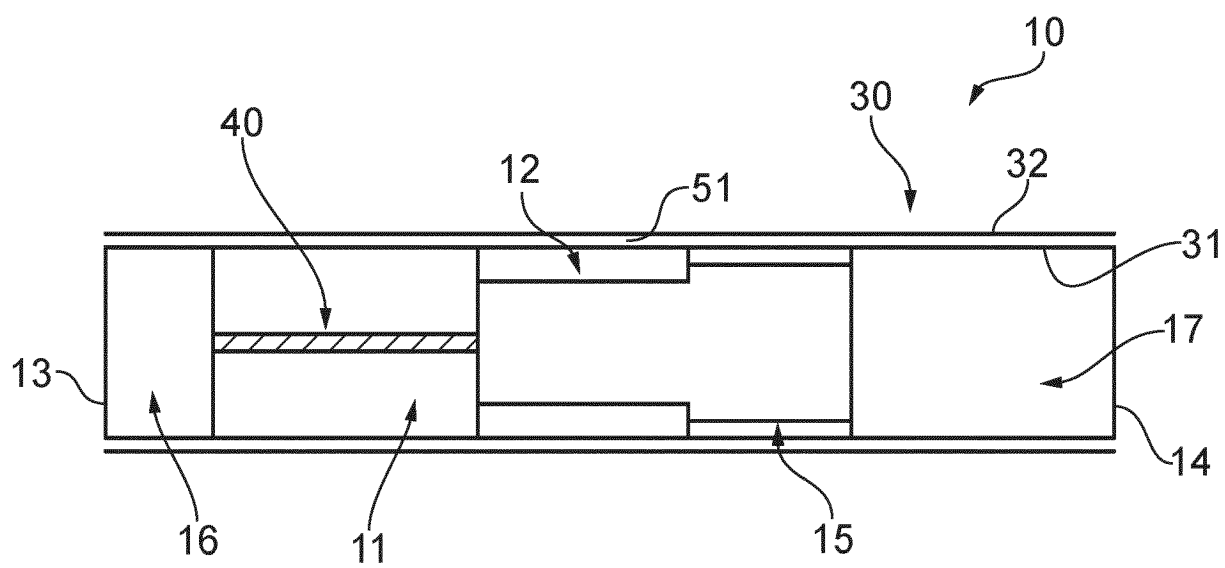


FIG. 4

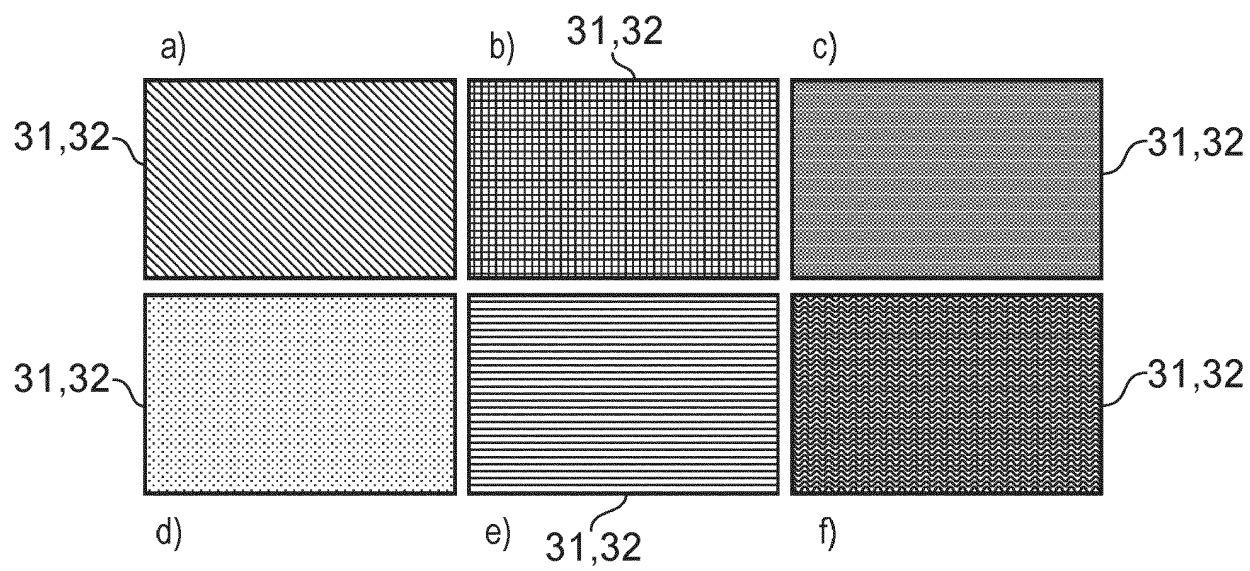


FIG. 5

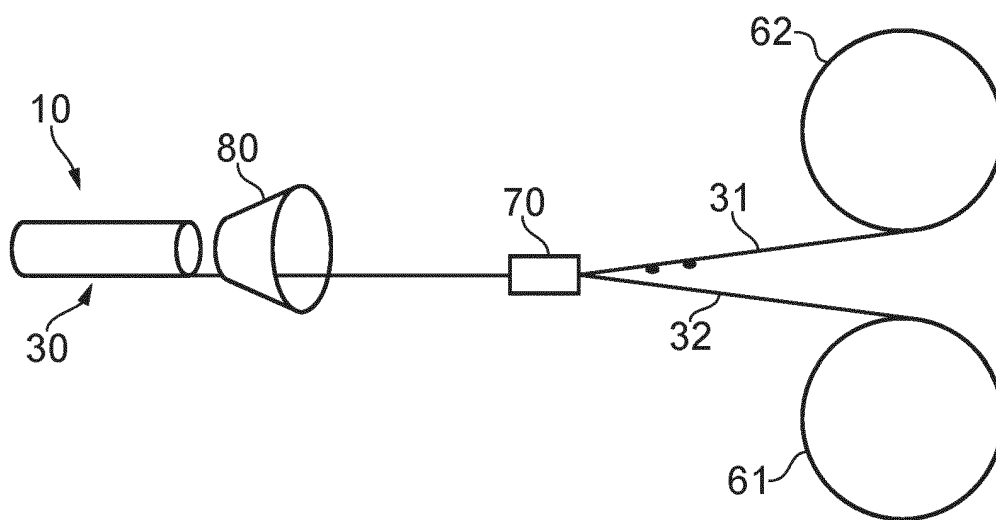


FIG. 6

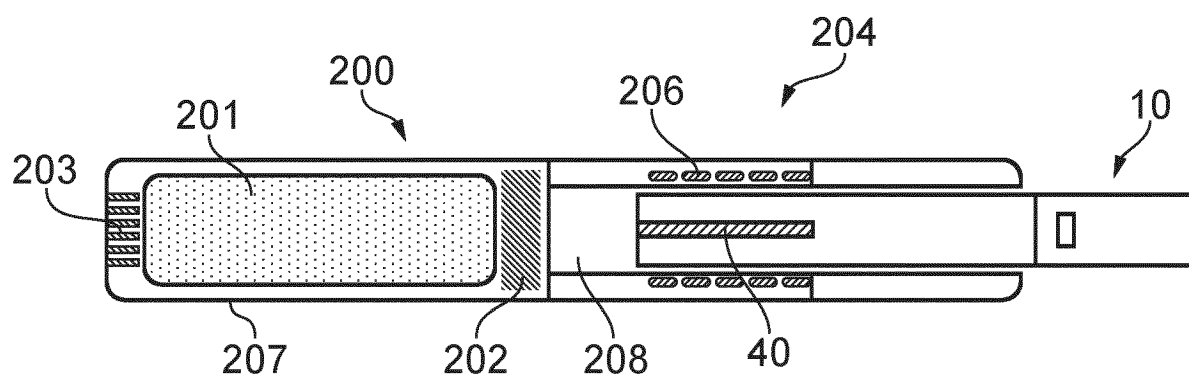


FIG. 7

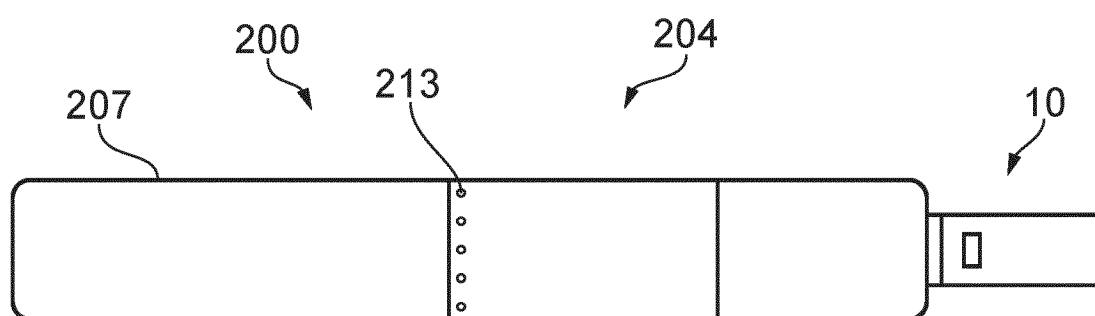


FIG. 8

REFERENCES CITED IN THE DESCRIPTION

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