US 20250255342A1

(19) United States

(12) Patent Application Publication

POINDRON

(10) Pub. No.: US 2025/0255342 A1

(43) Pub. Date: Aug. 14, 2025

(54) AEROSOL-GENERATING ARTICLE WITH COMPOSITE SUSCEPTOR ASSEMBLY

(71) Applicant: Philip Morris Products S.A., Neuchatel (CH)

(72) Inventor: Cyrille POINDRON, Geneva (CH)

(73) Assignee: Philip Morris Products S.A., Neuchatel (CH)

(21) Appl. No.: 18/855,079

(22) PCT Filed: May 2, 2023

(86) PCT No.: PCT/EP2023/061574

§ 371 (c)(1),
(2) Date: Oct. 8, 2024

(30) Foreign Application Priority Data

May 4, 2022 (EP) 22171690.5

Publication Classification

(51) Int. Cl.

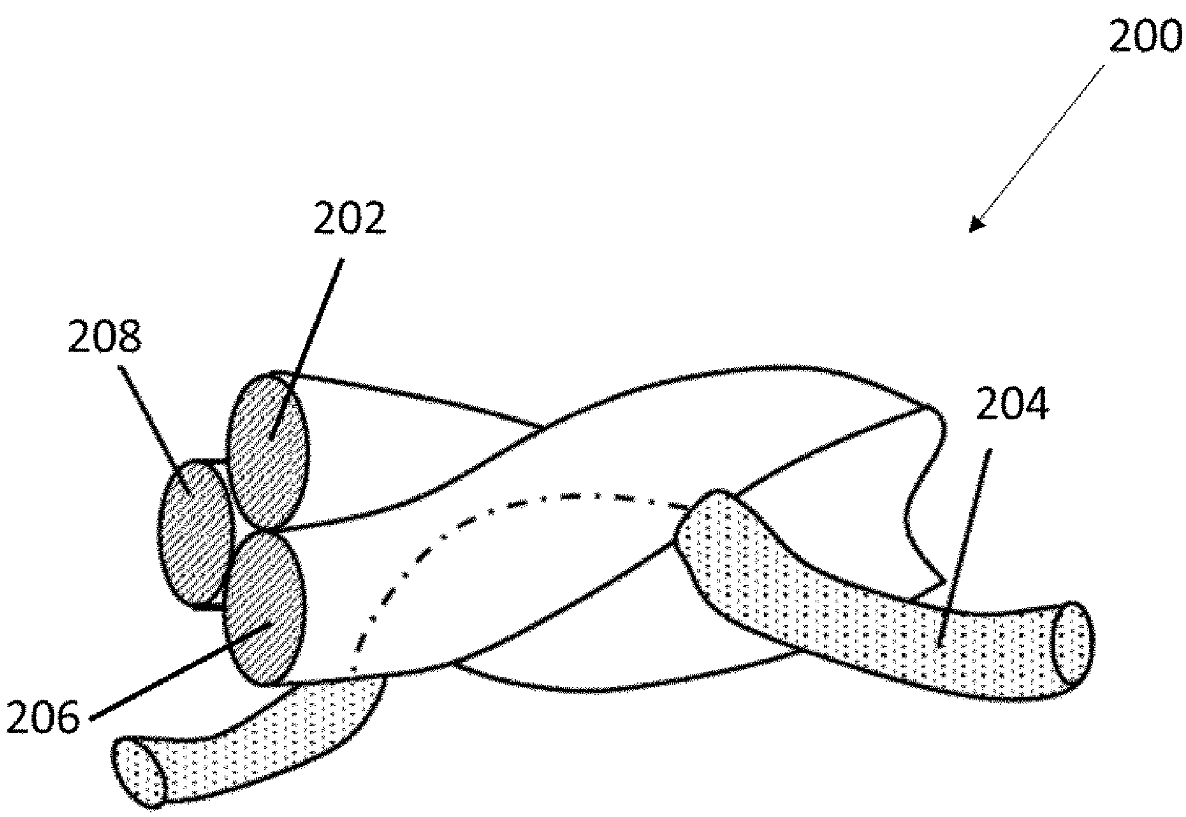
A24F 40/40	(2020.01)
A24D 1/20	(2020.01)
A24F 40/20	(2020.01)

(52) U.S. Cl.

CPC *A24F 40/40* (2020.01); *A24D 1/20* (2020.01); *A24F 40/20* (2020.01)

(57) ABSTRACT

An aerosol-generating article for generating an inhalable aerosol upon heating is provided, the aerosol-generating article including: an aerosol-generating rod including an aerosol-generating substrate; and a susceptor assembly including: at least one strand of susceptor material, the at least one strand of susceptor material being twisted such as to be laid helically around a longitudinal axis of the susceptor assembly, and an aerosol-generating element including at least one strand of a porous nontobacco material carrying an aerosol-forming composition comprising at least 35 percent by weight of an aerosol former, the at least one strand of the aerosol-generating element being twisted with the at least one strand of susceptor material, and the susceptor assembly being thermally coupled with the aerosol-generating substrate, the susceptor assembly extending longitudinally within the aerosol-generating rod and being embedded within the aerosol-generating substrate. An aerosol-generating system including a heating device and the aerosol-generating article is also provided.



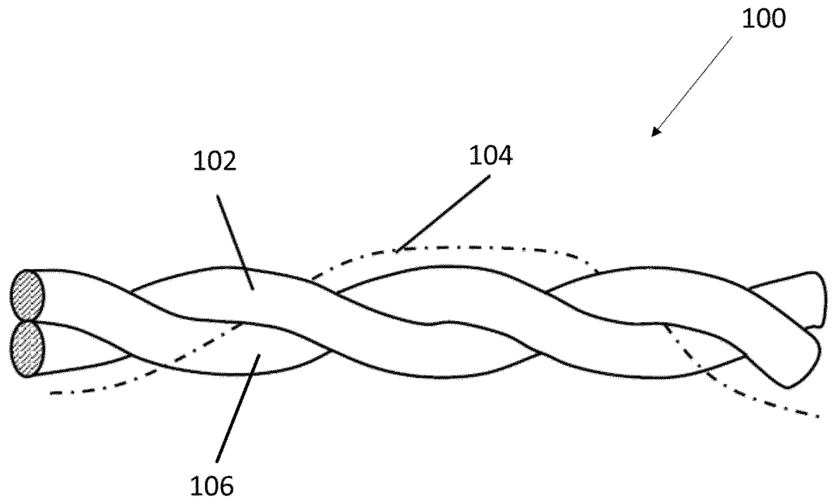


Figure 1

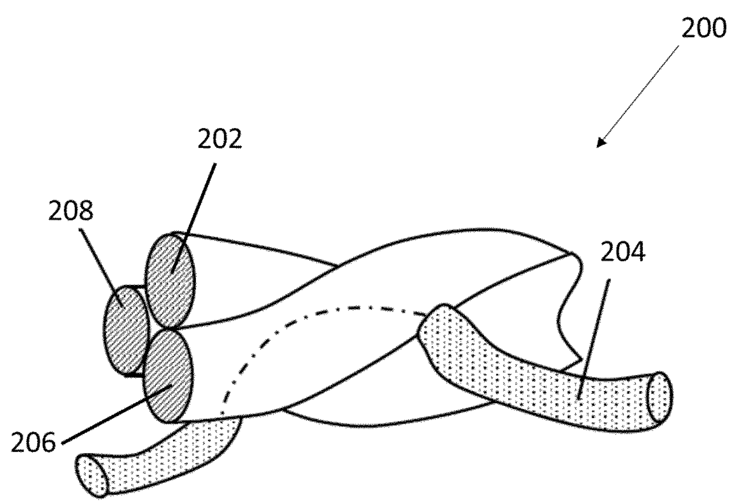


Figure 2

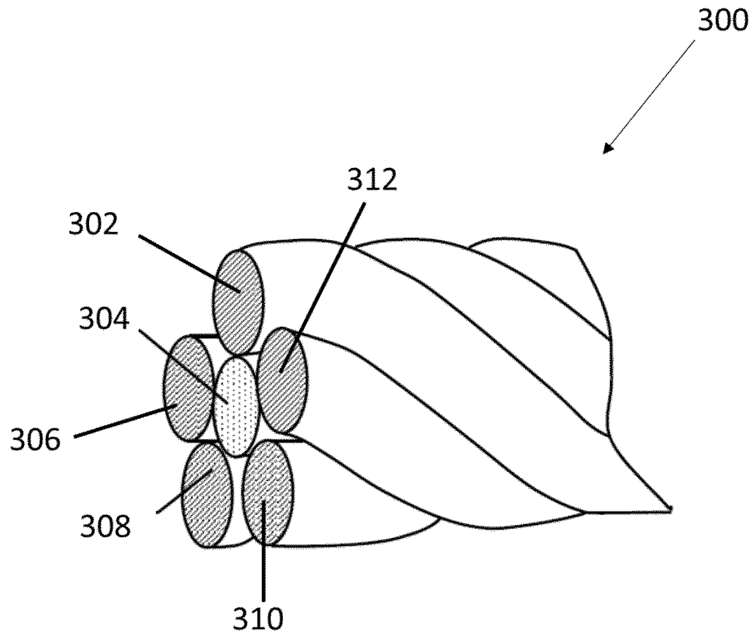


Figure 3

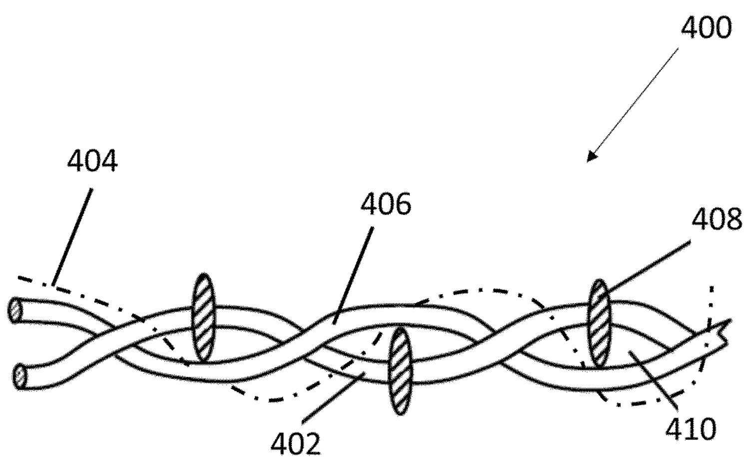


Figure 4

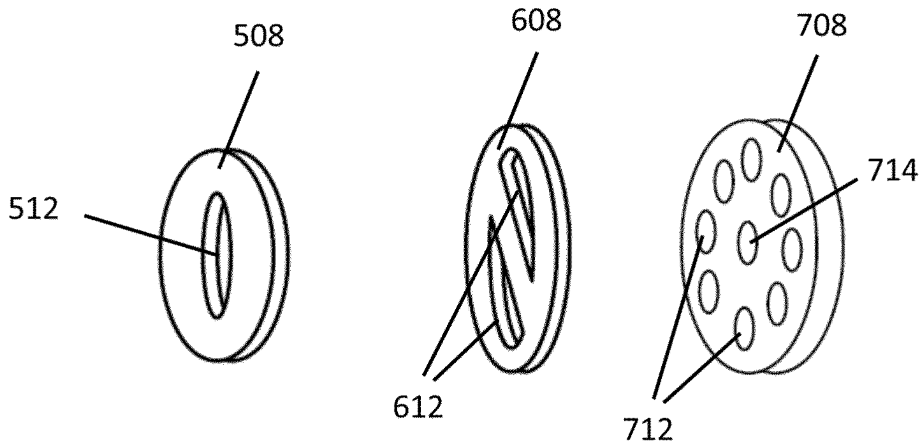


Figure 5

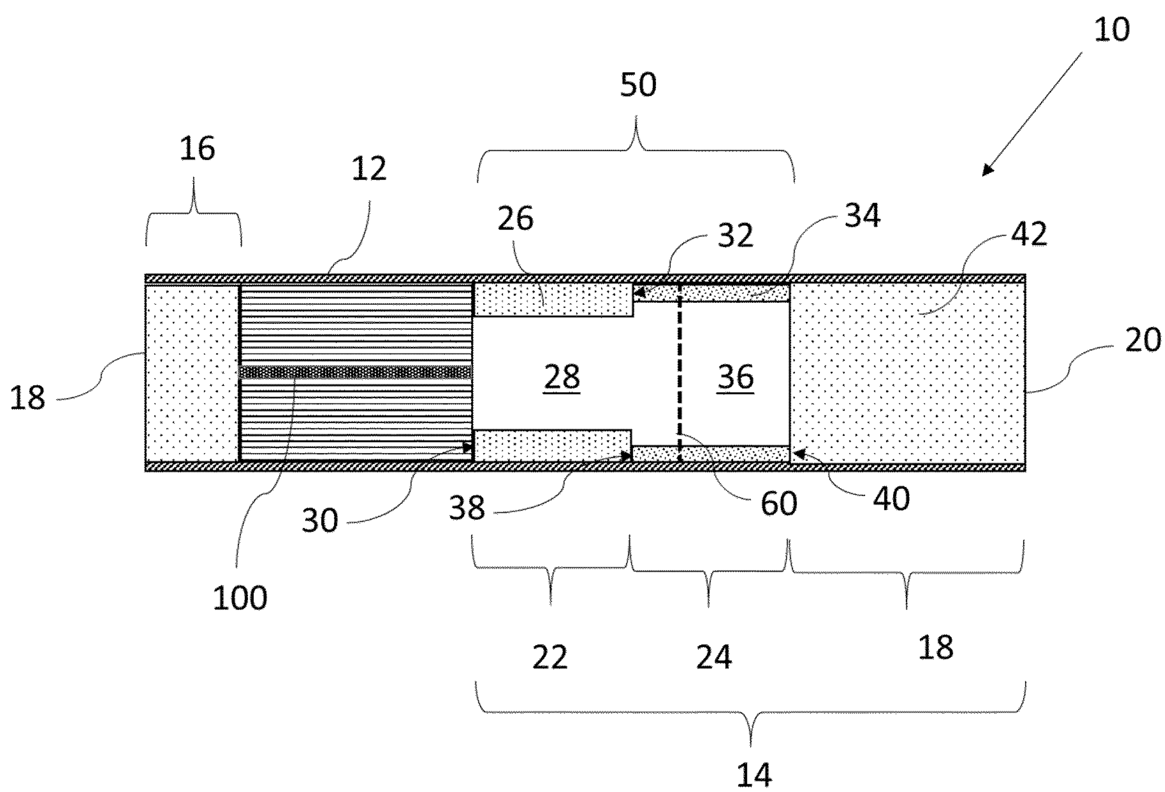


Figure 6

AEROSOL-GENERATING ARTICLE WITH COMPOSITE SUSCEPTOR ASSEMBLY

[0001] The present invention relates to an aerosol-generating article comprising an aerosol-generating substrate and adapted to produce an inhalable aerosol upon heating. In particular, the present invention relates to an aerosol-generating article comprising a susceptor element which is thermally coupled with an aerosol-generating substrate, and which is adapted to be inductively heated to supply heat to the aerosol-generating substrate. Aspects of the disclosure further relate to an aerosol-generating system comprising a heating device and an aerosol-generating article of the type set out above.

[0002] Aerosol-generating articles in which an aerosol-generating substrate, such as a tobacco-containing substrate, is heated rather than combusted, are known in the art. Typically, in such heated smoking articles an aerosol is generated by the transfer of heat from a heat source to a physically separate aerosol-generating substrate or material, which may be located in contact with, within, around, or downstream of the heat source. During use of the aerosol-generating article, volatile compounds are released from the aerosol-generating substrate by heat transfer from the heat source and are entrained in air drawn through the aerosol-generating article. As the released compounds cool, they condense to form an aerosol.

[0003] A number of prior art documents disclose aerosol-generating devices for consuming aerosol-generating articles. Such devices include, for example, electrically heated aerosol-generating devices in which an aerosol is generated by the transfer of heat from one or more electrical heater elements of the aerosol-generating device to the aerosol-generating substrate of a heated aerosol-generating article. For example, electrically heated aerosol-generating devices have been proposed that comprise an internal heater blade which is adapted to be inserted into the aerosol-generating substrate. As an alternative, inductively heatable aerosol-generating articles comprising an aerosol-generating substrate and a susceptor arranged within the aerosol-generating substrate have been proposed by WO 2015/176898.

[0004] Aerosol-generating articles in which a tobacco-containing substrate is heated rather than combusted present a number of challenges that were not encountered with conventional smoking articles. First of all, tobacco-containing substrates are typically heated to significantly lower temperatures compared with the temperatures reached by the combustion front in a conventional cigarette. This may have an impact on nicotine release from the tobacco-containing substrate and nicotine delivery to the consumer. At the same time, if the heating temperature is increased in an attempt to boost nicotine delivery, then the aerosol generated typically needs to be cooled to a greater extent and more rapidly before it reaches the consumer.

[0005] Secondly, heating a tobacco-containing aerosol-generating substrate even to one such temperature required for aerosol formation typically takes some time, and so there may be a delay in aerosol delivery to the consumer. This phenomenon, whereby when the user initially draws upon the article, the aerosol reaching the user may be relatively low in flavour or nicotine content or both, is often referred to as “cold puff” effect or “empty puff” effect.

[0006] One such delay may for example be detected in aerosol-generating rods and articles wherein the aerosol-generating substrate comprises a homogenised tobacco material, since the aerosol former and nicotine may not be especially readily available for release. In particular, this may occur where a cast leaf homogenised tobacco material is used that has been prepared from a slurry containing the aerosol former, as opposed to one wherein the aerosol former has been applied (for example, sprayed) onto the formed sheet.

[0007] It would, however, be desirable to provide a new and improved aerosol-generating rod or article adapted to tackle at least one of the challenges encountered with aerosol-generating articles in which a tobacco-containing substrate is heated rather than combusted and that normally would not be particularly relevant to conventional smoking articles.

[0008] The present disclosure relates to an aerosol-generating article for generating an inhalable aerosol upon heating.

[0009] The aerosol-generating article may comprise a susceptor assembly.

[0010] The susceptor assembly may comprise at least one strand of susceptor material.

[0011] The at least one strand of susceptor material may be twisted such as to be laid helically around a longitudinal axis of the susceptor assembly.

[0012] The susceptor assembly may comprise an aerosol-generating element.

[0013] The aerosol-generating element may comprise at least one strand of a porous (for example, fibrous), non-tobacco material carrying an aerosol-forming composition.

[0014] The aerosol-forming composition may comprise at least 35 percent by weight of an aerosol former (for example, glycerin).

[0015] The at least one strand of the aerosol-generating element may be twisted with the at least one strand of susceptor material.

[0016] According to the present invention, there is provided an aerosol-generating article for generating an inhalable aerosol upon heating, the aerosol-generating article comprising a susceptor assembly. The susceptor assembly comprises at least one strand of susceptor material, the at least one strand of susceptor material being twisted such as to be laid helically around a longitudinal axis of the susceptor assembly. Further, the susceptor assembly comprises at least one aerosol-generating element comprising at least a strand of a porous, non-tobacco material carrying an aerosol-forming composition comprising at least 35 percent by weight of an aerosol former. The at least one strand of the aerosol-generating element is twisted with the at least one strand of susceptor material.

[0017] In contrast to existing aerosol-generating articles, aerosol-generating articles in accordance with the present invention include a susceptor assembly wherein a composition comprising a significant amount of an aerosol former is held in intimate contact with the inductively heatable material of the at least one strand of susceptor material.

[0018] This is achieved by virtue of the twisted arrangement of the at least one strand of susceptor material and of the strand of porous, non-tobacco material carrying an aerosol-forming composition of the aerosol-generating element.

[0019] From a functional viewpoint, in aerosol-generating articles in accordance with the present invention, the strand of porous, non-tobacco material carrying an aerosol-forming composition can be regarded as an aerosol-forming strand. For the sake of brevity, in the following description, a strand of porous, non-tobacco material carrying an aerosol-forming composition forming part of the aerosol-generating element will often be referred to as an "aerosol-forming strand" or an "aerosol-generating strand".

[0020] Because the at least one strand of porous, non-tobacco material is pinched between or surrounded by adjacent spires or coils formed by the at least one strand of susceptor material, the structure of the susceptor assembly of aerosol-generating articles in accordance with the present invention ensures that at all times a significant fraction of the aerosol former is in close proximity of the heat source. Thus, during use, heat generated inductively may be rapidly transferred from the heated strand of susceptor material to the at least one strand of porous, non-tobacco material and to the aerosol forming composition, such as by conduction.

[0021] Accordingly, rapid heating of the strand of porous, non-tobacco material can be achieved in the very first moments after heat supply by induction has been initiated. Volatilisation of the aerosol former borne by the at least one strand of porous, non-tobacco material may advantageously help prevent occurrences of "cold puff" effect and enable a generally more consistent and better controlled delivery of aerosol to the consumer during use.

[0022] As will become apparent from the following description, preferred embodiments of aerosol-generating articles in accordance with the present invention may particularly benefit from certain mutual arrangements of the strand or strands of susceptor material and the strand or strands of the aerosol-generating element (that is, the aerosol-forming strand or strands), as well as from use of certain formulations of the aerosol forming composition, which can make the aerosol former especially adapted to be released faster than volatile species contained in a naturally occurring aerosol-generating substrate.

[0023] By adjusting the number of strands of susceptor material, the number of aerosol-forming strands or certain parameters of the helical arrangement of the strands around a longitudinal axis of the susceptor assembly, it may advantageously be possible to finely adjust and control the amount of aerosol former that is volatilised and delivered to the consumer, especially during the first moments of use after inductive heat generation has been initiated. For example, by varying the number of strands of susceptor material and the wire helix angle at which the strands of susceptor material are laid around the longitudinal axis of the susceptor, it may be possible to vary the amount of exposed surface area of the aerosol-forming strand as well as the amount of surface area of the at least one aerosol-forming strand in direct contact with the strand or strands of susceptor material.

[0024] In other preferred embodiments, which will be described in more detail below, a distance between adjacent strands of susceptor material and the mutual spatial arrangement thereof can be finely tuned and controlled. For example, this may be achieved by the provision of one or more spacer elements as additional components of the susceptor assembly. Thus, the size of gaps formed within the structure of the susceptor assembly can be adjusted, such that the gaps are adapted to host finite amounts of aerosol-generating substrate. This may advantageously provide a further degree of control over the overall amount and spatial distribution of substrate capable of releasing volatile species upon heating that is provided in close proximity of susceptor material.

[0025] As described briefly above, the present invention provides an aerosol-generating article for generating an inhalable aerosol upon heating.

[0026] The term "aerosol-generating article" is used herein to denote an article wherein an aerosol-generating substrate is heated to produce and deliver an inhalable aerosol to a consumer. As used herein, the term "aerosol-generating substrate" denotes a substrate capable of releasing volatile compounds upon heating to generate an aerosol.

[0027] In an aerosol-generating article in accordance with the present invention, an aerosol-forming composition carried by a strand of a porous, non-tobacco material that forms part of a susceptor assembly acts as one such aerosol-generating substrate. In some embodiments, as will be described in more detail below, the aerosol-generating article may comprise additional aerosol-generating substrate other than the aerosol-forming composition.

[0028] A conventional cigarette is lit when a user applies a flame to one end of the cigarette and draws air through the other end. The localised heat provided by the flame and the oxygen in the air drawn through the cigarette causes the end of the cigarette to ignite, and the resulting combustion generates an inhalable smoke. By contrast, in heated aerosol generating articles, an aerosol is generated by heating a flavour generating substrate, such as tobacco, without combustion of the flavour generating substrate. Known heated aerosol generating articles include, for example, electrically heated aerosol generating articles and aerosol generating articles in which an aerosol is generated by the transfer of heat from a combustible fuel element or heat source to a physically separate aerosol forming material.

[0029] Aerosol-generating articles according to the invention find particular application in aerosol-generating systems comprising an aerosol-generating device having an inductor for producing an alternating or fluctuating electromagnetic field. The aerosol-generating article engages with the aerosol-generating device such that the fluctuating electromagnetic field produced by the inductor induces a current in the susceptor assembly, causing the strands of susceptor material to heat up. The electrically-operated aerosol-generating device may 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 electrically-operated aerosol-generating device is preferably 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.

[0030] The aerosol-generating article may be in the form of a rod. 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.

[0031] 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.

[0032] 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.

[0033] The term "length" denotes the dimension of a component of the aerosol-generating article in the longitudinal direction. For example, it may be used to denote the dimension of the rod or of the elongate tubular elements in the longitudinal direction.

[0034] The term "aerosol former" is used herein to describe a compound which, upon volatilisation, can help convey other vaporised compounds released upon heating an aerosol-generating substrate, such as nicotine and flavourants, in an aerosol. Suitable aerosol formers for inclusion in the aerosol-forming composition are known in the art and include, but are not limited to: polyhydric alcohols, such as triethylene glycol, propylene glycol, **1**,**3**-butanediol and glycerol; 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.

[0035] The term "twisted" is used herein to describe a strand of susceptor material that is turned repeatedly, or wrapped around a longitudinal axis of the susceptor assembly. More particularly, in the context of the present invention, the term "twisted" is used to describe an arrangement wherein the strand of susceptor material is laid helically around a longitudinal axis of the susceptor assembly.

[0036] The expression "twisted together with the at least one strand of susceptor material" is used to describe an aerosol-generating strand that is similarly turned repeatedly around the longitudinal axis of the susceptor assembly and around a single strand of susceptor material or two or more strands of susceptor material, such that the aerosol-generating strand is effectively pinched between, and held in place by, the two or more strands of susceptor material.

[0037] FIGS. **1** and **2** show schematically two such configurations of a susceptor assembly for use in an aerosol-generating article in accordance with the present invention. In FIG. **1** a single aerosol-generating strand is twisted together with two strands of susceptor material. For the sake of simplicity, only the path of the aerosol-generating strand is illustrated by way of a dot-dashed line. In FIG. **2** a single aerosol-generating strand is twisted together with three strands of susceptor material. A dot-dashed line illustrates the path of a portion of the aerosol-generating strand pinched between adjacent strands of susceptor material.

[0038] These types of arrangements involving two or more strands bear similarities with the arrangements of "wire rope". A wire rope is formed of several strands of metal wire twisted into a helix forming a composite rope, in a pattern known as laid rope. Larger diameter wire ropes consist of multiple strands of such laid rope in a pattern known as cable laid.

[0039] As such, certain geometric parameters of the susceptor assembly of aerosol-generating articles in accordance with the present invention are identified and described herein with analogous nomenclature.

[0040] By way of example, the term "strand helix axis" may be used to describe the centroidal axis around which the strands are helically wound to form the susceptor assembly. In the case of the susceptor assembly of the invention it corresponds to the longitudinal axis of the susceptor assembly. The positive direction of the axis is defined to be the direction that the helix advances. By way of example, the "strand helix axis" may be parallel or coaxial with the longitudinal direction of the aerosol-generating article.

[0041] The term "angle of strand helix" (α_w)—at any point along the strand helix axis—describes the angle between the tangent vector at that point, heading in the direction that the wire helix advances, and the plane that is perpendicular to the wire helix axis and passes through that point.

[0042] As described briefly above, in an aerosol-generating article in accordance with the present invention a susceptor assembly is provided, which comprises at least one strand of susceptor material and an aerosol-generating element comprising at least one strand of a porous, non-tobacco material carrying an aerosol-forming composition comprising at least 35 percent by weight of an aerosol former.

[0043] The at least one strand of susceptor material is twisted such as to be laid helically around a longitudinal axis of the susceptor assembly. The at least one aerosol-generating strand is twisted with the at least one strand of susceptor material.

[0044] In preferred embodiments, the at least one or more strands of susceptor material comprises two or more strands of susceptor material twisted together, such that the two or more strands of susceptor material are laid helically around the longitudinal axis of the susceptor assembly, and the at least one aerosol-generating strand is twisted with the two or more strands of susceptor material. Such embodiments have the benefit that the at least one aerosol-generating strand can be more securely held in place, as portions of the at least one aerosol-generating strand are arranged between adjacent portions of the two or more strands of susceptor material. Thus, efficiency of heat transfer from the strands of susceptor material to the aerosol-generating strand can be maximised. The release of volatilised aerosol former can therefore be rapidly initiated during the very first moments of use of the aerosol-generating article. This may be very effective in countering the cold-puff effect.

[0045] In some of the embodiments wherein the at least one aerosol-generating strand is coupled with two or more strands of susceptor material, the at least one aerosol-generating strand is also laid helically around the longitudinal axis of the susceptor assembly and held in place by being pinched between at least two of the two or more strands of susceptor material. This type of arrangement is illustrated in the drawings of FIGS. **1** and **2**. By adjusting the number of aerosol-generating strands and strands of susceptor material in the susceptor assembly, it may be possible to vary the percentage of surface area of the aerosol-generating strand or strands that is exposed relative to the percentage of surface area of the aerosol-generating strand or strands that is in direct contact with one or more of the strands of susceptor material. This may offer a way of fine-tuning the amount of heat quickly transferred to the aerosol-generating strand or strands during use, as well as where the volatilised aerosol former may be more easily released within the aerosol-generating article.

[0046] In further embodiments wherein the at least one aerosol-generating strand is coupled with two or more strands of susceptor material, the at least one aerosol-generating strand extends substantially parallel to the longitudinal axis of the susceptor assembly to define a core of the susceptor assembly, the two or more strands of susceptor material being laid helically around the at least one aerosol-generating strand. This type of arrangement is illustrated schematically in the drawing of FIG. **3**.

[0047] In these embodiments, the aerosol-generating strand may be more effectively be protected against damage potentially caused by friction against other surfaces during manufacturing of the aerosol-generating article. This is because the strands of susceptor material substantially envelop the aerosol-generating strand or strands and may therefore reduce the likelihood that the aerosol-generating strand or strands comes into contact with other surfaces during manufacturing. Further, depending on their number, size and angle of strand helix, the coverage of the aerosol-generating strand or strands at the core of the susceptor assembly on the part of the strands of susceptor material may be more or less extensive, such that potentially a rather small fraction of the surface area of the aerosol-generating strand or strands may be left exposed.

[0048] In aerosol-generating articles in accordance with the present invention the at least one strand of susceptor material is a metallic strip, filament, pin or wire.

[0049] The aerosol-forming composition is preferably adsorbed, coated, impregnated or otherwise loaded onto the porous, non-tobacco material which preferably acts as an inert carrier. In other words, the porous, non-tobacco material is preferably unable to release volatile species into the aerosol formed during use.

[0050] In some embodiments, the porous material is provided in the form of a fibrous thread. Preferably, the fibrous thread comprises fibres selected from: cotton fibres, cellulose fibres, reconstituted natural fibres (including, for example, natural fibres from wood pulp) and combinations thereof.

[0051] As described briefly above, the aerosol-forming composition comprises at least 35 percent by weight of aerosol former. Preferably, the aerosol-forming composition comprises at least 40 percent by weight of aerosol former. More preferably, the aerosol-forming composition comprises at least 45 percent by weight of aerosol former. Even more preferably, the aerosol-forming composition comprises at least 50 percent by weight of aerosol former.

[0052] In particularly preferred embodiments, the aerosol-forming composition comprises at least 55 percent by weight of aerosol former, preferably at least 60 percent by weight of aerosol former, more preferably at least 70 percent by weight of aerosol former.

[0053] The aerosol-forming composition may comprise up to 95 percent by weight of aerosol former, and preferably comprises less than or equal to 90 percent by weight of aerosol former, more preferably less than or equal to 85 percent by weight of aerosol former, even more preferably less than or equal to 80 percent by weight of aerosol former.

[0054] In some embodiments, the aerosol-forming composition comprises from 35 percent by weight to about 90 percent of aerosol former, preferably from 40 percent by weight to about 90 percent of aerosol former, more preferably from 45 percent by weight to about 90 percent of aerosol former, even more preferably from 50 percent by weight to about 90 percent of aerosol former. In other embodiments, the aerosol-forming composition comprises from 35 percent by weight to about 85 percent of aerosol former, preferably from 40 percent by weight to about 85 percent of aerosol former, more preferably from 45 percent by weight to about 85 percent of aerosol former, even more preferably from 50 percent by weight to about 85 percent of aerosol former. In further embodiments, the aerosol-forming composition comprises from 35 percent by weight to about 80 percent of aerosol former, preferably from 40 percent by weight to about 80 percent of aerosol former, more preferably from 45 percent by weight to about 80 percent of aerosol former, even more preferably from 50 percent by weight to about 80 percent of aerosol former.

[0055] Preferably, the aerosol former is selected from the group consisting of triethylene glycol, propylene glycol, 1,3-butanediol, glycerol, and mixtures thereof. In particularly preferred embodiments, the aerosol former is glycerol.

[0056] Additionally, the aerosol-forming composition may comprise nicotine.

[0057] As used herein with reference to the invention, the term "nicotine" is used to describe nicotine, a nicotine base or a nicotine salt. In embodiments in which the solid aerosol-generating substrate comprises a nicotine base or a nicotine salt, the amounts of nicotine recited herein are the amount of free base nicotine or amount of protonated nicotine, respectively.

[0058] The aerosol-forming composition may comprise natural nicotine, or synthetic nicotine, or a combination of natural nicotine and synthetic nicotine.

[0059] The aerosol-forming composition may have a nicotine content of greater than or equal to 0.5 percent by weight, greater than or equal to 1 percent by weight, greater than or equal to 1.5 percent by weight, or greater than or equal to 2 percent by weight.

[0060] The aerosol-forming composition may have a nicotine content of less than or equal to 10 percent by weight, less than or equal to 8 percent by weight, less than or equal to 6 percent by weight, or less than or equal to 4 percent by weight.

[0061] The aerosol-forming composition may have a nicotine content of between 0.5 percent by weight and 10 percent by weight, between 0.5 percent by weight and 8 percent by weight, between 0.5 percent by weight and 6 percent by weight, or between 0.5 percent by weight and 4 percent by weight.

[0062] The aerosol-forming composition may have a nicotine content of between 1 percent by weight and 10 percent by weight, between 1 percent by weight and 8 percent by weight, between 1 percent by weight and 6 percent by weight, or between 1 percent by weight and 4 percent by weight.

[0063] The aerosol-forming composition may have a nicotine content of between 1.5 percent by weight and 10 percent by weight, between 1.5 percent by weight and 8 percent by weight, between 1.5 percent by weight and 6 percent by weight, or between 1.5 percent by weight and 4 percent by weight.

[0064] The aerosol-forming composition may have a nicotine content of between 2 percent by weight and 10 percent by weight, between 2 percent by weight and 8 percent by weight, between 2 percent by weight and 6 percent by weight, or between 2 percent by weight and 4 percent by weight.

[0065] In some embodiments, the aerosol-forming composition may comprise one or more carboxylic acids.

[0066] The aerosol-forming composition may comprise a plurality of carboxylic acids. That is, the aerosol-forming composition may comprise two or more carboxylic acids. For example, the aerosol-forming composition may comprise two carboxylic acids, three carboxylic acids, four carboxylic acids, or five carboxylic acids.

[0067] The aerosol-forming composition may comprise one or more carboxylic acids that do not contain any non-carboxyl hydroxyl groups.

[0068] As used herein with reference to the invention, the term "non-carboxyl hydroxyl groups" is used to describe hydroxyl groups that do not form part of a carboxyl group.

[0069] The aerosol-forming composition may comprise one or more carboxylic acids having a pKa at 25° C. in water of less than or equal to 3.5.

[0070] As used herein with reference to the invention, the term "carboxylic acids having a pKa at 25° C. in water of less than or equal to 3.5" is used to describe monoprotic carboxylic acids having a pKa at 25° C. in water of less than or equal to 3.5 and polyprotic carboxylic acids having a pKa_1 at 25° C. in water of less than or equal to 3.5.

[0071] The aerosol-forming composition may comprise a plurality of carboxylic acids having a pKa at 25° C. in water of less than or equal to 3.5. For example, the solid aerosol-generating substrate may comprise fumaric acid and maleic acid.

[0072] The aerosol-forming composition may comprise one or more carboxylic acids having a pKa at 25° C. in water of greater than or equal to 3.6.

[0073] As used herein with reference to the invention, the term "carboxylic acids having a pKa at 25° C. in water of greater than or equal to 3.6" is used to describe monoprotic carboxylic acids having a pKa at 25° C. in water of greater than or equal to 3.6 and polyprotic carboxylic acids having a pKa_1 at 25° C. in water of greater than or equal to 3.6.

[0074] For example, the aerosol-forming composition may comprise one or more carboxylic acids selected from acetic acid, benzoic acid, lactic acid, and levulinic acid.

[0075] The aerosol-forming composition may comprise a plurality of carboxylic acids having a pKa at 25° C. in water of greater than or equal to 3.6. For example, the aerosol-forming composition may comprise benzoic acid and lactic acid.

[0076] The aerosol-forming composition may comprise one or more carboxylic acids having a pKa at 25° C. in water of less than or equal to 3.5 and one or more carboxylic acids having a pKa at 25° C. in water of greater than or equal to 3.6.

[0077] For example, the aerosol-forming composition may comprise one or more carboxylic acids selected from fumaric acid, maleic acid, and malic acid and one or more carboxylic acids selected from acetic acid, benzoic acid, lactic acid, and levulinic acid.

[0078] For example, the aerosol-forming composition may comprise fumaric acid and one or more carboxylic acids selected from acetic acid, benzoic acid, lactic acid, and levulinic acid.

[0079] Preferably, the aerosol-forming composition comprises one or more carboxylic acids selected from fumaric acid, maleic acid, and malic acid.

[0080] More preferably, the aerosol-forming composition comprises one or more carboxylic acids selected from fumaric acid and maleic acid.

[0081] Most preferably, the aerosol-forming composition comprises fumaric acid.

[0082] The aerosol-forming composition may have a total carboxylic acid content of greater than or equal to 0.5 percent by weight.

[0083] As used herein with reference to the invention, the term "total carboxylic acid content" is used to describe the combined content of all carboxylic acids in the aerosol-forming composition. For example, where the solid aerosol-generating substrate comprises a plurality of carboxylic acids consisting of benzoic acid and fumaric acid, the term "total carboxylic acid content" describes the combined benzoic acid content and fumaric acid content of the solid aerosol-generating substrate.

[0084] The aerosol-forming composition may have a total carboxylic acid content of greater than or equal to 1 percent by weight, greater than or equal to 1.5 percent by weight, or greater than or equal to 2 percent by weight.

[0085] The aerosol-forming composition may have a total carboxylic acid content of less than or equal to 8 percent by weight, less than or equal to 6 percent by weight, or less than or equal to 4 percent by weight.

[0086] The aerosol-forming composition may have a total carboxylic acid content of between 0.5 percent by weight and 8 percent by weight, between 0.5 percent by weight and 6 percent by weight, or between 0.5 percent by weight and 4 percent by weight.

[0087] The aerosol-forming composition may have a total carboxylic acid content of between 1 percent by weight and 8 percent by weight, between 1 percent by weight and 6 percent by weight, or between 1 percent by weight and 4 percent by weight.

[0088] The aerosol-forming composition may have a total carboxylic acid content of between 1.5 percent by weight and 8 percent by weight, between 1.5 percent by weight and 6 percent by weight, or between 1.5 percent by weight and 4 percent by weight.

[0089] The aerosol-forming composition may have a total carboxylic acid content of between 2 percent by weight and 8 percent by weight, between 2 percent by weight and 6 percent by weight, or between 2 percent by weight and 4 percent by weight.

[0090] The aerosol-forming composition may comprise one or more cellulose based agents.

[0091] As used herein with reference to the invention, the term "cellulose based agent" is used to describe a cellulosic substance. Examples of cellulose based agents include cellulose based film-forming agents, cellulose based strengthening agents and cellulose based binding agents.

[0092] The aerosol-forming composition may comprise a plurality of cellulose based agents. That is, the solid aerosol-generating substrate may comprise two or more cellulose based agents. For example, the aerosol-forming composition may comprise two cellulose based agents, three cellulose based agents, four cellulose based agents, or five cellulose based agents.

[0093] The aerosol-forming composition may have a total cellulose based agent content of greater than or equal to 25 percent by weight, or greater than or equal to 30 percent by weight.

[0094] As used herein with reference to the invention, the term "total cellulose based agent" is used to describe the combined content of all cellulose based agents in the aerosol-forming composition. For example, where the aerosol-forming composition comprises a plurality of cellulose based agents consisting of a cellulose based film-forming agent, a cellulose based strengthening agent, and a cellulose based binding agent, the term "total cellulose based agent content" describes the combined cellulose based film-forming agent content, cellulose based strengthening agent content, and cellulose based binding agent content of the aerosol-forming composition.

[0095] In some embodiments, the aerosol-forming composition may have a total cellulose based agent content of greater than or equal to 35 percent by weight.

[0096] A diameter of the at least one strand of susceptor material may be at least 0.25 millimetres. Preferably, a diameter of the at least one strand of susceptor material is at least 0.3 millimetres. More preferably, a diameter of the at least one strand of susceptor material is at least 0.4 millimetres. Even more preferably, a diameter of the at least one strand of susceptor material is at least 0.5 millimetres.

[0097] A diameter of the at least one strand of susceptor material may be up to 2 millimetres. Preferably, a diameter of the at least one strand of susceptor material is less than or equal to 1.5 millimetres. More preferably, a diameter of the at least one strand of susceptor material is less than or equal to 1.25 millimetres. Even more preferably, a diameter of the at least one strand of susceptor material is less than or equal to 1 millimetre.

[0098] In some embodiments, a diameter of the at least one strand of susceptor material is from 0.3 millimetres to 1.5 millimetres, preferably from 0.3 millimetres to 1.25 millimetres, more preferably from 0.3 millimetres to 1 millimetre. In other embodiments, a diameter of the at least one strand of susceptor material is from 0.4 millimetres to 1.5 millimetres, preferably from 0.4 millimetres to 1.25 millimetres, more preferably from 0.4 millimetres to 1 millimetre. In further embodiments, a diameter of the at least one strand of susceptor material is from 0.5 millimetres to 1.5 millimetres, preferably from 0.5 millimetres to 1.25 millimetres, more preferably from 0.5 millimetres to 1 millimetre.

[0099] A diameter of the at least one aerosol-generating strand may be at least 0.5 millimetres. Preferably, a diameter of the at least one aerosol-generating strand is at least 0.6 millimetres. More preferably, a diameter of the at least one aerosol-generating strand is at least 0.7 millimetres.

[0100] A diameter of the at least one aerosol-generating strand may be up to 2 millimetres. Preferably, a diameter of the at least one aerosol-generating strand is less than or equal to 1.5 millimetres. More preferably, a diameter of the at least one aerosol-generating strand is less than or equal to 1.25 millimetres. Even more preferably, a diameter of the at least one aerosol-generating strand is less than or equal to 1 millimetre.

[0101] In some embodiments, a diameter of the at least one aerosol-generating strand is from 0.5 millimetres to 1.5 millimetres, preferably from 0.5 millimetres to 1.25 millimetres, more preferably from 0.5 millimetres to 1 millimetre. In other embodiments, a diameter of the at least one aerosol-generating strand is from 0.6 millimetres to 1.5 millimetres, preferably from 0.6 millimetres to 1.25 millimetres, more preferably from 0.6 millimetres to 1 millimetre. In further embodiments, a diameter of the at least one aerosol-generating strand is from 0.7 millimetres to 1.5 millimetres, preferably from 0.7 millimetres to 1.25 millimetres, more preferably from 0.7 millimetres to 1 millimetre.

[0102] In certain embodiments, a strand helix angle of the at least one strand of susceptor material is at least 20 degrees. Preferably, a strand helix angle of the at least one strand of susceptor material is at least 30 degrees. More preferably, a strand helix angle of the at least one strand of susceptor material is at least 35 degrees. Even more preferably, a strand helix angle of the at least one strand of susceptor material is at least 40 degrees. In particularly preferred embodiments, a strand helix angle of the at least one strand of susceptor material is at least 45 degrees.

[0103] A strand helix angle of the at least one strand of susceptor material is less than or equal to 80 degrees. Preferably, a strand helix angle of the at least one strand of susceptor material is less than or equal to 70 degrees. More preferably, a strand helix angle of the at least one strand of susceptor material is less than or equal to 65 degrees. Even more preferably, a strand helix angle of the at least one strand of susceptor material is less than or equal to 60 degrees. In particularly preferred embodiments, a strand helix angle of the at least one strand of susceptor material is less than or equal to 55 degrees.

[0104] In some embodiments, a strand helix angle of the at least one strand of susceptor material is from 20 degrees to 80 degrees, preferably from 20 degrees to 70 degrees, more preferably from 20 degrees to 65 degrees, even more preferably from 20 degrees to 60 degrees, and most preferably from 20 degrees to 55 degrees.

[0105] In some embodiments, a strand helix angle of the at least one strand of susceptor material is from 30 degrees to 80 degrees, preferably from 30 degrees to 70 degrees, more preferably from 30 degrees to 65 degrees, even more preferably from 30 degrees to 60 degrees, and most preferably from 30 degrees to 55 degrees.

[0106] In some embodiments, a strand helix angle of the at least one strand of susceptor material is from 35 degrees to 80 degrees, preferably from 35 degrees to 70 degrees, more preferably from 35 degrees to 65 degrees, even more preferably from 35 degrees to 60 degrees, and most preferably from 35 degrees to 55 degrees.

[0107] In some embodiments, a strand helix angle of the at least one strand of susceptor material is from 40 degrees to 80 degrees, preferably from 40 degrees to 70 degrees, more preferably from 40 degrees to 65 degrees, even more preferably from 40 degrees to 60 degrees, and most preferably from 40 degrees to 55 degrees.

[0108] In some embodiments, a strand helix angle of the at least one strand of susceptor material is from 45 degrees to 80 degrees, preferably from 45 degrees to 70 degrees, more preferably from 45 degrees to 65 degrees, even more preferably from 45 degrees to 60 degrees, and most preferably from 45 degrees to 55 degrees. Without wishing to be bound by theory, it is understood that by laying the at least one strand of susceptor material with a strand helix angle falling within the ranged described above, it is advantageously possible to provide a susceptor assembly that has a particularly good structural strength and wherein the at least one aerosol-generating strand is held in place very stably. Additionally, by laying the at least one strand of susceptor material with a strand helix angle falling within the ranged described above, it may advantageously be possible to protect the at least one aerosol-generating strand from potential damages caused by friction during manufacture and handling of the susceptor assembly. At the same time, in one such susceptor assembly satisfactory heat transfer from the strand or strands of susceptor material to the at least one aerosol-generating strand may be combined with a particularly effective matter transfer at the basis of aerosol generation and delivery to the consumer. With a helix angle ranging about 20 degrees, there is more material per unit of length, providing the capacity to generate more heat. With a helix angle ranging about 80 degrees, manufacturing costs are lowered, because there is less material per unit of length.

[0109] In some embodiments, the aerosol-generating article comprises an aerosol-generating rod comprising a primary aerosol-generating substrate. The susceptor assembly is thermally coupled with the primary aerosol-generating substrate. In more detail, this is achieved by having the susceptor assembly extend longitudinally within the aerosol-generating rod and be embedded within the aerosol-generating substrate.

[0110] By way of example, the aerosol-generating article may comprise a sheet of homogenised tobacco material gathered to form a rod extending along a longitudinal axis of the aerosol-generating article. The susceptor assembly may be embedded within the gathered sheet of homogenised tobacco material. As an alternative, the aerosol-generating article may comprise a rod comprising a cut filler obtained by cutting tobacco leaf material or a reconstituted or homogenised tobacco material. The susceptor assembly may be embedded within the cut filler, for example such as to be surrounded by cut filler.

[0111] In these embodiments, the rod comprising an aerosol-generating substrate provides an additional source of aerosol that, during use, will generally reach a temperature sufficient to release aerosol species later than the aerosol-forming composition carried by the at least one aerosol-generating strand in the susceptor assembly. Thus, by adjusting the content of aerosol-forming composition in the aerosol-generating article relative to the content of the additional aerosol-generating substrate, as well as by varying the formulation of the aerosol-forming composition or the nature and composition of the additional aerosol-generating substrate, aerosol-generating articles can be provided that may be associated with specifically tailored aerosol delivery profiles, including flavour delivery profiles. In particular, it may possible to fine-tune the release of aerosol from the susceptor assembly such as to counter a possible cold-puff effect associated with the additional aerosol-generating substrate. For example, the release of aerosol from the susceptor assembly may be fine-tuned depending on one or more of: the nature and composition of the additional aerosol-generating substrate; the geometry of the rod comprising the additional aerosol-generating substrate; the heating profile over time, etc.

[0112] In certain embodiments, the susceptor assembly further comprises one or more spacer elements of a non-conductive material, the one or more spacer elements configured to create gaps between two adjacent ones of the two or more strands of susceptor material, such that respective portions of the two adjacent ones of the two or more strands of susceptor material are at a predetermined distance from one another.

[0113] The aerosol-generating article may comprise a secondary aerosol-generating substrate provided in at least one of the predetermined gaps.

[0114] This may advantageously allow for an even more efficient use of the volume occupied within the aerosol-generating article by the susceptor assembly, since a greater fraction of such volume may be occupied by an active substance that contributes to the overall aerosol generation. Additionally, by selecting a secondary aerosol-generating substrate that is adapted to release volatile species at a different temperature compared with the aerosol-generating strand and the aerosol former contained therein, it may be possible to further broaden the scope of flavour release profiles that can be provided to the consumer. For example, the secondary aerosol-generating substrate may be adapted to release volatile species with some delay compared with the aerosol-generating strand and the aerosol former contained therein.

[0115] In those embodiments wherein the susceptor assembly is thermally coupled with a primary aerosol-generating substrate, the secondary aerosol-generating substrate may, for example, be adapted to release volatile species before the primary aerosol-generating substrate or substantially at the same time. This enables a very fine tuning of aerosol release and delivery to the consumer, wherein by controlling when and in what amounts different aerosol species are released from the various sources contained in the aerosol-generating article, a great number of different combinations and flavour and delivery profiles may be devised.

[0116] In some of these embodiments, the one or more spacer elements comprise a bead provided on one of the two or more strands of susceptor material.

[0117] A bead may provide a spacer element that is easy to combine with the two or more strands of susceptor material during manufacture of the susceptor assembly. For example, a bead may be provided as a droplet of heat-resistant glue deposited onto a strand of susceptor material. One such bead may have the benefit of a substantially smooth outer surface, which is desirable as it is less likely to damage an aerosol-generating strand when the aerosol-generating strand is combined with a bead-bearing strand of susceptor material.

[0118] Preferably, an equivalent diameter of the bead is at least 1.5 times a diameter of the strand of susceptor material. More preferably, an equivalent diameter of the bead is at least 2 times a diameter of the strand of susceptor material.

[0119] In some embodiments, an equivalent diameter of the bead may be at least 0.75 millimetres, preferably at least 1 millimetre, more preferably at least 1.25 millimetres, even more preferably at least 1.5 millimetres.

[0120] In some embodiments, an equivalent diameter of the bead may be less than or equal to 3 millimetres, preferably less than or equal to 2.5 millimetres, more preferably less than or equal to 2 millimetres.

[0121] With a bead having an equivalent diameter falling within the ranges described above, the gaps created between adjacent strands may be easy to fill with additional aerosol-generating substrate.

[0122] In preferred embodiments, the one or more spacer elements comprise a plurality of beads, the beads being equally spaced along a length of the one of the two or more strands of susceptor material.

[0123] Such evenly distributed beads force the strands to be regularly spaced apart, and so voids are provided with a predetermined pattern along the length of the strand or strands, the voids being adapted to receive aerosol-generating substrate, such as for example in the form of a gel.

[0124] In other ones of these embodiments, the one or more spacer elements comprise a plate comprising one or more openings, wherein the plate is arranged transversely to the longitudinal axis of the susceptor assembly, and each one of the one or more openings is adapted to receive a corresponding one of the two or more strands of susceptor material.

[0125] Use of one such plate as a spacer element may have the benefit that by controlling the size and mutual arrangement of the openings extending through the plate one may have a greater control over how different strands in the susceptor assembly are positioned relative to each other.

[0126] Preferably, the plate is circular and the one or more openings are equally spaced about the longitudinal axis.

[0127] Use of a substantially circular plate may be advantageous in that it is highly compatible with a pseudo-cylindrical shape of the susceptor assembly and, more importantly, of a rod-shaped aerosol-generating article containing the susceptor assembly. By having the openings equally spaced about the longitudinal axis of the plate, one may advantageously better control the arrangement of the strands within the susceptor assembly relative to the longitudinal axis of the susceptor assembly. This may help ensure a more homogenous generation of heat during use, as well as a more homogenous heat transfer and aerosol generation and delivery during use.

[0128] The plate may comprise a central opening extending through the plate coaxially with the longitudinal axis.

[0129] Providing a spacer plate with a central opening may be desirable particularly if such central opening is used to receive an aerosol-generating strand, particularly in those embodiments wherein the aerosol-generating strand extends at the core of the susceptor assembly. In this case, the central opening of the spacer plate may be used to stably hold the aerosol-generating strand in a core position along the longitudinal axis of the susceptor assembly.

[0130] In an embodiment, an aerosol-generating article for generating an inhalable aerosol upon heating according to the present invention may comprise a susceptor assembly, wherein the susceptor assembly comprises at least one strand of susceptor material, the at least one strand of susceptor material being twisted such as to be laid helically around a longitudinal axis of the susceptor assembly; and an aerosol-generating element comprising at least one aerosol-forming strand. The susceptor assembly further comprises one or more spacer elements of a non-conductive material, the one or more spacer elements configured to create gaps between two adjacent ones of the at least one strand of susceptor material and the at least one aerosol-forming strand of the aerosol-generating element, such that respective portions of two adjacent ones of the at least one strand of susceptor material and the at least one aerosol-forming strand of the aerosol-generating element are at a predetermined distance from one another. An aerosol-generating article in accordance with the present invention may further comprise a downstream section at a location downstream of the susceptor assembly. For example, in those embodiments wherein the aerosol-generating article comprises a rod comprising aerosol-generating substrate with which the susceptor assembly is thermally coupled, such as by being embedded in the aerosol-generating substrate, the downstream section may be at a location downstream of the rod.

[0131] The downstream section may comprise one or more downstream elements.

[0132] The downstream section may comprise a hollow section between a mouth end of the aerosol-generating article and the susceptor assembly. The hollow section may comprise a hollow tubular element.

[0133] As used herein, terms such as "hollow tubular segment" and "hollow tubular element" are used to denote a generally elongate element defining a lumen or airflow passage along a longitudinal axis thereof. In particular, the term "tubular" is used with reference to an element or segment having a substantially cylindrical cross-section and defining at least one airflow conduit establishing an uninterrupted fluid communication between an upstream end of the tubular element or segment and a downstream end of the tubular element or segment. However, it will be understood that alternative geometries (for example, alternative cross-sectional shapes) of the tubular element or segment may be possible.

[0134] In the context of the present invention a hollow tubular segment or hollow tubular element provides an unrestricted flow channel. This means that the hollow tubular segment or hollow tubular element provides a negligible level of resistance to draw (RTD).

[0135] The resistance to draw (RTD) of an aerosol-generating article or of a component thereof, such as a segment of filtration material, may be assessed as the negative pressure that has to be applied to a downstream end of the article or component in order to sustain a steady volumetric flow of air of 17.5 ml/s through the article or component. The skilled person may find further details about the measurement method, test conditions, etc. in ISO 6565: 2015 (2015).

[0136] The downstream section may comprise a support element positioned downstream of the susceptor assembly. For example, the support element may be provided immediately downstream of the susceptor assembly, and preferably in abutting arrangement with the susceptor assembly or with a segment—such as a rod of aerosol-generating substrate—within which the susceptor assembly may be provided. The support element may for example be in the form of a plug of cellulose acetate. The support element itself may be hollow.

[0137] The downstream section may comprise an aerosol-cooling element positioned downstream of the susceptor assembly. The aerosol-cooling element may be provided immediately downstream of the susceptor assembly or immediately downstream of a segment—such as a rod of aerosol-generating substrate—within which the susceptor assembly may be provided. Alternatively, another element may be provided between the susceptor assembly or segment comprising the susceptor assembly and the aerosol-cooling element. For example, a support element as described above may be positioned between the susceptor assembly or segment comprising the susceptor assembly and the aerosol-cooling element. In such case, all three elements may be arranged in abutting relationship along the longitudinal axis of the aerosol-generating article.

[0138] In certain embodiments, an aerosol-cooling element may be provided in the form of a hollow tubular element comprising a ventilation zone arranged at a location along the hollow tubular element and configured to enable ingress of air from the outer environment when a consumer draws upon the aerosol-generating article.

[0139] The downstream section may comprise a mouthpiece element. The mouthpiece element may be positioned at the downstream end of the aerosol-generating article, and therefore not only downstream of the susceptor assembly or of a segment comprising the susceptor assembly, but also downstream of any other one of the optional elements described above. The mouthpiece element extends all the way to the mouth end of the aerosol-generating article.

[0140] Preferably, the mouthpiece element comprises at least one mouthpiece filter segment of a fibrous filtration material. Suitable fibrous filtration materials would be known to the skilled person. Particularly preferably, the at least one mouthpiece filter segment comprises a cellulose acetate filter segment formed of cellulose acetate tow.

[0141] In certain embodiments of the invention, the downstream section may comprise a mouth end cavity at the downstream end, downstream of a mouthpiece filter segment as described above. The mouth end cavity may be defined by a hollow tubular element provided at the downstream end of the mouthpiece. The mouth end cavity may be defined by the outer wrapper of the mouthpiece element, wherein the outer wrapper extends in a downstream direction from the mouthpiece element.

[0142] The mouthpiece element may optionally comprise a flavourant, which may be provided in any suitable form. For example, the mouthpiece element may comprise one or more capsules, beads or granules of a flavourant, or one or more flavour loaded threads or filaments.

[0143] Preferably, the mouthpiece element has a low particulate filtration efficiency.

[0144] Preferably, the mouthpiece is formed of a segment of a fibrous filtration material.

[0145] Preferably, the mouthpiece element is circumscribed by a plug wrap.

[0146] An aerosol-generating article in accordance with the present invention may comprise an upstream section at a location upstream of the susceptor assembly. For example, in those embodiments wherein the aerosol-generating article comprises a rod comprising aerosol-generating substrate with which the susceptor assembly is thermally coupled, such as by being embedded in the aerosol-generating substrate, the upstream section may be at a location upstream of the rod.

[0147] The upstream section may comprise one or more upstream elements. In some embodiments, the upstream section may comprise an upstream element arranged immediately upstream of the susceptor assembly or of a segment comprising the susceptor assembly.

[0148] The upstream element may provide an improved appearance to the upstream end of the aerosol-generating article. Furthermore, if desired, the upstream element may be used to provide information on the aerosol-generating article, such as information on brand, flavour, content, or details of the aerosol-generating device that the article is intended to be used with.

[0149] The upstream element may be a porous plug element, such as a plug of cellulose acetate tow.

[0150] As described briefly above, an aerosol-generating system in accordance with the present invention comprises a heating device and an aerosol-generating article in line with the foregoing description.

[0151] Thus, the present invention also relates to an aerosol-generating system comprising one such heating device, such as an electrically heated aerosol-generating device, and an aerosol-generating article including a susceptor assembly as described above.

[0152] Examples of suitable aerosol-generating devices will be known to the person of skill in the art. In general, suitable aerosol-generating devices will comprise a cavity (that is, a heating chamber) for receiving the aerosol-generating article, and one or more inductor elements adapted to generate a fluctuating electromagnetic field within the cavity. Additionally, a suitable aerosol-generating device will typically comprise an electrical power supply connected to the one or more inductor elements; and a control element configured to control the supply of power from the power supply to the one or more inductor elements.

[0153] Each inductor element may comprise one or more coils that generate a fluctuating electromagnetic field. The coil or coils may surround the cavity.

[0154] Preferably the aerosol-generating device is capable of generating a fluctuating electromagnetic field of between 1 and 30 MHz, for example, between 2 and 10 MHz, for example between 5 and 7 MHz.

[0155] Preferably the device is capable of generating a fluctuating electromagnetic field having a field strength (H-field) of between 1 and 5 kA m, for example between 2 and 3 kA/m, for example about 2.5 kA/m.

[0156] Preferably, the aerosol-generating device is a portable or handheld aerosol-generating device that is comfortable for a user to hold between the fingers of a single hand.

[0157] The aerosol-generating device may be substantially cylindrical in shape

[0158] The aerosol-generating device may have a length of between approximately 70 millimetres and approximately 120 millimetres.

[0159] The power supply may be any suitable power supply, for example a DC voltage source such as a battery. In one embodiment, the power supply is a Lithium-ion battery. Alternatively, the power supply may be a Nickel-metal hydride battery, a Nickel cadmium battery, or a Lithium based battery, for example a Lithium-Cobalt, a Lithium-Iron-Phosphate, Lithium Titanate or a Lithium-Polymer battery.

[0160] The control element may be a simple switch. Alternatively the control element may be electric circuitry and may comprise one or more microprocessors or microcontrollers.

[0161] Features described in relation to one or more aspects may equally be applied to other aspects of the invention. In particular, features described in relation to the susceptor assembly of the aerosol-generating article may be equally applied to the aerosol-generating system.

[0162] The invention is defined in the claims. However, below there is provided a non-exhaustive list of non-limiting examples. Any one or more of the features of these examples may be combined with any one or more features of another example, embodiment, or aspect described herein.

[0163] Example Ex1: An aerosol-generating article for generating an inhalable aerosol upon heating, the aerosol-generating article comprising: a susceptor assembly comprising:

[0164] at least one strand of susceptor material, the at least one strand of susceptor material being twisted such as to be laid helically around a longitudinal axis of the susceptor assembly; and at least one aerosol-generating strand, wherein the at least one aerosol-generating strand is twisted with the at least one strand of susceptor material.

[0165] Example Ex2: An aerosol-generating article according to Ex1, wherein the at least one aerosol-generating strand comprises a strand of a porous, non-tobacco material carrying an aerosol-forming composition.

[0166] Example Ex3: An aerosol-generating article according to Ex2, wherein the aerosol-forming composition comprises at least 35 percent by weight of an aerosol former.

[0167] Example Ex4: An aerosol-generating article according to Ex2, wherein the aerosol-forming composition comprises at least 40 percent by weight of an aerosol former.

[0168] Example Ex5: An aerosol-generating article according to Ex2, wherein the aerosol-forming composition comprises at least 45 percent by weight of an aerosol former.

[0169] Example Ex6: An aerosol-generating article according to Ex2, wherein the aerosol-forming composition comprises at least 50 percent by weight of an aerosol former.

[0170] Example Ex7: An aerosol-generating article according to any one of Examples Ex3 to Ex6, wherein the aerosol former is selected from the group consisting of triethylene glycol, propylene glycol, 1,3-butanediol, glycerol; glycerol mono-, di-and triacetate; dimethyl dodecanedioate and dimethyl tetradecanedioate.

[0171] Example Ex8: An aerosol-generating article according to any one of the preceding Examples, wherein the at least one or more strands of susceptor material comprises two or more strands of susceptor material twisted together, such that the two or more strands of susceptor material are laid helically around the longitudinal axis of the susceptor assembly, and the at least one aerosol-generating strand is twisted with the two or more strands of susceptor material.

[0172] Example Ex9: An aerosol-generating article according to Ex8, wherein the at least one aerosol-generating strand is also laid helically around the longitudinal axis of the susceptor assembly and held in place by being pinched between at least two of the two or more strands of susceptor material.

[0173] Example Ex10: An aerosol-generating article according to Ex8, wherein the at least one aerosol-generating strand extends substantially parallel to the longitudinal axis of the susceptor assembly to define a core of the susceptor assembly, the two or more strands of susceptor material being laid helically around the at least one aerosol-generating strand.

[0174] Example Ex11: An aerosol-generating article according to any one of the preceding Examples, wherein the at least one strand of susceptor material is a metallic strip, filament, pin or wire.

[0175] Example Ex12: An aerosol-generating article according to any one of the preceding Examples, wherein the aerosol-forming composition is adsorbed, coated, impregnated or otherwise loaded onto the porous material.

[0176] Example Ex13: An aerosol-generating article according to any one of the preceding Examples, wherein the porous material is a fibrous material.

[0177] Example Ex14: An aerosol-generating article according to any one of the preceding Examples, wherein the porous material is provided in the form of a fibrous thread.

[0178] Example Ex 15: An aerosol-generating article according to Ex 14, wherein the fibrous thread comprises fibres selected from: cotton fibres, cellulose fibres, reconstituted natural fibres and combinations thereof.

[0179] Example Ex16: An aerosol-generating article according to any one of the preceding Examples, wherein a diameter of the at least one aerosol-generating strand is at least 0.5 millimetres.

[0180] Example Ex17: An aerosol-generating article according to any one of the preceding Examples, wherein a diameter of the at least one aerosol-generating strand is less than or equal to 1.5 millimetres.

[0181] Example Ex18: An aerosol-generating article according to any one of the preceding Examples, wherein a diameter of the at least one strand of susceptor material is at least 0.3 millimetres.

[0182] Example Ex19: An aerosol-generating article according to any one of the preceding Examples, wherein a diameter of the at least one strand of susceptor material is less than or equal to 1.5 millimetres.

[0183] Example Ex20: An aerosol-generating article according to any one of the preceding Examples, wherein a strand helix angle of the at least one strand of susceptor material is less than 80 degrees.

[0184] Example Ex21: An aerosol-generating article according to any one of the preceding Examples, wherein the aerosol-generating article comprises an aerosol-generating rod comprising an aerosol-generating substrate; wherein the susceptor assembly is thermally coupled with the first aerosol-generating substrate.

[0185] Example Ex 22: An aerosol-generating article according to Ex 21, wherein the susceptor assembly extends longitudinally within the aerosol-generating rod and is embedded within the aerosol-generating substrate.

[0186] Example Ex 23: An aerosol-generating article according to any one of Examples Ex Ex8 to Ex22, wherein the susceptor assembly further comprises one or more spacer elements of a non-conductive material, the one or more spacer elements configured to create gaps between two adjacent ones of the two or more strands of susceptor material, such that respective portions of the two adjacent ones of the two or more strands of susceptor material are at a predetermined distance from one another.

[0187] Example Ex 24: An aerosol-generating article according to Ex 23, comprising a secondary aerosol-generating substrate provided in at least one of the predetermined gaps.

[0188] Example Ex 25: An aerosol-generating article according to Ex 23, wherein the one or more spacer elements comprise a bead provided on one of the two or more strands of susceptor material.

[0189] Example Ex26: An aerosol-generating article according to Ex 25, wherein an equivalent diameter of the bead is at least 0.75 millimetres.

[0190] Example Ex 27: An aerosol-generating article according to Ex 26, wherein the one or more spacer elements comprise a plurality of beads, the beads being equally spaced along a length of the one of the two or more strands of susceptor material.

[0191] Example Ex 28: An aerosol-generating article according to any one of Examples Ex 23 to Ex 27, wherein the one or more spacer elements comprise a plurality of beads, the beads being equally spaced along a length of the one of the two or more strands of susceptor material.

[0192] Example Ex 28: An aerosol-generating article according to Ex 23 or Ex 24, wherein the one or more spacer elements comprise a plate comprising one or more openings, wherein the plate is arranged transversely to the longitudinal axis of the susceptor assembly, and each one of the one or more openings is adapted to receive a corresponding one of the two or more strands of susceptor material.

[0193] Example Ex 29: An aerosol-generating article according to Ex 28, wherein the plate is circular and the one or more openings are equally spaced about the longitudinal axis.

[0194] Example Ex30: An aerosol-generating article according to Ex 28 or Ex 29, wherein the plate comprises a central opening extending through the plate coaxially with the longitudinal axis.

[0195] Example Ex31: An aerosol-generating article according to one of Examples Ex 28 to Ex 30, wherein the one or more spacer elements comprise a plurality of plates equally spaced along the length of the susceptor assembly, wherein each plate comprises one or more openings.

[0196] Example Ex32: An aerosol-generating article for generating an inhalable aerosol upon heating, the aerosol-generating article comprising:

[0197] an aerosol-generating rod comprising a first aerosol-generating substrate; and

[0198] a susceptor assembly thermally coupled with the first aerosol-generating substrate;

[0199] wherein the susceptor assembly comprises:

[0200] two or more strands of susceptor material twisted together, such that the two or more strands of susceptor material are laid helically around a longitudinal axis of the susceptor assembly;

[0201] one or more spacer elements of a non-conductive material, the one or more spacer elements configured to create gaps between two adjacent ones of the two or more strands of susceptor material, such that respective portions of the two adjacent ones of the two or more strands of susceptor material are at a predetermined distance from one another;

[0202] and a second aerosol-generating substrate provided in at least one of the predetermined gaps.

[0203] Example Ex 33: An aerosol-generating system comprising a heating device and an aerosol-generating article according to any one of Examples Ex1 to Ex32.

[0204] Example Ex 34: An aerosol-generating article for generating an inhalable aerosol upon heating, the aerosol-generating article comprising a susceptor assembly, the susceptor assembly comprising: at least one strand of susceptor material, the at least one strand of susceptor material being twisted such as to be laid helically around a longitudinal axis of the susceptor assembly; and an aerosol-generating element comprising at least one strand; wherein the susceptor assembly further comprises one or more spacer elements of a non-conductive material, the one or more spacer elements configured to create gaps between two adjacent ones of the at least one strand of susceptor material and the at least one strand of the aerosol-generating element, such that respective portions of two adjacent ones of the at least one strand of susceptor material and the at least one strand of the aerosol-generating element are at a predetermined distance from one another.

[0205] Examples will now be further described with reference to the figures in which:

[0206] FIG. **1** is a schematic illustration of a detail of a susceptor assembly in an embodiment of an aerosol-generating article in accordance with the present invention;

[0207] FIG. **2** is a schematic illustration of a detail of a susceptor assembly in another embodiment of an aerosol-generating article in accordance with the present invention;

[0208] FIG. **3** is a schematic illustration of a detail of a susceptor assembly in yet another embodiment of an aerosol-generating article in accordance with the present invention;

[0209] FIG. **4** is a schematic illustration of a detail of a susceptor assembly in a further embodiment of an aerosol-generating article in accordance with the present invention, wherein the susceptor assembly comprises a plurality of bead-shaped spacer elements;

[0210] FIG. **5** is a schematic illustration of alternative spacer elements for use in a susceptor assembly of an aerosol-generating article in accordance with the present invention; and

[0211] FIG. **6** is a schematic side cross-sectional view of an aerosol-generating article in accordance with the present invention.

[0212] A detail of a susceptor assembly **100** for use in an aerosol-generating article in accordance with the present invention is shown in FIG. **1**. The susceptor assembly **100** comprises a strand **102** of susceptor material, which is twisted such as to be laid helically around a longitudinal axis of the susceptor assembly **100**. Further, the susceptor assembly **100** comprises one aerosol-generating strand **104**. This is provided in the form of a thread of cotton and carries an aerosol-forming composition comprising at least 35 percent by weight of an aerosol former. The aerosol-generating strand **104** is twisted with the strand **102** of susceptor material. As shown in FIG. **1**, the susceptor assembly **100** also comprises a further strand **106** of susceptor material, which is also laid helically around the longitudinal axis of the susceptor assembly, and twisted with the strand **102** of susceptor material and the aerosol-generating strand **104**. As illustrated, portions of the aerosol-generating strand **104** are pinched between respective portions of the strands **102**, **106** of susceptor material, and so are held in place within the susceptor assembly. At the same time, this ensures an intimate contact between the susceptor material and the cotton thread loaded with the aerosol-forming composition, which facilitates heat transfer towards the aerosol former carried by the cotton thread during use.

[0213] Another embodiment of a susceptor assembly **200** for use in an aerosol-generating article in accordance with the present invention is shown in FIG. **2**. The overall structure of the susceptor assembly **200** of FIG. **2** is similar to the overall structure of the susceptor assembly **100** of FIG. **1**. However, the susceptor assembly **200** comprises three strands **202**, **206**, and **208** of susceptor material twisted together with one aerosol-generating strand **204**. The dash-dotted line in FIG. **2** indicates a portion of the aerosol-generating strand **204** that is pinched amongst respective portions of the strands **202**, **206**, and **208** of susceptor material. This arrangement may provide increased stability to the aerosol-generating strand within the susceptor assembly.

[0214] A further embodiments of a susceptor assembly **300** for use in an aerosol-generating article in accordance with the present invention is shown in FIG. **3**. The susceptor assembly **300** of FIG. **3** comprises an aerosol-generating strand **304** that defines a core of the susceptor assembly and extends along a longitudinal axis of the susceptor assembly. Further, the susceptor assembly **300** comprises five strands

302, **306**, **308**, **310**, and **312** of susceptor material that are twisted such as to be laid helically around the aerosol-generating strand. Thus, the aerosol-generating strand **304** at the core is especially protected from friction against other surfaces during manufacture of the aerosol-generating article, since it is substantially enveloped by the strands of susceptor material.

[0215] FIG. **4** shows yet another embodiment of a susceptor assembly **400** for use in an aerosol-generating article in accordance with the present invention. Like the susceptor assembly **100** of FIG. **1**, the susceptor assembly **400** of FIG. **4** comprises two strands **402**, and **406** of susceptor material twisted together with one aerosol-generating strand **404**. The dash-dotted line in FIG. **4** indicates a portion of the aerosol-generating strand **404** that is pinched amongst respective portions of the strands **402** and **406** of susceptor material. Spacer elements in the form of beads **408** are arranged substantially equally spaced along the strand **402** of susceptor material, and are adapted to maintain certain portions of the strands **402** and **406** of susceptor material at a predetermined distance from one another. Thus, gaps **10** are defined between such portions of the strands **402** and **406** of susceptor material, which may host additional aerosol-generating substrate.

[0216] FIG. **5** shows alternative forms in which a spacer element may be provided for inclusion in a susceptor element of the type shown in FIG. **4**. All three spacer elements **508**, **608**, and **708** shown in FIG. **4** are in the form of a plate element comprising one or more openings that extend through the plate element. Plate element **508** comprises a single opening **512** arranged substantially at the centre of the plate element **508**. Plate element **608** comprises two openings **612** that are equally spaced about the longitudinal axis of the plate element. Plate element **708** comprises both a plurality of openings **712** arranged substantially equally spaced about the longitudinal axis of the plate element and a central opening **714**. The opening or openings in each plate element may receive a respective one or more of the strands forming the susceptor assembly, such as to keep them at a predetermined distance from one another or, more generally, to control an overall shape and volume of the susceptor assembly.

[0217] An example of an aerosol-generating article **10** in accordance with the present invention is shown in FIG. **6**.

[0218] The aerosol-generating article **10** shown in FIG. **6** comprises a rod **12** of aerosol-generating substrate **12** and a downstream section **14** at a location downstream of the rod **12** of aerosol-generating substrate. Further, the aerosol-generating article **10** comprises an upstream section **16** at a location upstream of the rod **12** of aerosol-generating substrate. Thus, the aerosol-generating article **10** extends from an upstream or distal end **18** to a downstream or mouth end **20**.

[0219] The aerosol-generating article has an overall length of about 45 millimetres.

[0220] The downstream section **14** comprises a support element **22** located immediately downstream of the rod **12** of aerosol-generating substrate, the support element **22** being in longitudinal alignment with the rod **12**. In the embodiment of FIG. **1**, the upstream end of the support element **18** abuts the downstream end of the rod **12** of aerosol-generating substrate. In addition, the downstream section **14** comprises an aerosol-cooling element **24** located immediately downstream of the support element **22**, the aerosol-cooling element **24** being in longitudinal alignment with the rod **12** and the support element **22**. In the embodiment of FIG. **1**, the upstream end of the aerosol-cooling element **24** abuts the downstream end of the support element **22**.

[0221] The support element **22** and the aerosol-cooling element **24** together define an intermediate hollow section **50** of the aerosol-generating article **10**. As a whole, the intermediate hollow section **50** does not substantially contribute to the overall RTD of the aerosol-generating article. An RTD of the intermediate hollow section **26** as a whole is substantially 0 millimetres H_2O.

[0222] The support element **22** comprises a first hollow tubular segment **26**. The first hollow tubular segment **26** is provided in the form of a hollow cylindrical tube made of cellulose acetate. The first hollow tubular segment **26** defines an internal cavity **28** that extends all the way from an upstream end **30** of the first hollow tubular segment to an downstream end **32** of the first hollow tubular segment **20**. The internal cavity **28** is substantially empty, and so substantially unrestricted airflow is enabled along the internal cavity **28**. The first hollow tubular segment **26**—and, as a consequence, the support element **22**—does not substantially contribute to the overall RTD of the aerosol-generating article **10**. In more detail, the RTD of the first hollow tubular segment **26** (which is essentially the RTD of the support element **22**) is substantially 0 millimetres H_2O.

[0223] The first hollow tubular segment **26** has a length of about 8 millimetres, an external diameter of about 7.25 millimetres, and an internal diameter (DFTS) of about 1.9 millimetres. Thus, a thickness of a peripheral wall of the first hollow tubular segment **26** is about 2.67 millimetres.

[0224] The aerosol-cooling element **24** comprises a second hollow tubular segment **34**. The second hollow tubular segment **34** is provided in the form of a hollow cylindrical tube made of cellulose acetate. The second hollow tubular segment **34** defines an internal cavity **36** that extends all the way from an upstream end **38** of the second hollow tubular segment to a downstream end **40** of the second hollow tubular segment **34**. The internal cavity **36** is substantially empty, and so substantially unrestricted airflow is enabled along the internal cavity **36**. The second hollow tubular segment **28**—and, as a consequence, the aerosol-cooling element **24**—does not substantially contribute to the overall RTD of the aerosol-generating article **10**. In more detail, the RTD of the second hollow tubular segment **34** (which is essentially the RTD of the aerosol-cooling element **24**) is substantially 0 millimetres H_2O. The second hollow tubular segment **34** has a length of about 8 millimetres, an external diameter of about 7.25 millimetres, and an internal diameter (D_{STS}) of about 3.25 millimetres. Thus, a thickness of a peripheral wall of the second hollow tubular segment **34** is about 2 millimetres. Thus, a ratio between the internal diameter (D_{FTS}) of the first hollow tubular segment **26** and the internal diameter (D_{STS}) of the second hollow tubular segment **34** is about 0.75.

[0225] The aerosol-generating article **10** comprises a ventilation zone **60** provided at a location along the second hollow tubular segment **34**. In more detail, the ventilation zone is provided at about 2 millimetres from the upstream end of the second hollow tubular segment **34**. A ventilation level of the aerosol-generating article **10** is about 25 percent.

[0226] In the embodiment of FIG. **6**, the downstream section **14** further comprises a mouthpiece element **42** at a location downstream of the intermediate hollow section **50**.

In more detail, the mouthpiece element **42** is positioned immediately downstream of the aerosol-cooling element **24**. As shown in the drawing of FIG. **6**, an upstream end of the mouthpiece element **42** abuts the downstream end **40** of the aerosol-cooling element **18**.

[0227] The mouthpiece element **42** is provided in the form of a cylindrical plug of low-density cellulose acetate.

[0228] The mouthpiece element **42** has a length of about 12 millimetres and an external diameter of about 7.25 millimetres. The RTD of the mouthpiece element **42** is about 12 millimetres H_2O. The ratio of the length of the mouthpiece element **42** to the length of the intermediate hollow section **50** is approximately 0.6.

[0229] The rod **12** comprises an aerosol-generating substrate in the form of a gathered sheet of homogenised tobacco material. However, other types of tobacco-containing substrate, such as a tobacco cut filler, can replace the gathered sheet of homogenised tobacco material.

[0230] The rod **12** of aerosol-generating substrate has an external diameter of about 7.25 millimetres and a length of about 12 millimetres.

[0231] The aerosol-generating article **10** further comprises a susceptor assembly **44** of the type described above within the rod **12** of aerosol-generating substrate. In more detail, the susceptor assembly **44** is arranged substantially longitudinally within the aerosol-generating substrate, such as to be approximately parallel to the longitudinal direction of the rod **12**. As shown in the drawing of FIG. **6**, the susceptor assembly **44** is positioned in a radially central position within the rod and extends effectively along the longitudinal axis of the rod **12**.

[0232] The susceptor assembly **44** extends all the way from an upstream end to a downstream end of the rod **12**. In effect, the susceptor assembly **44** has substantially the same length as the rod **12** of aerosol-generating substrate.

[0233] The upstream section **16** comprises an upstream element **46** located immediately upstream of the rod **12** of aerosol-generating substrate, the upstream element **46** being in longitudinal alignment with the rod **12**. In the embodiment of FIG. **6**, the downstream end of the upstream element **46** abuts the upstream end of the rod **12** of aerosol-generating substrate. This advantageously prevents the susceptor assembly **44** from being dislodged. Further, this ensures that the consumer cannot accidentally contact the heated susceptor assembly **44** during or after use.

[0234] The upstream element **46** is provided in the form of a cylindrical plug of cellulose acetate circumscribed by a stiff wrapper. The upstream element **46** has a length of about 5 millimetres. The RTD of the upstream element 46 is about 30 millimetres H_2O.

[0235] For the purpose of the present description and of the appended claims, except where otherwise indicated, all numbers expressing amounts, quantities, percentages, and so forth, are to be understood as being modified in all instances by the term "about". Also, all ranges include the maximum and minimum points disclosed and include any intermediate ranges therein, which may or may not be specifically enumerated herein. In this context, therefore, a number A is understood as A±5 percent of A. Within this context, a number A may be considered to include numerical values that are within general standard error for the measurement of the property that the number A modifies. The number A, in some instances as used in the appended claims, may deviate by the percentages enumerated above provided that the amount by which A deviates does not materially affect the basic and novel characteristic(s) of the claimed invention. Also, all ranges include the maximum and minimum points disclosed and include any intermediate ranges therein, which may or may not be specifically enumerated herein.

1.-**14**. (canceled)

15. An aerosol-generating article for generating an inhalable aerosol upon heating, the aerosol-generating article comprising:
- an aerosol-generating rod comprising an aerosol-generating substrate; and
- a susceptor assembly comprising:
  - at least one strand of susceptor material, the at least one strand of susceptor material being twisted such as to be laid helically around a longitudinal axis of the susceptor assembly, and
  - an aerosol-generating element comprising at least one strand of a porous nontobacco material carrying an aerosol-forming composition comprising at least 35 percent by weight of an aerosol former,
  - wherein the at least one strand of the aerosol-generating element is twisted with the at least one strand of susceptor material, and
- wherein the susceptor assembly is thermally coupled with the aerosol-generating substrate, the susceptor assembly extending longitudinally within the aerosol-generating rod and being embedded within the aerosol-generating substrate.

16. The aerosol-generating article according to claim **15**, wherein the at least one strand of susceptor material comprises two or more strands of susceptor material twisted together, such that the two or more strands of susceptor material are laid helically around the longitudinal axis of the susceptor assembly, and the at least one strand of the aerosol-generating element is twisted with the two or more strands of susceptor material.

17. The aerosol-generating article according to claim **16**, wherein the at least one strand of the aerosol-generating element is also laid helically around the longitudinal axis of the susceptor assembly and held in place by being pinched between at least two of the two or more strands of susceptor material.

18. The aerosol-generating article according to claim **16**, wherein the at least one strand of the aerosol-generating element extends substantially parallel to the longitudinal axis of the susceptor assembly to define a core of the susceptor assembly, the two or more strands of susceptor material being laid helically around the at least one strand of the aerosol-generating element.

19. The aerosol-generating article according to claim **15**, wherein the at least one strand of susceptor material is a metallic strip, filament, pin, or wire.

20. The aerosol-generating article according to claim **15**, wherein the aerosol-forming composition is adsorbed, coated, impregnated, or otherwise loaded onto the porous nontobacco material.

21. The aerosol-generating article according to claim **15**, wherein a diameter of the at least one strand of susceptor material is from 0.3 millimetre to 1.5 millimetres.

22. The aerosol-generating article according to claim **16**, wherein the susceptor assembly further comprises one or more spacer elements of a nonconductive material, the one or more spacer elements being configured to create gaps between two adjacent ones of the two or more strands of susceptor material, such that respective portions of the two adjacent ones of the two or more strands of susceptor material are at a predetermined distance from one another.

23. The aerosol-generating article according to claim **22**, further comprising a secondary aerosol-generating substrate provided in at least one of the gaps.

24. The aerosol-generating article according to claim **22**, wherein the one or more spacer elements comprise a bead provided on one of the two or more strands of susceptor material.

25. The aerosol-generating article according to claim **22**,
wherein the one or more spacer elements comprise a plate comprising one or more openings,
wherein the plate is arranged transversely to the longitudinal axis of the susceptor assembly, and
wherein each one of the one or more openings is configured to receive a corresponding one of the two or more strands of susceptor material.

26. The aerosol-generating article according to claim **25**, wherein the plate is circular and the one or more openings are equally spaced about the longitudinal axis.

27. The aerosol-generating article according to claim **25**,
wherein the one or more spacer elements further comprise a plurality of plates equally spaced along a length of the susceptor assembly, and
wherein each plate comprises one or more openings.

28. An aerosol-generating system comprising a heating device and an aerosol-generating article according to claim **15**.

* * * * *