US 20250031750A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2025/0031750 A1**

BATISTA et al. (43) **Pub. Date: Jan. 30, 2025**

(54) **PLANAR CONSUMABLE FOR AEROSOL-GENERATING DEVICE**

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(21) Appl. No.: **18/715,629**

(22) PCT Filed: **Dec. 1, 2022**

(86) PCT No.: **PCT/EP2022/084128**

§ 371 (c)(1),
(2) Date: **May 31, 2024**

(30) **Foreign Application Priority Data**

Dec. 2, 2021 (EP) 21211954.9

Publication Classification

(51) **Int. Cl.**

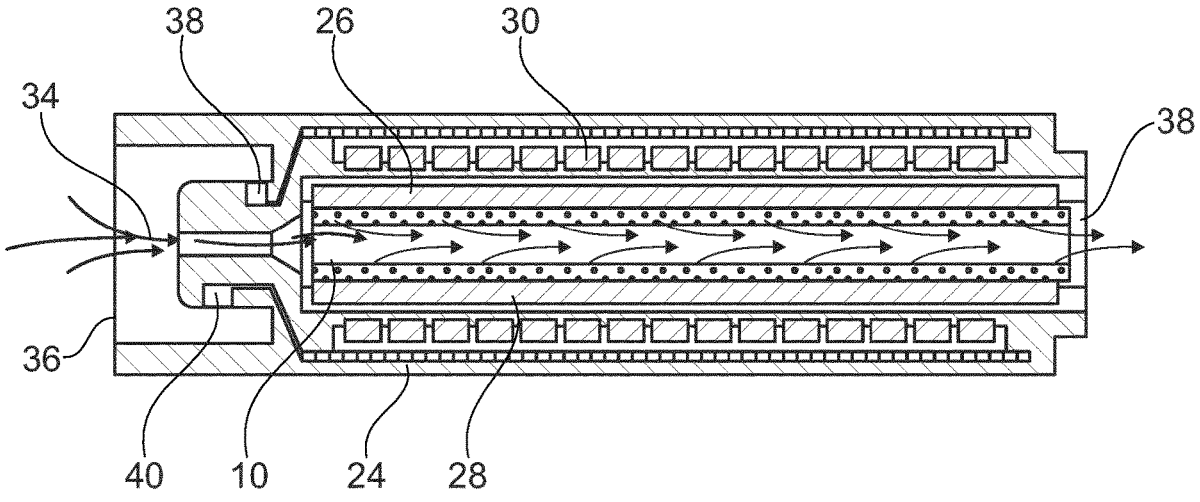
A24D 1/20	(2006.01)
A24F 40/20	(2006.01)
A24F 40/465	(2006.01)
A24F 40/485	(2006.01)

(52) **U.S. Cl.**

CPC ***A24D 1/20*** (2020.01); ***A24F 40/20*** (2020.01); ***A24F 40/465*** (2020.01); ***A24F 40/485*** (2020.01)

(57) **ABSTRACT**

A consumable for an aerosol-generating device is provided, the consumable including: a first planar substrate layer of aerosol-forming substrate; a second planar substrate layer of aerosol-forming substrate; and a planar porous layer allowing airflow through the planar porous layer in a planar extension direction of the planar porous layer, the planar porous layer having a resistance-to-draw of between 10 millimeters H_2O and 65 millimeters H_2O, the planar porous layer having a thickness of between 0.3 millimeter to 4.0 millimeters, and the planar porous layer being arranged between the first and the second planar substrate layers. An aerosol-generating system including the consumable and an aerosol-generating device is also provided.



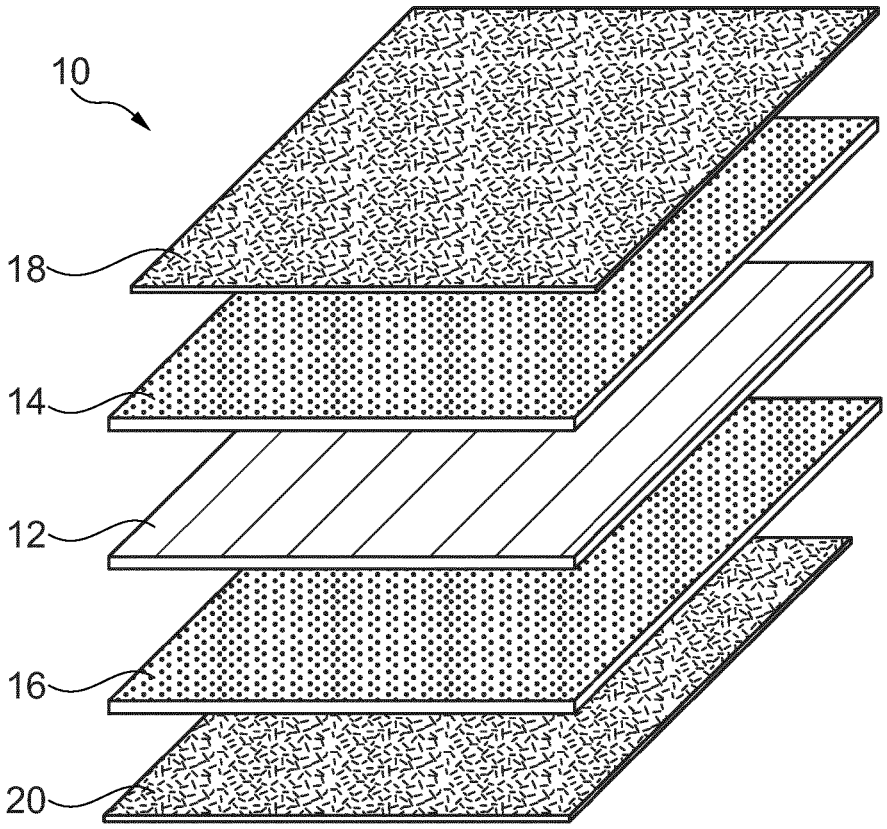


Fig. 1

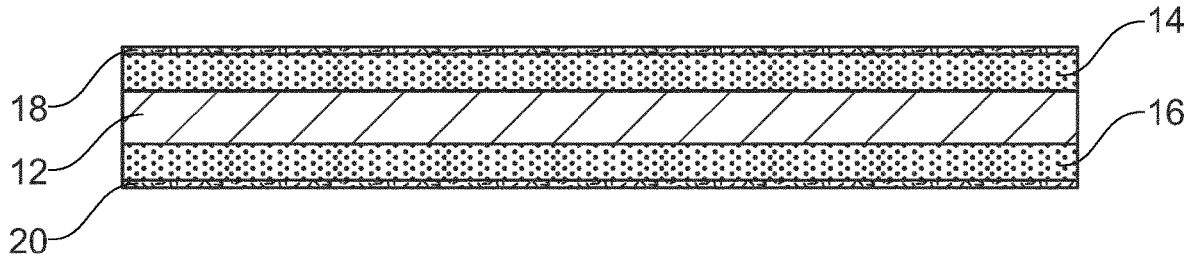


Fig. 2

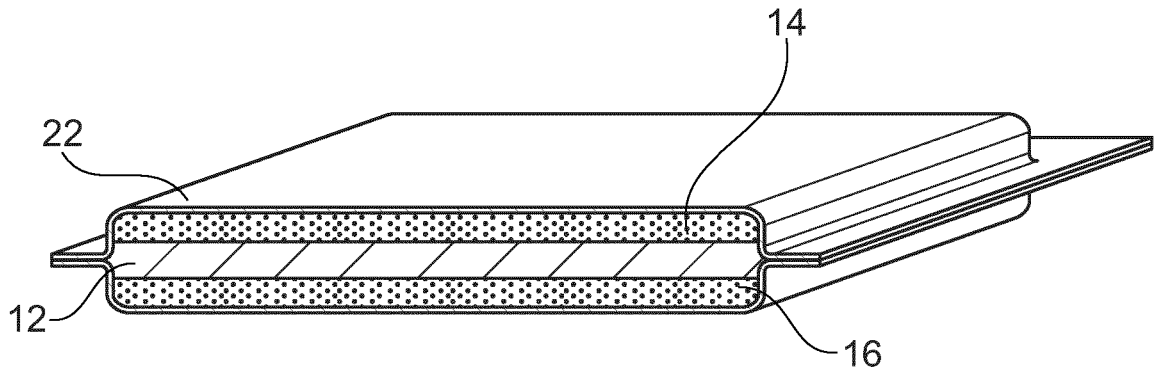


Fig. 3

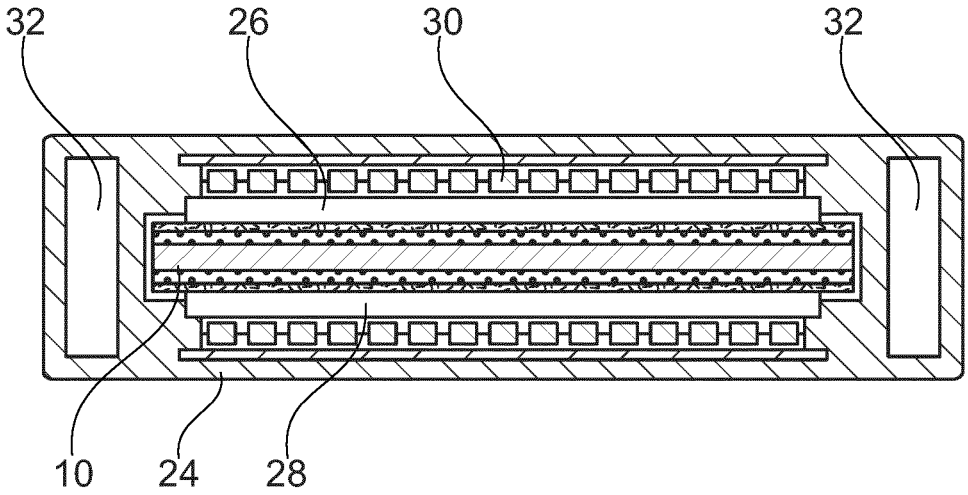


Fig. 4

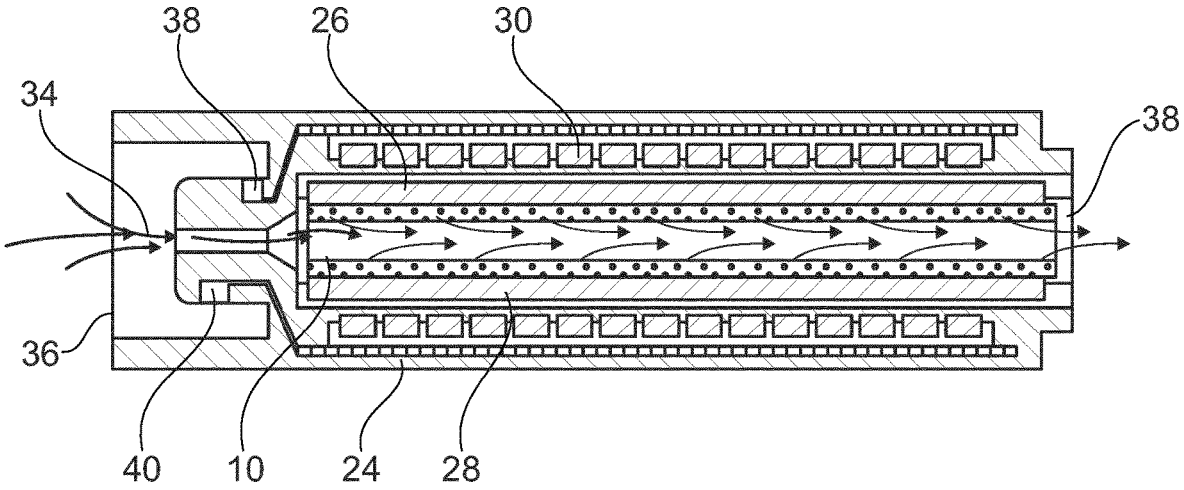


Fig. 5

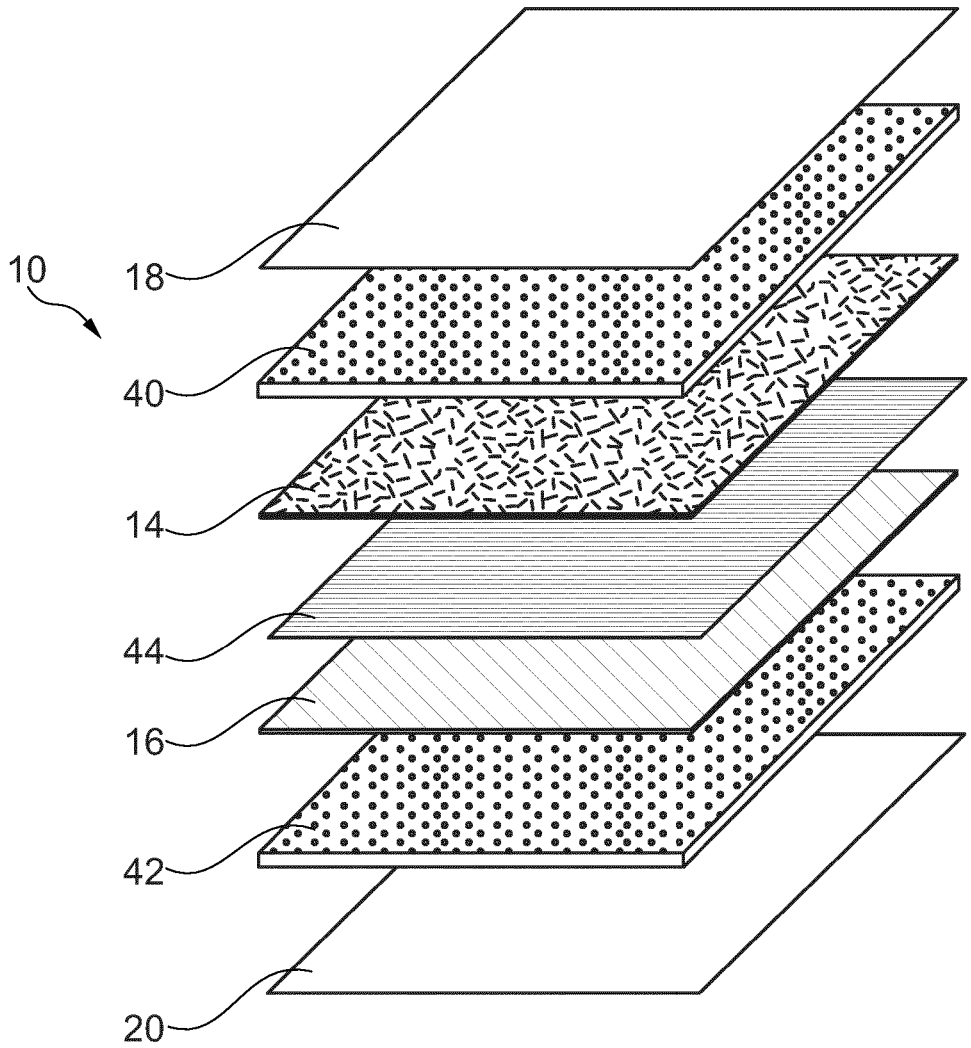


Fig. 6

PLANAR CONSUMABLE FOR AEROSOL-GENERATING DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a U.S. national stage application of PCT/EP2022/084128, filed on Dec. 1, 2022, which is based upon and claims the benefit of priority under 35 U.S.C. § 119 from European patent application no. 21211954.9, filed Dec. 2, 2021, the entire contents of each of which are incorporated herein by reference.

TECHNICAL FIELD

[0002] The present invention relates to a consumable for an aerosol-generating device.

DESCRIPTION OF THE RELATED ART

[0003] It is known to provide an aerosol-generating device for generating an inhalable vapor. Such devices may heat aerosol-forming substrate contained in a consumable to a temperature at which one or more components of the aerosol-forming substrate are volatilised without burning the aerosol-forming substrate. The consumable may have a shape for insertion of the aerosol-generating article into a cavity, such as a heating chamber, of the aerosol-generating device. A heating element may be arranged in or around the heating chamber for heating the aerosol-forming substrate once the aerosol-generating article is inserted into the heating chamber of the aerosol-generating device.

[0004] It would be desirable to have a consumable for an aerosol-generating device with improved airflow through the consumable. It would be desirable to have a consumable for an aerosol-generating device with improved heating of an aerosol-forming substrate contained in the consumable. It would be desirable to have a consumable for an aerosol-generating device in which all the aerosol-forming substrate contained in the consumable is heated to an optimal temperature.

SUMMARY

[0005] According to an embodiment of the invention there is provided a consumable for an aerosol-generating device. The consumable may comprise a first planar substrate layer of aerosol-forming substrate. The consumable may further comprise a second planar substrate layer of aerosol-forming substrate. The consumable may further comprise a planar porous layer allowing airflow through the porous layer in the planar extension direction of the porous layer. The porous layer may be arranged between the first and second substrate layers.

[0006] According to an embodiment of the invention there is provided a consumable for an aerosol-generating device. The consumable comprises a first planar substrate layer of aerosol-forming substrate. The consumable further comprises a second planar substrate layer of aerosol-forming substrate. The consumable further comprises a planar porous layer allowing airflow through the porous layer in the planar extension direction of the porous layer. The porous layer is arranged between the first and second substrate layers.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] The invention will be further described, by way of example only, with reference to the accompanying drawings in which:

[0008] FIG. **1** shows a consumable for an aerosol-generating device;

[0009] FIG. **2** shows the consumable of FIG. **1** in a fully assembled state;

[0010] FIG. **3** shows a pouch-shaped consumable;

[0011] FIG. **4** shows the consumable received in a cavity of an aerosol-generating device;

[0012] FIG. **5** shows the airflow through the consumable and the cavity; and

[0013] FIG. **6** shows an embodiment of a consumable with an integrated heater.

DETAILED DESCRIPTION

[0014] The consumable improves airflow through the consumable, particularly by providing the planar porous layer allowing airflow therethrough.

[0015] The planar porous layer may be arranged as a central layer in the consumable. The porous layer is preferably arranged in the planar extension plane of the consumable.

[0016] The porous layer preferably enables lateral airflow through the consumable.

[0017] The heating of the aerosol-forming substrate contained in the consumable is improved, particularly by arranging the aerosol-forming substrate in the form of two planar layers. A heating element as described in more detail below may be arranged next to the planar layers of aerosol-forming substrate such that all of the aerosol-forming substrate in the planar layers is heated. This prevents uneven heating of aerosol-forming substrate. Further, this prevents aerosol-forming substrate to be heated to a non-sufficient temperature and therefore prevents unused aerosol-forming substrate.

[0018] The length of the consumable is preferably larger than the thickness of the consumable. The ratio of length to thickness of the consumable may be larger than two, preferably larger than three, more preferably larger than four, most preferably larger than five. The width of the consumable is preferably larger than the thickness of the consumable. The ratio of width to thickness of the consumable may be larger than two, preferably larger than three, more preferably larger than four, most preferably larger than five.

[0019] The consumable may be flat. Preferably, the consumable is not bent. The consumable preferably extends in a plane.

[0020] The length of the consumable may be slightly larger than the width of the consumable. The consumable may have a rectangular cross-sectional shape in the extension plane of the consumable. The consumable may further have a rectangular cross-sectional shape in a plane perpendicular to the extension plane of the consumable.

[0021] Alternatively, the length of the consumable may be similar or identical to the width of the consumable. In this case, the consumable may have a square cross-sectional shape in the extension plane of the consumable. The consumable may further have a rectangular cross-sectional shape in a plane perpendicular to the extension plane of the consumable.

[0022] The first substrate layer may be arranged directly adjacent a first surface of the porous layer and the second substrate layer may be arranged directly adjacent a second opposite surface of the porous layer. In other words, the porous layer may be sandwiched between the first and second substrate layers.

[0023] The surface area of the surface of the first substrate layer facing the porous layer may be identical to the surface area of the surface of the porous layer facing the first substrate layer. The surface area of the surface of the second substrate layer facing the porous layer may be identical to the surface area of the surface of the porous layer facing the second substrate layer.

[0024] The first substrate layer may have a similar or identical length than the porous layer. The first substrate layer may have a similar or identical width than the porous layer.

[0025] One or both of the first substrate layer and the second substrate layer may have a length of between 10 millimeters and 35 millimeters, preferably between 10 millimeters and 25 millimeters, most preferably around 11 millimeters.

[0026] One or both of the first substrate layer and the second substrate layer may have a thickness of between 0.3 millimeter and 3 millimeters, preferably between 0.4 millimeter and 2 millimeters, most preferably around 0.5 millimeter.

[0027] One or both of the first substrate layer and the second substrate layer have a width of between 2 millimeters and 8 millimeters, preferably between 3 millimeters and 5 millimeters.

[0028] The porous layer may have a length of between 10 millimeters and 35 millimeters, preferably between 10 millimeters and 25 millimeters, most preferably around 11 millimeters.

[0029] The porous layer may have a thickness of between 0.3 millimeter and 3 millimeters, preferably between 0.4 millimeter and 2 millimeters, most preferably between 0.5 millimeter and 1 millimeter.

[0030] The porous layer may have a width of between 2 millimeters and 8 millimeters, preferably between 3 millimeters and 5 millimeters.

[0031] The second substrate layer may have a similar or identical length than the porous layer. The second substrate layer may have a similar or identical width than the porous layer.

[0032] The first substrate layer may have a similar or identical thickness than the porous layer. The second substrate layer may have a similar or identical thickness than the porous layer. Alternatively, one or both the first substrate layer and the second substrate layer have a thickness that is smaller than the thickness of the porous layer.

[0033] The length of one or more of the first substrate layer, the second substrate layer and the porous layer may be measured in the planar extension direction of the respective layer. The width of one or more of the first substrate layer, the second substrate layer and the porous layer may be measured in the planar extension direction of the respective layer. The width is measured in a direction perpendicular to the thickness. The thickness of one or more of the first substrate layer, the second substrate layer and the porous layer may be measured perpendicular to the planar extension direction of the respective layer. The thickness is measured in a direction perpendicular to the length direction and to the width direction.

[0034] A ratio between the thickness of the first substrate layer and the thickness of the second substrate layer may be between 0.1 and 10, preferably between 0.3 and 3, more preferably between 0.7 and 1.5, most preferably around 1.

[0035] A ratio between the thickness of one or both of the first planar substrate layer and the second planar substrate layer and the thickness of the porous layer may be between 0.2 and 10, preferably between 0.6 and 6, more preferably between 1 and 3, most preferably around 2.

[0036] The first substrate layer may have the same cross-sectional shape in the extension plane of the consumable than the porous layer. The first substrate layer may have the same cross-sectional shape in the extension plane of the consumable than the second substrate layer. The second substrate layer may have the same cross-sectional shape in the extension plane of the consumable than the porous layer.

[0037] The first substrate layer may have the same cross-sectional shape in a plane perpendicular to the extension plane of the consumable than the porous layer. The first substrate layer may have the same cross-sectional shape in a plane perpendicular to the extension plane of the consumable than the second substrate layer. The second substrate layer may have the same cross-sectional shape in a plane perpendicular to the extension plane of the consumable than the porous layer.

[0038] The porous layer may comprise cellulose acetate. The porous layer may consist of cellulose acetate. The porous layer may comprise a high porosity acetate tow fiber-based, or other cellulosic based fiber compound. The material of the porous layer may have a cross-sectional porosity.

[0039] As used herein, the term "porosity" refers to a fraction of void space in a porous body. In more detail, the term "porosity" is used herein with reference to the "cross-sectional porosity" of one such body, that is, the fraction of void space in a cross-sectional area of the porous body, for example a cross-section of the planar porous layer or of the first planar substrate layer or of the second planar substrate layer. The cross-sectional porosity is the area fraction of void space in a transverse cross-sectional area of the respective layer. The transverse cross-sectional area of the respective layer is the area of the respective layer in a plane that is perpendicular to the longitudinal axis of the respective layer.

[0040] The porosity of the porous layer in the direction of the extension plane of the consumable may be higher than the porosity of the porous layer in a direction perpendicular to the extension plane of the consumable.

[0041] The porosity of one or both of the first substrate layer and the second substrate layer in the direction of the extension plane of the consumable may be higher than the porosity of the porous layer in a direction perpendicular to the extension plane of the consumable.

[0042] The aerosol-forming substrate of one or both of the first substrate layer and the second substrate layer may be a sensorial media. The aerosol-forming substrate may comprise a sensorial media compound. NCP, HTP or Herbals or cut-filler tobacco.

[0043] The aerosol-forming substrate of the first substrate layer may be different from the aerosol-forming substrate of the second substrate layer. Exemplarily, the first substrate

layer may be a nicotine containing substrate while the second substrate layer may be a flavour containing substrate.

[0044] The porous layer may have a higher porosity than the aerosol-forming substrate.

[0045] The porous layer may have a cross-sectional porosity of between 0.3 and 0.95, preferably between 0.5 and 0.9. The porous layer may have a cross-sectional porosity of at least 0.15, more preferably at least 0.2.

[0046] The first substrate layer may have a cross-sectional porosity of between 0.10 and 0.45. The first substrate layer may have a cross-sectional porosity of at least 0.15, more preferably at least 0.2. The first substrate layer may have a cross-sectional porosity of less than or equal to 0.4, more preferably less than or equal to 0.35, most preferable or less than or equal to 0.25. The first substrate layer may have a cross-sectional porosity of between 0.15 and 0.40, preferably between 0.15 and 0.35, more preferably between 0.15 and 0.25. In other embodiments, the first substrate layer may have a cross-sectional porosity of between 0.20 and 0.40, preferably between 0.20 and 0.35, more preferably between 0.20 and 0.25.

[0047] The second substrate layer may have a cross-sectional porosity of between 0.10 and 0.45. The second substrate layer may have a cross-sectional porosity of at least 0.15, more preferably at least 0.2. The second substrate layer may have a cross-sectional porosity of less than or equal to 0.4, more preferably less than or equal to 0.35, most preferable or less than or equal to 0.25. The second substrate layer may have a cross-sectional porosity of between 0.15 and 0.40, preferably between 0.15 and 0.35, more preferably between 0.15 and 0.25. In other embodiments, the second substrate layer may have a cross-sectional porosity of between 0.20 and 0.40, preferably between 0.20 and 0.35, more preferably between 0.20 and 0.25.

[0048] The porous layer may have a cross-sectional porosity of at least 120 percent, preferably at least 130 percent, more preferably at least 140 percent, more preferably at least 150 percent, more preferably at least 175 percent, more preferably at least 200 percent, more preferably at least 250 percent, more preferably at least 300 percent, more preferably at least 400 percent, more preferably at least 500 percent, more preferably at least 600 percent, of the cross-sectional porosity of one or both of the first substrate layer and the second substrate layer.

[0049] The porous layer may have a cross-sectional porosity of between 130 percent and 600 percent, preferably between 130 percent and 500 percent, more preferably between 130 percent and 400 percent, more preferably between 130 percent and 300 percent, more preferably between 130 percent and 200 percent, more preferably between 140 percent and 600 percent, more preferably between 140 percent and 500 percent, more preferably between 140 percent and 400 percent, more preferably between 140 percent and 300 percent, more preferably between 140 percent and 200 percent, more preferably between 150 percent and 600 percent, more preferably between 150 percent and 500 percent, more preferably between 150 percent and 400 percent, more preferably between 150 percent and 300 percent, more preferably between 150 percent and 200 percent, of the cross-sectional porosity of one or both of the first substrate layer and the second substrate layer.

[0050] The porous layer may have a cross-sectional porosity of up to 0.99. The porous layer may have a cross-sectional porosity of less than 0.95, preferably of less than 0.90, more preferably of less than 0.85. The porous layer may have a cross-sectional porosity of at least 0.3, preferably of at least 0.35, more preferably of at least 0.4, more preferably of at least 0.45. The porous layer may have a cross-sectional porosity of between 0.3 and 0.95, preferably between 0.35 and 0.95, more preferably between 0.4 and 0.95, more preferably between 0.5 and 0.95. In other embodiments, the porous layer may have a cross-sectional porosity of between 0.3 and 0.90, preferably between 0.35 and 0.90, more preferably between 0.4 and 0.90, more preferably between 0.5 and 0.90. In other embodiments, the porous layer may have a cross-sectional porosity of between 0.3 and 0.85, preferably between 0.35 and 0.85, more preferably between 0.4 and 0.85, more preferably between 0.5 and 0.85.

[0051] Preferably the cross-sectional porosity is determined by obtaining a digital image of a transverse cross-sectional area of the respective layer and determining the area fraction of voids of the transverse area. Further details relating to the measurement of cross-sectional porosity in a porous body can be found in the publication of international patent application WO 2016/023965 in the name of the present applicant.

[0052] The porous layer may have a resistance to draw of between 10 millimeters H_2O and 65 millimeters H_2O, preferably between 30 millimeters H_2O and 60 millimeters H_2O.

[0053] A resistance to draw of the porous layer may be lower than 50%, preferably lower than 30%, more preferably lower than 10%, of a resistance to draw of one or both of the first substrate layer and the second substrate layer.

[0054] The aerosol-forming substrate may comprise tobacco. The aerosol-forming substrate may comprise an aerosol former. The aerosol-forming substrate may be solid.

[0055] The aerosol-generating substrate may comprise an aerosol-former. The aerosol-generating substrate preferably comprises homogenised tobacco material, an aerosol-former and water. Providing homogenised tobacco material may improve aerosol generation, the nicotine content and the flavour profile of the aerosol generated during heating of the aerosol-generating article. Specifically, the process of making homogenised tobacco involves grinding tobacco leaf, which more effectively enables the release of nicotine and flavours upon heating.

[0056] The aerosol-generating substrate may further comprise a flavourant between about 0.1 percent and about 10 percent by weight. The flavourant may be any suitable flavourant known in the art, such as menthol.

[0057] The aerosol-former preferably comprises at least one polyhydric alcohol. In a preferred embodiment, the aerosol-former comprises at least one of: triethylene glycol; 1,3-butanediol; propylene glycol; and glycerine.

[0058] The consumable may be planar or pouch-shaped.

[0059] The consumable may further comprise an outer layer made of a paper wrapper. In case of a planar consumable, the paper wrapper may comprise a first paper wrapper layer and a second paper wrapper layer. The first paper wrapper layer may be arranged on the outer surface of the first substrate layer. The second paper wrapper layer may be arranged on the outer surface of the second substrate layer. The consumable may consist of the porous layer, the first substrate layer, the second substrate layer, the first paper wrapper layer and the second paper wrapper layer.

[0060] In case of a pouch-shaped consumable, a single paper wrapper layer may be arranged fully surrounding the consumable. More specifically, a single paper wrapper layer may be provided covering the large outer surfaces and at least two side surfaces of the consumable or covering the large outer surfaces and all side surfaces of the consumable.

[0061] The invention further relates to an aerosol-generating system comprising the consumable as described herein and an aerosol-generating device. The aerosol-generating device may comprise a cavity for receiving the consumable.

[0062] The invention further relates to an aerosol-generating system comprising the consumable as described herein and an aerosol-generating device. The aerosol-generating device comprises a cavity for receiving the consumable.

[0063] The cavity may have a rectangular cross-section. The cavity may be shaped such that the consumable can be nestled into the cavity. The inner volume of the cavity may correspond to the volume of the consumable.

[0064] The aerosol-generating device may comprise a heating element, preferably an induction heating element.

[0065] The heating element may comprise a first planar heater and a second planar heater.

[0066] The first planar heater may be arranged adjacent a first sidewall of the cavity. The second planar heater may be arranged adjacent a second opposite sidewall of the cavity.

[0067] The first planar heater may at least partly form or completely form the first sidewall of the cavity. The second planar heater may at least partly form or completely form the second sidewall of the cavity.

[0068] When the consumable is received in the cavity of the aerosol-generating device, the first substrate layer of the consumable may be arranged adjacent the first planar heater of the heating element. The first planar heater of the heating element may then be configured to heat the aerosol-forming substrate of the first substrate layer of the consumable.

[0069] When the consumable is received in the cavity of the aerosol-generating device, the second substrate layer of the consumable may be arranged adjacent the second planar heater of the heating element. The second planar heater of the heating element may then be configured to heat the aerosol-forming substrate of the second substrate layer of the consumable.

[0070] The aerosol-generating device may comprise an airflow channel. The airflow channel may be arranged to allow airflow into a base of the cavity. The airflow channel may be arranged abutting the porous layer of the consumable, when the consumable is received in the cavity to allow airflow into the porous layer of the consumable.

[0071] When the consumable is received in the cavity, air may flow centrally through the porous layer and the vaporized substrate from the first and second substrate layers may be entrained in the airflow and delivered towards the user for inhalation.

[0072] Downstream of the cavity, the aerosol-generating device may comprise an air outlet. The air outlet may be part of or form a mouthpiece. The mouthpiece may be integrally formed with the aerosol-generating device. Alternatively, the mouthpiece may be removably attachable to the aerosol-generating device.

[0073] One or both of the first planar heater and the second planar heater may be susceptors. The aerosol-generating device may further comprise an induction coil for heating one or both of the first planar heater and the second planar heater.

[0074] The aerosol-generating device may comprise electric circuitry. The electric circuitry may comprise a microprocessor, which may be a programable microprocessor. The microprocessor may be part of a controller. The electric circuitry may comprise further electronic components. The electric circuitry may be configured to regulate a supply of power to one or both of the first planar heater and the second planar heater. Power may be supplied to one or both of the first planar heater and the second planar heater continuously following activation of the aerosol-generating device or may be supplied intermittently, such as on a puff-by-puff basis. The power may be supplied to one or both of the first planar heater and the second planar heater in the form of pulses of electrical current. The electric circuitry may be configured to monitor the electrical resistance of one or both of the first planar heater and the second planar heater, and preferably to control the supply of power to one or both of the first planar heater and the second planar heater dependent on the electrical resistance of one or both of the first planar heater and the second planar heater.

[0075] The aerosol-generating device may comprise a power supply, typically a battery, within a main body of the aerosol-generating device. 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. As an alternative, the power supply may be another form of charge storage device such as a capacitor. The power supply may require recharging and may have a capacity that enables to store enough energy for one or more usage experiences; for example, the power supply may have sufficient capacity to continuously generate aerosol for a period of around six minutes or for a period of a multiple of six minutes. In another example, the power supply may have sufficient capacity to provide a predetermined number of puffs or discrete activations of one or both of the first planar heater and the second planar heater.

[0076] The invention further relates to a consumable for an aerosol-generating device, the consumable may comprise a first planar substrate layer of aerosol-forming substrate. The consumable may comprise a second planar substrate layer of aerosol-forming substrate. The consumable may comprise a first planar porous layer allowing airflow through the first porous layer in the planar extension direction of the first porous layer. The consumable may comprise a second planar porous layer allowing airflow through the second porous layer in the planar extension direction of the second porous layer and a planar heater. The heater may be arranged between the first and second substrate layers. The heater and the first and second substrate layers may be arranged between the first and second porous layers.

[0077] The invention further relates to a consumable for an aerosol-generating device, the consumable comprises a first planar substrate layer of aerosol-forming substrate. The consumable comprises a second planar substrate layer of aerosol-forming substrate. The consumable comprises a first planar porous layer allowing airflow through the first porous layer in the planar extension direction of the first porous layer. The consumable comprises a second planar porous layer allowing airflow through the second porous layer in the planar extension direction of the second porous layer and a planar heater. The heater is arranged between the first and

second substrate layers. The heater and the first and second substrate layers are arranged between the first and second porous layers.

[0078] Preferably, the first planar substrate layer is distinct from the second planar substrate layer. Preferably, the first planar porous layer is distinct from the second planar porous layer.

[0079] Preferably, one or more of the first planar substrate layer, the second planar substrate layer, the first planar porous layer and the second planar porous layer has a constant thickness.

[0080] The consumable may not comprise a single central porous layer. Instead, the planar heater may form the central layer of the consumable. The central planar heater may be sandwiched between the first substrate layer and the second substrate layer. Outside of the first substrate layer and the second substrate layer, the first porous layer and the second porous layer may be arranged. Thus, the first substrate layer and the second substrate layers may be sandwiched between the first porous layer and the second porous layer.

[0081] Air may not centrally flow through the consumable in one embodiment. Rather, two separate air flows may be created through the first and second porous layers.

[0082] The disclosure herein concerning the dimensions and materials of the first and second substrate layers applies to this embodiment as well. Similarly, the disclosure of the materials and dimensions of the porous layer described above apply to the first and second porous layers described for this embodiment with a single difference. In the early embodiment, the thickness of the singer porous layer is most preferably 1 millimeter. In the current embodiment, the thickness of each of the first porous layer and the second porous layer is most preferably 0.5 millimeter.

[0083] The heater may be a susceptor. This has the advantage that the heater may be heated by an aerosol-generating device without the need for any electrical connection to the consumable. The aerosol-generating device may for this purpose comprise an induction coil for generating an alternating magnetic field in the susceptor, when the consumable is received in the cavity of the aerosol-generating device.

[0084] The consumable may further comprise an outer layer made of a paper wrapper. Similar to the initially described embodiment, the paper wrapper may comprise a first paper wrapper layer and a second paper wrapper layer. The first paper wrapper layer may be arranged outside of the first porous layer. The second paper wrapper layer may be arranged outside the second paper wrapper layer. In case the consumable is planar, the outer large surfaces of the consumable may be covered by the first paper wrapper layer and the second paper wrapper layer. Alternatively, the consumable may be a pouch-shaped consumable. In this case, the paper wrapper may fully cover the two large surfaces of the consumable and at least two side surfaces of the consumable or at the two large surfaces of the consumable and all side surfaces of the consumable.

[0085] As used herein, an 'aerosol-generating device' relates to a device that interacts with an aerosol-forming substrate to generate an aerosol. The aerosol-forming substrate may be part of an aerosol-generating article, for example part of a smoking article. An aerosol-generating device may be a smoking device that interacts with an aerosol-forming substrate of an aerosol-generating article to generate an aerosol that is directly inhalable into a user's lungs thorough the user's mouth. An aerosol-generating device may be a holder. The device may be an electrically heated smoking device. The aerosol-generating device may comprise a housing, electric circuitry, a power supply, a heating chamber and a heating element.

[0086] As used herein, the term 'consumable' refers to an article comprising an aerosol-forming substrate that is capable of releasing volatile compounds that can form an aerosol. For example, a consumable may be a smoking article that generates an aerosol that is directly inhalable into a user's lungs through the user's mouth. A consumable may be disposable.

[0087] As used herein, the terms 'upstream', 'downstream'. 'proximal', 'distal', 'front' and 'rear', are used to describe the relative positions of components, or portions of components, of the aerosol-generating device in relation to the direction in which a user draws on the aerosol-generating device during use thereof.

[0088] The heater may be configured as an induction heater. The induction heater may comprise an induction coil and a susceptor. In general, a susceptor is a material that is capable of generating heat, when penetrated by an alternating magnetic field. When located in an alternating magnetic field. If the susceptor is conductive, then typically eddy currents are induced by the alternating magnetic field. If the susceptor is magnetic, then typically another effect that contributes to the heating is commonly referred to hysteresis losses. Hysteresis losses occur mainly due to the movement of the magnetic domain blocks within the susceptor, because the magnetic orientation of these will align with the magnetic induction field, which alternates. Another effect contributing to the hysteresis loss is when the magnetic domains will grow or shrink within the susceptor. Commonly all these changes in the susceptor that happen on a nano-scale or below are referred to as "hysteresis losses", because they produce heat in the susceptor. Hence, if the susceptor is both magnetic and electrically conductive, both hysteresis losses and the generation of eddy currents will contribute to the heating of the susceptor. If the susceptor is magnetic, but not conductive, then hysteresis losses will be the only means by which the susceptor will heat, when penetrated by an alternating magnetic field. According to the invention, the susceptor may be electrically conductive or magnetic or both electrically conductive and magnetic. An alternating magnetic field generated by one or several induction coils heat the susceptor, which then transfers the heat to the aerosol-forming substrate, such that an aerosol is formed. The heat transfer may be mainly by conduction of heat. Such a transfer of heat is best, if the susceptor is in close thermal contact with the aerosol-forming substrate.

[0089] The susceptor may be formed from any material that can be inductively heated to a temperature sufficient to generate an aerosol from the aerosol-forming substrate. A preferred susceptor may comprise or consist of a ferromagnetic material or ferri-magnetic material, for example a ferromagnetic alloy, ferritic iron, or a ferromagnetic steel or stainless steel. A suitable susceptor may be, or comprise, aluminium. Preferred susceptors may be heated to a temperature in excess of 250 degrees Celsius.

[0090] Preferred susceptors are metal susceptors, for example stainless steel. However, susceptor materials may also comprise or be made of graphite, molybdenum, silicon carbide, aluminum, niobium. Inconel alloys (austenite nickel-chromium-based superalloys), metallized films, ceramics such as for example zirconia, transition metals

such as for example iron, cobalt, nickel, or metalloids components such as for example boron, carbon, silicon, phosphorus, aluminium.

[0091] 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.

[0092] Example Ex1: A consumable for an aerosol-generating device, the consumable comprising:

[0093] a first planar substrate layer of aerosol-forming substrate;

[0094] a second planar substrate layer of aerosol-forming substrate; and a planar porous layer allowing airflow through the porous layer in the planar extension direction of the porous layer,

[0095] wherein the porous layer is arranged between the first and second substrate layers.

[0096] Example Ex2: The consumable according to example Ex1, wherein the first substrate layer is arranged directly adjacent a first surface of the porous layer and the second substrate layer is arranged directly adjacent a second opposite surface of the porous layer.

[0097] Example Ex3: The consumable according to any of the preceding examples, wherein the porous layer is sandwiched between the first and second substrate layers.

[0098] Example Ex4: The consumable according to any of the preceding examples, wherein the porous layer comprises cellulose acetate, preferably wherein the porous layer consists of cellulose acetate.

[0099] Example Ex5: The consumable according to any of the preceding examples, wherein the porous layer has a higher porosity than the aerosol-forming substrate.

[0100] Example Ex6: The consumable according to any of the preceding examples, wherein the porous layer has a porosity of between 50 percent and 90 percent in the planar extension direction of the porous layer, preferably between 60 percent and 80 percent in the planar extension direction of the porous layer, more preferably between 65 percent and 75 percent in the planar extension direction of the porous layer.

[0101] Example Ex7: The consumable according to any of the preceding examples, wherein the porous layer has a resistance to draw of between 10 millimeters H_2O and 65 millimeters H_2O, preferably between 30 millimeters H_2O and 60 millimeters H_2O.

[0102] Example Ex7.1: The consumable according to any of the preceding examples, wherein a resistance to draw of the porous layer is lower than 50%, preferably lower than 30%, more preferably lower than 10%, of a resistance to draw of one or both of the first substrate layer and the second substrate layer.

[0103] Example Ex8: The consumable according to any of the preceding examples, wherein the porous layer has a thickness of between 0.3 millimeter to 4.0 millimeters, preferably between 0.4 millimeter to 3.0 millimeters, more preferably between 0.5 millimeter to 1.0 millimeter.

[0104] Example Ex9: The consumable according to any of the preceding examples, wherein the porous layer has a length of between 5 millimeters to 35 millimeters, preferably between 7 millimeters to 25 millimeters, more preferably between 10 millimeters to 15 millimeters.

[0105] Example Ex10: The consumable according to any of the preceding examples, wherein the aerosol-forming substrate comprises tobacco.

[0106] Example Ex11: The consumable according to any of the preceding examples, wherein the aerosol-forming substrate comprises an aerosol former.

[0107] Example Ex12: The consumable according to any of the preceding examples, wherein the aerosol-forming substrate is solid.

[0108] Example Ex13: The consumable according to any of the preceding examples, wherein the consumable is planar or pouch-shaped.

[0109] Example Ex14: The consumable according to any of the preceding examples, wherein the consumable further comprises an outer layer made of a paper wrapper.

[0110] Example Ex15: An aerosol-generating system comprising the consumable of any of the preceding examples and an aerosol-generating device, wherein the aerosol-generating device comprises a cavity for receiving the consumable.

[0111] Example Ex16: The aerosol-generating system according to the preceding example, wherein the cavity has a rectangular cross-section.

[0112] Example Ex17: The aerosol-generating system according to any of the two preceding examples, wherein the aerosol-generating device comprises a heating element, preferably an induction heating element.

[0113] Example Ex18: The aerosol-generating system according to the preceding example, wherein the heating element comprises a first planar heater and a second planar heater, wherein the first planar heater is arranged adjacent a first sidewall of the cavity, and wherein the second planar heater is arranged adjacent a second opposite sidewall of the cavity.

[0114] Example Ex19: The aerosol-generating system according to any of the four preceding examples, wherein the aerosol-generating device comprises an airflow channel, wherein the airflow channel is arranged to allow airflow into a base of the cavity, and wherein the airflow channel is arranged abutting the porous layer of the consumable, when the consumable is received in the cavity to allow airflow into the porous layer of the consumable.

[0115] Example Ex20: A consumable for an aerosol-generating device, the consumable comprising:

[0116] a first planar substrate layer of aerosol-forming substrate;

[0117] a second planar substrate layer of aerosol-forming substrate;

[0118] a first planar porous layer allowing airflow through the first porous layer in the planar extension direction of the first porous layer;

[0119] a second planar porous layer allowing airflow through the second porous layer in the planar extension direction of the second porous layer; and

[0120] a planar heater.

[0121] wherein the heater is arranged between the first and second substrate layers, and wherein the heater and the first and second substrate layers are arranged between the first and second porous layers.

[0122] Example Ex21: The consumable according to the preceding example, wherein the heater is a susceptor.

[0123] Example 22: The consumable according to any of the preceding claims, wherein the consumable further comprises an outer layer made of a paper wrapper.

[0124] Features described in relation to one embodiment may equally be applied to other embodiments of the invention.

[0125] A consumable **10** for an aerosol-generating device **24** is shown in FIG. **1**. The consumable **10** comprises a porous layer **12**. The porous layer **12** is the central layer of the consumable **10**.

[0126] The consumable **10** is planar. The porous layer **12** is planar. The porous layer **12** enables airflow **34** laterally through the consumable **10**. The porous layer **12** has a rectangular cross-sectional shape in an extension plane of the consumable **10**. The consumable **10** as a whole has a rectangular cross-sectional shape in an extension plane of the consumable **10**.

[0127] The consumable **10** further comprises a first substrate layer **14**. The first substrate layer **14** comprises an aerosol-forming substrate. The first substrate layer **14** is arranged directly adjacent the porous layer **12**. The first substrate layer **14** has the same cross-sectional shape in an extension plane of the consumable **10** as the porous layer **12**. The first substrate layer **14** has the same length and width as the porous layer **12**. The first substrate layer **14** is in direct physical contact with the porous layer **12**.

[0128] The consumable **10** further comprises a second substrate layer **16**. The second substrate layer **16** comprises an aerosol-forming substrate. The second substrate layer **16** is arranged directly adjacent the porous layer **12**. The second substrate layer **16** has the same cross-sectional shape in an extension plane of the consumable **10** as the porous layer **12**. The second substrate layer **16** has the same length and width as the porous layer **12**. The second substrate layer **16** is in direct physical contact with the porous layer **12**.

[0129] The aerosol-forming substrate of the first substrate layer **14** may be identical with the aerosol-forming substrate of the second substrate layer **16**. Alternatively, the aerosol-forming substrate of the first substrate layer **14** may be different from the aerosol-forming substrate of the second substrate layer **16**. Exemplarily, the aerosol-forming substrate of the first substrate layer **14** may be a nicotine-containing substrate and the aerosol-forming substrate of the second substrate layer **16** may be a flavor-containing substrate.

[0130] The porous layer **12** is sandwiched between the first substrate layer **14** and the second substrate layer **16**. In other words, the first substrate layer **14** and the second substrate layer **16** cover opposite large surfaces of the porous layer **12**.

[0131] The consumable **10** further comprises a first paper wrapper layer **18** and a second paper wrapper layer **20**.

[0132] The first paper wrapper layer **18** is arranged adjacent the first substrate layer **14**. The first paper wrapper layer **18** is arranged on an opposite large surface of the first substrate layer **14** than the porous layer **12**. The first paper wrapper layer **18** is an outer layer of the consumable **10**. The first paper wrapper layer **18** has the same length and width as the first substrate layer **14**.

[0133] The second paper wrapper layer **20** is arranged adjacent the second substrate layer **16**. The second paper wrapper layer **20** is arranged on an opposite large surface of the second substrate layer **16** than the porous layer **12**. The second paper wrapper layer **20** is an outer layer of the consumable **10**. The second paper wrapper layer **20** has the same length and width as the second substrate layer **16**.

[0134] The first substrate layer **14** and the second substrate layer **16** and sandwiched between the first paper wrapper layer **18** and the second paper wrapper layer **20**.

[0135] FIG. **2** shows the consumable **10** of FIG. **1** in a fully assembled state. The porous layer **12** forms the central layer. The large surfaces of the porous layer **12** are covered with the first and second substrate layers **14**, **16**. The outer large surfaces of the first and second substrate layers **14**, **16** are covered by the first and second paper wrapper layers **18**, **20**. The central porous layer **12** enables airflow **34** through the consumable **10**.

[0136] FIG. **3** shows a different type of paper wrapper to wrap the consumable **10**. In this embodiment, the paper wrapper is also covering all side surfaces of the consumable **10** such that the consumable **10** is configured as a pouch-shaped consumable **10**. Hence, the paper wrapper is configured as a pouch-shaped paper wrapper **22**. This may be realized by providing oversized first and second paper wrapper layers **18**, **20** and gluing the overlapping parts of the layers together.

[0137] FIG. **4** shows the consumable **10** of one of FIGS. **1** and **2** inserted into a cavity of an aerosol-generating device **24**. Of course, also the consumable **10** of FIG. **3** could be inserted into the cavity of the aerosol-generating device **24** shown in FIG. **4**.

[0138] The aerosol-generating device **24** comprises a first planar heater **26** and a second planar heater **28**. The first planar heater **26** es arranged at or forming a side surface of the cavity into which the consumable **10** is inserted. The second planar heater **28** es arranged at or forming an opposite side surface of the cavity.

[0139] When the consumable **10** is received in the cavity, the first substrate layer **14** is arranged adjacent the first planar heater **26**. The second substrate layer **16** is arranged adjacent the second planar heater **28**.

[0140] The aerosol-generating device **24** further comprises an induction coil **30**. The induction coil **30** is arranged at least partly surrounding the first planar heater **26** and the second planar heater **28**. The first planar heater **26** and the second planar heater **28** are each susceptors. The induction coil **30** is configured to heat the first planar heater **26** and the second planar heater **28**.

[0141] FIG. **4** further shows thermal insulation chambers **32** to thermally insulate the cavity of the aerosol-generating device **24**.

[0142] FIG. **5** shows the airflow **34** through the consumable **10** and the cavity of the aerosol-generating device **24** during operation of the aerosol-generating device **24**. FIG. **5** is a sideview of the cavity in contrast to the top view of the cavity shown in FIG. **4**.

[0143] The airflow **34** comes from a base **36** of the cavity and flows further through the porous layer **12** of the consumable **10**. The air flows out of the consumable **10** and out of the cavity through an outlet **38** of the cavity. The generated aerosol may then be inhaled by a user.

[0144] FIG. **5** further shows contacts **38** for contacting the induction coil **30**. A power supply (not shown) and a controller (not shown) are part of the aerosol-generating device **24**. The controller controls the flow of electrical energy from the power supply to the induction coil **30** during operation of the aerosol-generating device **24**.

[0145] FIG. **6** shows an alternative embodiment of a consumable **10** with an integrated heater. In this embodiment, the central layer is not formed by a single porous layer.

Instead, the central layer is formed by a central planar heater **44**. The central planar heater **44** is a susceptor.

[0146] Similar to the previously described embodiment, the central layer is sandwiched between a first substrate layer **14** and a second substrate layer **16**. These substrate layers are the same substrate layers as previously described. These substrate layers are sandwiched between first and second porous layers **40**, **42**. The first and second porous layers **40**, **42** are sandwiched between a first paper wrapper layer **18** and a second paper wrapper layer **20**. The paper wrapper layers are the same as previously described.

[0147] In this alternative embodiment, the aerosol-generating device **24** does not need to be provided with heaters, since the heater is placed in the consumable **10**. The aerosol-generating device **24** will in this case only be equipped with an induction coil **30** as previously described.

[0148] When the consumable **10** of this embodiment is inserted in the cavity of the aerosol-generating device **24**, air will flow in two separate paths through the first and second porous layers **40**, **42**. The first and second porous layers **40**, **42** are arranged next to the first substrate layer **14** and the second substrate layer **16**, respectively. At the same time, the induction coil **30** of the aerosol-generating device **24** will generate an alternating magnetic field such that the central planar heater **44** of the consumable **10** is heated. This heat will lead to a vaporization of the aerosol-forming substrate of the first substrate layer **14** and of the second substrate layer **16**. This vaporized aerosol-forming substrate will be entrained in the air flowing through the first and second porous layers **40**, **42** and delivered towards a user for inhalation.

1.-15. (canceled)

16. A consumable for an aerosol-generating device, the consumable comprising:

a first planar substrate layer of aerosol-forming substrate;

a second planar substrate layer of aerosol-forming substrate; and

a planar porous layer allowing airflow through the planar porous layer in a planar extension direction of the planar porous layer,

wherein the planar porous layer has a resistance-to-draw of between 10 millimeters H_2O and 65 millimeters H_2O,

wherein the planar porous layer has a thickness of between 0.3 millimeter to 4.0 millimeters, and

wherein the planar porous layer is arranged between the first and the second planar substrate layers.

17. The consumable according to claim **16**, wherein the first planar substrate layer is arranged directly adjacent a first surface of the planar porous laver and the second planar substrate layer is arranged directly adjacent a second opposite surface of the planar porous layer.

18. The consumable according to claim **16**, wherein the planar porous layer is sandwiched between the first and the second planar substrate layers.

19. The consumable according to claim **16**, wherein the planar porous layer comprises cellulose acetate.

20. The consumable according to claim **16**, wherein the planar porous layer consists of cellulose acetate.

21. The consumable according to claim **16**, wherein the planar porous layer has a higher cross-sectional porosity than the first planar substrate layer.

22. The consumable according to claim **16**,

wherein the planar porous layer has a cross-sectional porosity of between 0.3 and 0.95,

wherein the cross-sectional porosity is an area fraction of void space in a transverse cross-sectional area of the respective layer, and

wherein the transverse cross-sectional area of the respective layer is an area of the respective layer in a plane that is perpendicular to a longitudinal axis of the respective layer.

23. The consumable according to claim **16**,

wherein the planar porous layer has a cross-sectional porosity of between 0.5 and 0.9,

wherein the cross-sectional porosity is an area fraction of void space in a transverse cross-sectional area of the respective layer, and

wherein the transverse cross-sectional area of the respective layer is an area of the respective layer in a plane that is perpendicular to a longitudinal axis of the respective layer.

24. The consumable according to claim **16**, wherein the planar porous layer has a resistance-to-draw of between 30 millimeters H_2O and 60 millimeters H_2O.

25. The consumable according to claim **16**, wherein the planar porous layer has a thickness of between 0.4 millimeter to 3.0 millimeters.

26. The consumable according to claim **16**, wherein the planar porous layer has a thickness of between 0.5 millimeter to 1.0 millimeter.

27. The consumable according to claim **16**, wherein the planar porous layer has a length of between 5 millimeters to 35 millimeters.

28. The consumable according to claim **16**, wherein the planar porous layer has a length of between 10 millimeters to 15 millimeters.

29. An aerosol-generating system comprising the consumable according to claim **16** and an aerosol-generating device, wherein the aerosol-generating device comprises a cavity configured to receive the consumable.

30. The aerosol-generating system according to claim **29**, wherein the aerosol-generating device further comprises a heating element.

31. The aerosol-generating system according to claim **29**, wherein the aerosol-generating device further comprises an induction heating element.

32. The aerosol-generating system according to claim **30**,

wherein the heating element comprises a first planar heater and a second planar heater,

wherein the first planar heater is arranged adjacent a first sidewall of the cavity, and

wherein the second planar heater is arranged adjacent a second opposite sidewall of the cavity.

33. The aerosol-generating system according to claim **29**,

wherein the aerosol-generating device further comprises an airflow channel,

wherein the airflow channel is arranged to allow airflow into a base of the cavity, and

wherein the airflow channel is further arranged abutting the planar porous layer of the consumable, when the consumable is received in the cavity, to allow airflow into the planar porous layer of the consumable.

34. A consumable for an aerosol-generating device, the consumable comprising:

a first planar substrate layer of aerosol-forming substrate;

a second planar substrate layer of aerosol-forming substrate, the first and the second planar substrate layers being distinct from each other;

a first planar porous layer allowing airflow through the first planar porous layer in a planar extension direction of the first planar porous layer,

a second planar porous layer allowing airflow through the second planar porous layer in a planar extension direction of the second planar porous layer; and

a planar heater,

wherein the planar heater is arranged between the first and the second planar substrate layers, and

wherein the planar heater and the first and the second planar substrate layers are arranged between the first and the second planar porous layers.

35. The consumable according to claim **34**, wherein the heater is a susceptor.

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