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(54) AEROSOL-GENERATING DEVICE WITH SPANNING STOPPER

AEROSOLERZEUGUNGSVORRICHTUNG MIT ÜBERSPANNENDEM STOPPER

DISPOSITIF DE GÉNÉRATION D'AÉROSOL AVEC BOUCHON TRAVERSANT

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Description

[0001] The present invention relates to an aerosol-generating device.

[0002] It is known to provide an aerosol-generating device for generating an inhalable vapor. Such devices may heat aerosol-forming substrate to a temperature at which one or more components of the aerosol-forming substrate are volatilised without burning the aerosol-forming substrate. Aerosol-forming substrate may be provided as part of an aerosol-generating article. The aerosol-generating article may have a rod 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. During insertion of the aerosol-generating article into the heating chamber, the aerosol-generating article should be inserted a predetermined distance into the heating chamber. The reason for that is that the aerosol-forming substrate of the aerosol-generating article should be placed in an optimal position relative to the heating element of the aerosol-generating device. A further problem is that unwanted debris such as residues of aerosol-forming substrate may accumulate in the heating chamber over time. This may influence the insertion of the aerosol-generating article, as the aerosol-generating article may abut the unwanted debris during insertion. The aerosol-generating article may then not be positioned optimally within the heating chamber.

[0003] US 2020/0236999 A1 describes an aerosol-generating device, including a housing having a chamber; an induction coil disposed around at least a portion of the chamber; a heating compartment configured to receive an aerosol-generating article and being detachably insertable into the chamber of the housing.

[0004] It would be desirable to have an aerosol-generating device, wherein the aerosol-generating article is optimally received in the heating chamber. It would be desirable to have an aerosol-generating device with an improved feedback to a user that the aerosol-generating article is optimally received in the heating chamber. It would be desirable to have an aerosol-generating device in which contamination of the heating chamber with unwanted residues is prevented.

[0005] The invention provides an aerosol-generating device comprising a cavity for receiving an aerosol-generating article. The aerosol-generating article comprises an aerosol-forming substrate. The device further comprises a stopper. The stopper is arranged at a distal portion or distal of the cavity. The stopper is configured to stop the aerosol-generating article, when the aerosol-generating article contacts the stopper. The stopper is arranged transversally spanning the distal portion of the cavity. The stopper is arranged such that air can flow from distal of the stopper around the stopper into the cavity. The stopper has a circular cross-section in a plane parallel to a longitudinal axis of the cavity and perpendicular to a longitudinal axis of the stopper.

[0006] Providing the stopper transversally spanning the distal portion of the cavity may have multiple advantages. The stopper securely stops an aerosol-generating article inserted into the cavity. The term "to stop" refers to the stopper stopping the consumable at a position along the longitudinal axis of the cavity such that further insertion is faced with resistance. The stopper prevents accumulation of unwanted debris in the distal portion of the cavity, since the unwanted debris falls left and right of the spanning part of the stopper. Particularly due to airflow being enabled around the stopper, unwanted debris may escape through this unobstructed space adjacent to the stopper. The stopper automatically sheds unwanted debris off the stopper due to the spanning arrangement of the stopper. The unwanted debris is pushed to the left and right of the spanning part of the stopper during one or more of insertion and removal of the aerosol-generating article. If the aerosol-generating article contacts the stopper, the unwanted debris is pushed off the spanning part of the stopper by the aerosol-generating article.

[0007] The cavity of the aerosol-generating device may have an open end into which the aerosol-generating article is inserted. The open end may be a proximal end. The cavity may have a base opposite the open end. The base may be arranged at the distal portion of the cavity. The base of the cavity may be arranged distal of the cavity. The base may comprise one or more air apertures allowing airflow into the cavity. The base is preferably configured as a through hole. The stopper may be arranged at the base or directly adjacent the base in the cavity. The stopper may be arranged spanning the base.

[0008] The shedding of unwanted debris from the stopper may lead to the unwanted debris being pushed off the stopper and into the open base. Unwanted debris may be easily removed from the open base. Multiple options are possible for removing unwanted debris from the open base. The open base may fully extend through the aerosol-generating device such that unwanted debris can be removed through this passage. This passage may be an airflow channel. A cleaning tool may be inserted into this passage to remove the unwanted debris. A further option is to provide a recess in the open base in which the unwanted debris can accumulate. At certain intervals, a user may have to clean the recess.

[0009] The open end may be arranged proximal of the cavity. The cavity may have an elongate extension. The cavity may have a longitudinal central axis. A longitudinal direction may be the direction extending between the open and closed ends along the longitudinal central axis. The longitudinal central axis of the cavity may be parallel to or along the longitudinal axis of the aerosol-generating device.

[0010] The cavity may be configured as a heating chamber. The cavity may have a cylindrical shape. The cavity may have a hollow cylindrical shape. The cavity

may have a shape corresponding to the shape of the aerosol-generating article to be received in the cavity. The cavity may have a circular cross-section. The cavity may have an elliptical or rectangular cross-section. The cavity may have an inner diameter corresponding to the outer diameter of the aerosol-generating article.

[0011] The airflow channel may run through the cavity. Ambient air may be drawn into the aerosol-generating device through the airflow channel distal of the cavity and the open base of the cavity, into the cavity and towards the user through the airflow channel. When entering the cavity, the air may flow around the stopper spanning the distal portion of the cavity. The stopper thus has the functionality of enabling a secure stopping action of the inserted aerosol-generating device while automatically shedding unwanted debris into the open base of the cavity and while allowing airflow into the cavity around the stopper. Proximal of the cavity, a mouthpiece may be arranged or a user may directly draw on the aerosol-generating article. The airflow channel may extend through the mouthpiece.

[0012] The stopper has a circular cross-section. Providing the stopper with a circular cross-section has the advantage that unwanted debris slides off the stopper more easily.

[0013] Any cross-sectional shape of the stopper is defined as a shape in a plane parallel to a longitudinal axis of the cavity and perpendicular to a longitudinal axis of the stopper.

[0014] The stopper may be arranged crossing the longitudinal central axis of the cavity. In other words, the stopper may be arranged centrally crossing the cavity. Such a symmetrical arrangement of the stopper may improve the stopping action of the stopper and may improve the shedding of unwanted debris.

[0015] The stopper may be arranged perpendicular to the longitudinal axis of the cavity.

[0016] The stopper may be a pin. A pin-shaped stopper is easy to manufacture while improving the stopping action of the stopper and automatically shedding unwanted debris. The length of the pin may be longer than the inner diameter of an inner sidewall of the cavity. This may facilitate a secure mounting of the pin. The stopper may be one or more of a pin, a bar, a rod, a pole, a shaft, a beam, a rail, a strut, a small pole, a spoke, a stem, a spoke and a crossbar.

[0017] The stopper may have a curved surface. The curved surface may improve the shedding action of the stopper of unwanted debris.

[0018] The stopper may comprise a surface treatment to make the stopper more slippery. Providing a slippery stopper surface improves the automatic shedding of unwanted debris off the surface of the stopper.

[0019] The stopper may be elongate. The length of the stopper may be longer, preferably substantially longer, than the width of the stopper. As a consequence, the stopper provides a secure stop for the insertion of the aerosol-generating article and at the same time does not lead to an accumulation of unwanted debris in the area of the stopper.

[0020] The stopper may be straight. The stopper may be straight in the extension direction of the longitudinal axis of the stopper. In some embodiments, the longitudinal axis of the stopper may be perpendicular to a longitudinal axis of the cavity. Providing a straight stopper is easy to manufacture while creating a secure stop for the insertion of the aerosol-generating article.

[0021] The stopper may be cylindrical. A cylindrically shaped stopper may improve the shedding abilities of the stopper thereby preventing unwanted accumulation of debris in the area of the stopper.

[0022] The stopper may be configured cross-shaped. A cross-shaped stopper may further improve the stopping ability of the stopper. The cross-shaped stopper may be arranged in a plane. This plane may be perpendicular to the longitudinal axis of the cavity. Each member of the cross-shaped stopper may be shaped as described herein. Exemplarily, each member of the cross-shaped stopper may have a circular cross-section, may have a curved surface, be configured as a pin etc.

[0023] The stopper may be configured T-shaped. A T-shaped stopper may improve the stopping ability of the stopper while maintaining a relatively large area between the members of the stopper for shedding unwanted debris off the stopper. In comparison to a single stopper element such as an elongate pin as described herein, a T-shaped stopper may have improved stopping ability. At the same time, the area between the stopper elements is slightly diminished such that a single elongate stopper element or a T-shaped stopper may be chosen depending on whether the stopping action is of higher importance or whether the shedding action of unwanted debris is of high importance. The same is the case for a cross-shaped stopper. In comparison to a T-shaped stopper, a cross-shaped stopper is further improving the stopping action while having a slightly diminished shedding capability due to the reduced surface area between the individual members of the stopper. Hence, if an improved stopping action is required, a cross-shaped stopper may be chosen over a T-shaped stopper or an elongate single stopper. If an improved shedding of unwanted debris is desired, a single elongate stopper may be chosen over a T-shaped stopper or a cross-shaped stopper.

[0024] The cavity may comprise an inner sidewall. The inner sidewall may comprise a first recess. The stopper may be mounted in the first recess. The first recess may thus be configured as a mounting recess. The stopper may be slotted into the first recess. The stopper may be mounted in the first recess by means of a press-fit or snap-fit connection. Alternatively, the stopper may be integrally formed with the inner sidewall.

[0025] The inner sidewall may comprise a second recess opposite the first recess. The stopper may be mounted in the second recess so as to be mounted between the first recess and the second recess. The second recess may thus be configured as a mounting

recess. The stopper may be slotted into the second recess. The stopper may be mounted in the second recess by means of a press-fit or snap-fit connection. Alternatively, the stopper may be integrally formed with the inner sidewall. The stopper spans the inner volume of the cavity between the first recess and the second recess.

[0026] The stopper may be arranged such that air can flow from distal of the stopper around the stopper into the cavity. Preferably, air can flow around the stopper. Particularly due to the spanning arrangement of the stopper, air can flow around the stopper. This may advantageously establish a fluid connection between the cavity and the airflow channel arranged distal of the cavity via the stopper. The airflow channel may have a double functionality of enabling airflow into the cavity and at the same time of receiving the unwanted debris that is shed off the stopper. The airflow channel may thus further be configured as a cleaning channel.

[0027] The stopper may be arranged at the base of the cavity.

[0028] The cavity may be configured as a heating chamber.

[0029] The aerosol-generating device may comprise a heating element arranged at least partly surrounding the cavity.

[0030] The heating element may be configured to heat the heating chamber to between 160 °C and 300 °C, preferably between 180 °C and 270 °C, more preferably between 200 °C and 250 °C.

[0031] The aerosol-generating device may comprise an airflow channel distal of the cavity and the stopper. The airflow channel may be arranged to enable airflow into the cavity past the stopper.

[0032] The stopper may be arranged in the airflow channel.

[0033] The stopper may be arranged between the cavity and the airflow channel.

[0034] The distal portion of the cavity may have an inner diameter of between 7.0 mm and 7.6 mm, preferably between 7.1 mm and 7.5 mm, more preferably between 7.2 mm and 7.4 mm, most preferably around 7.3 mm.

[0035] The stopper may be arranged closer to a proximal end of the aerosol-generating device than to a distal end of the aerosol-generating device.

[0036] The stopper may be made from PEEK.

[0037] The stopper may be configured to withstand temperatures of up to around 340 °C.

[0038] The stopper may be made of a thermally insulating material, preferably a ceramic material or a metallic material.

[0039] The stopper may be integrally formed with the inner sidewall of the cavity.

[0040] The aerosol-generating device may comprise electric circuitry. The electric circuitry may comprise a microprocessor, which may be a programmable 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 the heating element. Power may be supplied to the heating element 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 the heating element in the form of pulses of electrical current. The electric circuitry may be configured to monitor the electrical resistance of the heating element, and preferably to control the supply of power to the heating element dependent on the electrical resistance of the heating element.

[0041] 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 the heating element.

[0042] As used herein, the term 'aerosol-generating article' refers to an article comprising an aerosol-forming substrate that is capable of releasing volatile compounds that can form an aerosol. For example, an aerosol-generating article may be a smoking article that generates an aerosol that is directly inhalable into a user's lungs through the user's mouth. An aerosol-generating article may be disposable.

[0043] As used herein, the term 'aerosol-forming substrate' relates to a substrate capable of releasing one or more volatile compounds that can form an aerosol. Such volatile compounds may be released by heating the aerosol-forming substrate. An aerosol-forming substrate may conveniently be part of an aerosol-generating article or smoking article.

[0044] The aerosol-forming substrate may be a solid aerosol-forming substrate. The aerosol-forming substrate may comprise both solid and liquid components. The aerosol-forming substrate may comprise a tobacco-containing material containing volatile tobacco flavour compounds which are released from the substrate upon heating. The aerosol-forming substrate may comprise a non-tobacco material. The aerosol-forming substrate may comprise an aerosol former that facilitates the formation of a dense and stable aerosol. Examples of suitable aerosol formers are glycerine and propylene

glycol.

[0045] If the aerosol-forming substrate is a solid aerosol-forming substrate, the solid aerosol-forming substrate may comprise, in some embodiments, one or more of: powder, granules, pellets, shreds, spaghettis, strips or sheets containing one or more of: herb leaf, tobacco leaf, fragments of tobacco ribs, reconstituted tobacco, homogenised tobacco, extruded tobacco, cast leaf tobacco and expanded tobacco. The solid aerosol-forming substrate may be in loose form, or may be provided in a suitable container or cartridge. Optionally, the solid aerosol-forming substrate may contain additional tobacco or non-tobacco volatile flavour compounds, to be released upon heating of the substrate. The solid aerosol-forming substrate may also contain capsules that, for example, include the additional tobacco or non-tobacco volatile flavour compounds and such capsules may melt during heating of the solid aerosol-forming substrate.

[0046] As used herein, the terms 'proximal' and 'distal' 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 the components of the device are oriented relative to a user during use of the device. A component oriented towards a user, particularly a user's mouth, is a proximal component and a component at the opposite end of the device is a distal component. Similarly, a proximal direction is towards the user during use of the device and a distal direction is pointing away from the user. Aerosol-generating devices according to the invention comprise a proximal end through which, in use, an aerosol exits the device. The proximal end of the aerosol-generating device may also be referred to as the mouth end or the downstream end. The mouth end is downstream of the distal end. The distal end of the aerosol generating article may also be referred to as the upstream end.

[0047] 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.

[0048] In any of the aspects of the disclosure, the heating element may comprise an electrically resistive material. Suitable electrically resistive materials include but are not limited to: semiconductors such as doped ceramics, electrically "conductive" ceramics (such as, for example, molybdenum disilicide), carbon, graphite, metals, metal alloys and composite materials made of a ceramic material and a metallic material. Such composite materials may comprise doped or undoped ceramics. Examples of suitable doped ceramics include doped silicon carbides. Examples of suitable metals include titanium, zirconium, tantalum platinum, gold and silver. Examples of suitable metal alloys include stainless steel, nickel-, cobalt-, chromium-, aluminium- titanium- zirconium-, hafnium-, niobium-, molybdenum-, tantalum-, tungsten-, tin-, gallium-, manganese-, gold- and iron-containing alloys, and super-alloys based on nickel, iron, cobalt, stainless steel, Timetal® and iron-manganese-aluminium based alloys. In composite materials, the electrically resistive material may optionally be embedded in, encapsulated or coated with an insulating material or vice-versa, depending on the kinetics of energy transfer and the external physicochemical properties required.

[0049] As described, in any of the aspects of the disclosure, the heating element may be part of an aerosol-generating device. The aerosol-generating device may comprise an internal heating element or an external heating element, or both internal and external heating elements, where "internal" and "external" refer to the aerosol-forming substrate. An internal heating element may take any suitable form. For example, an internal heating element may take the form of a heating blade. Alternatively, the internal heater may take the form of a casing or substrate having different electro-conductive portions, or an electrically resistive metallic tube. Alternatively, the internal heating element may be one or more heating needles or rods that run through the center of the aerosol-forming substrate. Other alternatives include a heating wire or filament, for example a Ni-Cr (Nickel-Chromium), platinum, tungsten or alloy wire or a heating plate. Optionally, the internal heating element may be deposited in or on a rigid carrier material. In one such embodiment, the electrically resistive heating element may be formed using a metal having a defined relationship between temperature and resistivity. In such an exemplary device, the metal may be formed as a track on a suitable insulating material, such as ceramic material, and then sandwiched in another insulating material, such as a glass. Heaters formed in this manner may be used to both heat and monitor the temperature of the heating elements during operation.

[0050] As an alternative to an electrically resistive heating element, the heating element may be configured as an induction heating element. The induction heating element 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.

[0051] The invention further relates to an aerosol-generating system comprising an aerosol-generating device as described herein and an aerosol-generating article as described herein.

[0052] Features described in relation to one embodiment may equally be applied to other embodiments of the invention.

[0053] The invention will be further described, by way of example only, with reference to the accompanying drawings in which:

Figs. 1A and 1B show a cross-sectional view of an aerosol-generating device according to the invention;

Fig. 2 shows a cross-sectional view of an embodiment of a stopper arranged in a cavity of the aerosol-generating device;

Fig. 3 shows a cross-sectional view of an embodiment of the pin of the stopper of Fig. 2, the pin having a circular cross-section;

Fig. 4 shows a top view of an embodiment of the stopper in which the stopper is integrally formed with an inner sidewall of the cavity;

Fig. 5 shows a top view of an embodiment of the stopper in which the stopper is cross-shaped;

Fig. 6 shows a perspective cutaway view of a stopper described therein in which the stopper is partly C-shaped; and

Fig. 7 shows a top view of an embodiment of the stopper in which the stopper has a C-shape.

[0054] Figure 1 shows a cross-sectional view of an aerosol-generating device 10. Figure 1 only shows parts of the aerosol-generating device 10, particularly a proximal part. The aerosol-generating device 10 may comprise further parts, particularly parts including a power supply and electric circuitry. The aerosol-generating device 10 comprises a housing 12. The aerosol-generating device 10 further comprises a cavity 14.

[0055] The cavity 14 is configured to receive an aerosol-generating article 16. The aerosol-generating article 16 comprises aerosol-forming substrate that is configured to be heated to generate an inhalable aerosol.

[0056] The cavity 14 has an open proximal end 30 at a proximal portion 32 through which the aerosol-generating article 16 is inserted into the cavity 14. At a distal portion 34 of the cavity 14, a stopper 18 is provided. The stopper 18 has the function of stopping the insertion of the aerosol-generating article 16 at a predetermined point along the length of the cavity 14. In other words, the stopper 18 is arranged such that the aerosol-generating article 16 is received into the cavity 14 until a predetermined portion of the aerosol-generating article 16 is received in the cavity 14.

[0057] The stopper 18 has the further functionality of preventing accumulation of unwanted residues in the area of the stopper 18. Different embodiments of the stopper 18 design are discussed below with reference to Figures 2 to 5 for achieving this effect.

[0058] The aerosol-generating device 10 further comprises a heating element 20. The heating element 20 is configured as a resistive hearing element or as an induction heating element 20. The heating element 20 is arranged at least partly surrounding the cavity 14. When the aerosol-generating article 16 is received in the cavity 14, the heating element 20 is configured to heat the aerosol-forming substrate of the aerosol-generating article 16 to create an inhalable aerosol.

[0059] Distal of the cavity 14, an airflow channel 22 is provided. The airflow channel 22 enables air to enter into the cavity 14 from a base of the cavity 14. The air flows around the stopper 18 to flow into the cavity 14 from the airflow channel 22. Hence, the stopper 18 is shaped to allow airflow into the cavity 14.

[0060] Unwanted debris such as residues of aerosol-forming substrate can be pushed from the stopper 18 into the airflow channel 22 such that an accumulation of the debris in the area of the stopper 18 is prevented. The pushing action to remove any unwanted residue is done by the aerosol-generating article 16 itself during insertion of the aerosol-generating article 16 into the cavity 14.

[0061] As shown in Figure 1A, the aerosol-generating article 16 can be inserted into the cavity 14 from the proximal open end of the cavity 14. As shown in Figure 1B, the insertion action of the aerosol-generating article 16 is stopped once the aerosol-generating article 16 abuts the stopper 18 by the stopping action of the stopper 18. When the aerosol-generating article 16 contacts the stopper 18, unwanted residues in the area of the stopper 18 will be scraped off the stopper 18 by the contact with the aerosol-generating article 16.

[0062] Figure 2 shows a cross-sectional view of the device along the line A-A' in Figure 1B. Particularly shown in Figure 2 is an embodiment of the stopper 18, in which

the stopper 18 is configured as a pin spanning the inner volume of the cavity 14. The stopper 18 is mounted in an inner sidewall 24 of the cavity 14. The stopper 18 extends perpendicular to a longitudinal axis of the cavity 14. As becomes clear from the design of the stopper 18 shown in Figure 2, airflow around the stopper 18 is enabled. Further, it is enabled that unwanted debris does not accumulate in the area of the stopper 18, since the stopper 18 has a narrow design.

[0063] Figure 3 shows a cross-sectional view through the pin of the stopper 18 of Figure 2. The stopper 18 has a circular cross-section. This cross section leads to unwanted debris easily falling off the stopper 18 or easily being pushed off the stopper 18. The cross-sectional shape of the stopper 18 shown in Figure 3 can be employed, for example, in the stopper 18 shown in Figures 1, 2, 4 and 5.

[0064] Figure 4 shows an embodiment similar to the embodiment shown in Figure 2 with the difference that the stopper 18 is integrally formed with the inner sidewall 24 of the cavity 14.

[0065] Figure 5 shows an embodiment in which the stopper 18 is configured cross-shaped. This means that instead of a single spanning element as shown for example in Figure 2, two perpendicular spanning members are provided. The two spanning members intersect in the center of the cavity 14. The two spanning members can be provided as separate elements or as a single integrally formed element.

[0066] Figure 6 shows an example of a stopper 18 not according to the invention which is not configured as a spanning element spanning the cavity 14. Instead, the stopper 18 has a circular shape. The stopper 18 is arranged mounted in a groove 28 at least partly arranged in the inner sidewall 24 of the cavity 14. The stopper 18 comprises ribs 26 facing the cavity 14. The ribs 26 have the function of contacting the aerosol-generating article 16 and stopping the insertion of the aerosol-generating article 16.

[0067] Figure 7 shows a circular stopper 18 as used in the example shown in Figure 6. However, the stopper 18 has an open ring shape and is not fully closed. This enables a snap fit mounting of the stopper 18 in the groove 28. For simplicity, the ribs 26 are not shown in Figure 7 although the open ring-shaped stopper 18 may of course comprise ribs 26 as shown in the example of Figure 6.

Claims

1. Aerosol-generating device (10) comprising:

a cavity (14) for receiving an aerosol-generating article (16) comprising aerosol-forming substrate,
a heating element (20), wherein the heating element (20) is arranged at least partly surrounding the cavity (14), and
a stopper (18), wherein the stopper has a circular cross-section in a plane parallel to a longitudinal axis of the cavity (14) and perpendicular to a longitudinal axis of the stopper,
wherein the stopper (18) is arranged at a distal portion of the cavity (14), wherein the stopper (18) is configured to stop the aerosol-generating article (16), when the aerosol-generating article (16) contacts the stopper (18), wherein the stopper (18) is arranged transversally spanning the distal portion of the cavity (14), and wherein the stopper (18) is arranged such that air can flow from distal of the stopper (18) around the stopper (18) into the cavity (14), wherein the terms 'proximal' and 'distal' describe the relative positions of components, or portions of components, of the aerosol-generating device in relation to the direction in which the components of the device are oriented relative to a user during use of the device with a component oriented towards a user, being a proximal component and a component at the opposite end of the device being a distal component.

2. Aerosol-generating device (10) according to any of the preceding claims, wherein the stopper (18) is arranged crossing the longitudinal central axis of the cavity (14).

3. Aerosol-generating device (10) according to any of the preceding claims, wherein the stopper (18) is a pin, a bar, a rod, a pole, a shaft, a beam, a rail, a strut, a spoke, a stem, a spoke or a crossbar.

4. Aerosol-generating device (10) according to any of the preceding claims, wherein the stopper (18) has a curved surface.

5. Aerosol-generating device (10) according to any of the preceding claims, wherein the stopper (18) is configured cross-shaped.

6. Aerosol-generating device (10) according to any of the preceding claims, wherein the stopper (18) is configured T-shaped.

7. Aerosol-generating device (10) according to any of the preceding claims, wherein the cavity (14) comprises an inner sidewall, and wherein the inner sidewall comprises a first recess, and wherein the stopper (18) is mounted in the first recess.

8. Aerosol-generating device (10) according to claim 7, wherein the inner sidewall comprises a second recess opposite the first recess, and wherein the stopper (18) is mounted in the second recess so as to be mounted between the first recess and the second

recess.

9. Aerosol-generating device (10) according to any of the preceding claims, wherein the stopper (18) is arranged at a base of the cavity (14), wherein the base of the cavity (14) is arranged at the distal portion of the cavity (14).

10. Aerosol-generating device (10) according to any of the preceding claims, wherein the cavity (14) is configured as a heating chamber.

11. Aerosol-generating device (10) according to any of the preceding claims, wherein the aerosol-generating device comprises an airflow channel distal of the cavity (14) and the stopper (18), and wherein the airflow channel is arranged to enable airflow into the cavity (14) past the stopper (18).

12. Aerosol-generating device (10) according to claim 11, wherein the stopper (18) is arranged in the airflow channel.

13. Aerosol-generating device (10) according to any of the preceding claims, wherein the stopper (18) is arranged closer to a proximal end of the aerosol-generating device than to a distal end of the aerosol-generating device.

14. Aerosol-generating system comprising an aerosol-generating device (10) according to any of the preceding claims and an aerosol-generating article (16) comprising aerosol-forming substrate.

Patentansprüche

1. Aerosolerzeugungsvorrichtung (10), umfassend:

einen Hohlraum (14) für ein Aufnehmen eines aerosolerzeugenden Artikels (16), umfassend ein aerosolerzeugendes Substrat,
ein Heizelement (20), wobei das Heizelement (20) wenigstens teilweise um den Hohlraum (14) herum angeordnet ist, und
einen Anschlag (18), wobei der Anschlag einen runden Querschnitt in einer Ebene parallel zu einer Längsachse des Hohlraums (14) und senkrecht zu einer Längsachse des Anschlags aufweist,
wobei der Anschlag (18) an einem distalen Abschnitt des Hohlraums (14) angeordnet ist, wobei der Anschlag (18) dazu eingerichtet ist, den aerosolerzeugenden Artikel (16) zu stoppen, wenn der aerosolerzeugende Artikel (16) den Anschlag (18) kontaktiert, wobei der Anschlag (18) quer angeordnet ist und sich über den distalen Abschnitt des Hohlraums (14) erstreckt, und wobei der Anschlag (18) derart angeordnet ist, dass Luft von distal des Anschlags (18) um den Anschlag (18) herum in den Hohlraum (14) strömen kann, wobei die Begriffe "proximal" und "distal" die relativen Positionen von Komponenten oder Abschnitten von Komponenten der Aerosolerzeugungsvorrichtung in Bezug auf die Richtung beschreiben, in der die Komponenten der Vorrichtung in Bezug auf einen Benutzer bei Gebrauch der Vorrichtung ausgerichtet sind, wobei eine Komponente, die in Richtung eines Benutzers ausgerichtet ist, eine proximale Komponente ist und eine Komponente an dem gegenüberliegenden Ende der Vorrichtung eine distale Komponente ist.

2. Aerosolerzeugungsvorrichtung (10) nach einem beliebigen der vorhergehenden Ansprüche, wobei der Anschlag (18) quer zu der Längsmittelachse des Hohlraums (14) angeordnet ist.

3. Aerosolerzeugungsvorrichtung (10) nach einem beliebigen der vorhergehenden Ansprüche, wobei der Anschlag (18) ein Stift, eine Stange, ein Stab, ein Pfosten, ein Schaft, ein Balken, eine Schiene, eine Strebe, eine Speiche, ein Stiel, eine Speiche oder eine Querstange ist.

4. Aerosolerzeugungsvorrichtung (10) nach einem beliebigen der vorhergehenden Ansprüche, wobei der Anschlag (18) eine gekrümmte Oberfläche aufweist.

5. Aerosolerzeugungsvorrichtung (10) nach einem beliebigen der vorhergehenden Ansprüche, wobei der Anschlag (18) kreuzförmig ausgebildet ist.

6. Aerosolerzeugungsvorrichtung (10) nach einem beliebigen der vorhergehenden Ansprüche, wobei der Anschlag (18) T-förmig ausgebildet ist.

7. Aerosolerzeugungsvorrichtung (10) nach einem beliebigen der vorhergehenden Ansprüche, wobei der Hohlraum (14) eine innere Seitenwand umfasst und wobei die innere Seitenwand eine erste Aussparung umfasst und wobei der Anschlag (18) in der ersten Aussparung angebracht ist.

8. Aerosolerzeugungsvorrichtung (10) nach Anspruch 7, wobei die innere Seitenwand eine zweite Aussparung gegenüber der ersten Aussparung umfasst und wobei der Anschlag (18) in der zweiten Aussparung derart angebracht ist, dass er zwischen der ersten Aussparung und der zweiten Aussparung angebracht ist.

9. Aerosolerzeugungsvorrichtung (10) nach einem beliebigen der vorhergehenden Ansprüche, wobei der Anschlag (18) an einer Basis des Hohlraums (14)

angeordnet ist, wobei die Basis des Hohlraums (14) an dem distalen Abschnitt des Hohlraums (14) angeordnet ist.

10. Aerosolerzeugungsvorrichtung (10) nach einem beliebigen der vorhergehenden Ansprüche, wobei der Hohlraum (14) als Heizkammer ausgelegt ist.

11. Aerosolerzeugungsvorrichtung (10) nach einem beliebigen der vorhergehenden Ansprüche, wobei die Aerosolerzeugungsvorrichtung einen Luftstromkanal distal von dem Hohlraum (14) und dem Anschlag (18) umfasst, und wobei der Luftstromkanal angeordnet ist, um einen Luftstrom in den Hohlraum (14) vorbei an dem Anschlag (18) zu ermöglichen.

12. Aerosolerzeugungsvorrichtung (10) nach Anspruch 11, wobei der Anschlag (18) in dem Luftstromkanal angeordnet ist.

13. Aerosolerzeugungsvorrichtung (10) nach einem beliebigen der vorhergehenden Ansprüche, wobei der Anschlag (18) näher an einem proximalen Ende der Aerosolerzeugungsvorrichtung als an einem distalen Ende der Aerosolerzeugungsvorrichtung angeordnet ist.

14. Aerosolerzeugungssystem, umfassend eine Aerosolerzeugungsvorrichtung (10) nach einem beliebigen der vorhergehenden Ansprüche und einen aerosolerzeugenden Artikel (16), umfassend ein aerosolbildendes Substrat.

Revendications

1. Dispositif de génération d'aérosol (10) comprenant :

une cavité (14) destinée à recevoir un article de génération d'aérosol (16) comprenant un substrat formant aérosol,
un élément de chauffage (20), dans lequel l'élément de chauffage (20) est agencé entourant au moins en partie la cavité (14), et
un arrêtoir (18), dans lequel l'arrêtoir a une coupe transversale circulaire dans un plan parallèle à un axe longitudinal de la cavité (14) et perpendiculaire à un axe longitudinal de l'arrêtoir,
dans lequel l'arrêtoir (18) est agencé au niveau d'une portion distale de la cavité (14), dans lequel l'arrêtoir (18) est configuré pour arrêter l'article de génération d'aérosol (16), lorsque l'article de génération d'aérosol (16) entre en contact avec l'arrêtoir (18), dans lequel l'arrêtoir (18) est agencé enjambant transversalement la portion distale de la cavité (14), et dans lequel l'arrêtoir (18) est agencé de telle sorte que l'air peut s'écouler depuis l'extrémité distale de l'arrêtoir (18) autour de l'arrêtoir (18) jusque dans la cavité (14), dans lequel les termes « proximal » et « distal » décrivent les positions relatives de composants, ou de portions de composants, du dispositif de génération d'aérosol en rapport avec la direction dans laquelle les composants du dispositif sont orientés par rapport à un utilisateur pendant l'utilisation du dispositif avec un composant orienté vers un utilisateur, qui est un composant proximal et un composant à l'extrémité opposée du dispositif qui est un composant distal.

2. Dispositif de génération d'aérosol (10) selon l'une quelconque des revendications précédentes, dans lequel l'arrêtoir (18) est agencé coupant l'axe longitudinal central de la cavité (14).

3. Dispositif de génération d'aérosol (10) selon l'une quelconque des revendications précédentes, dans lequel l'arrêtoir (18) est une broche, une barre, une tige, un mât, un arbre, un barreau, un rail, une entretoise, une ailette, une queue, une ailette ou une barre transversale.

4. Dispositif de génération d'aérosol (10) selon l'une quelconque des revendications précédentes, dans lequel l'arrêtoir (18) a une forme courbe.

5. Dispositif de génération d'aérosol (10) selon l'une quelconque des revendications précédentes, dans lequel l'arrêtoir (18) est configurée en forme de croix.

6. Dispositif de génération d'aérosol (10) selon l'une quelconque des revendications précédentes, dans lequel l'arrêtoir (18) est configurée en forme de T.

7. Dispositif de génération d'aérosol (10) selon l'une quelconque des revendications précédentes, dans lequel la cavité (14) comprend une paroi latérale intérieure, et dans lequel la paroi latérale intérieure comprend un premier évidement, et dans lequel l'arrêtoir (18) est monté dans le premier évidement.

8. Dispositif de génération d'aérosol (10) selon la revendication 7, dans lequel la paroi latérale intérieure comprend un deuxième évidement opposé au premier évidement, et dans lequel l'arrêtoir (18) est monté dans le deuxième évidement de manière à être monté entre le premier évidement et le deuxième évidement.

9. Dispositif de génération d'aérosol (10) selon l'une quelconque des revendications précédentes, dans lequel l'arrêtoir (18) est agencé au niveau d'une base de la cavité (14), dans lequel la base de la cavité (14) est agencée au niveau de la portion distale de la

cavité (14).

10. Dispositif de génération d'aérosol (10) selon l'une quelconque des revendications précédentes, dans lequel la cavité (14) est configurée sous la forme d'une chambre de chauffage.

11. Dispositif de génération d'aérosol (10) selon l'une quelconque des revendications précédentes, dans lequel le dispositif de génération d'aérosol comprend un conduit d'écoulement d'air distal de la cavité (14) et de l'arrêtoir (18), et dans lequel le conduit d'écoulement d'air est agencé pour permettre un écoulement d'air dans la cavité (14) au-delà de l'arrêtoir (18).

12. Dispositif de génération d'aérosol (10) selon la revendication 11, dans lequel l'arrêtoir (18) est agencé dans le conduit d'écoulement d'air.

13. Dispositif de génération d'aérosol (10) selon l'une quelconque des revendications précédentes, dans lequel l'arrêtoir (18) est agencé plus près d'une extrémité proximale du dispositif de génération d'aérosol que d'une extrémité distale du dispositif de génération d'aérosol.

14. Système de génération d'aérosol comprenant un dispositif de génération d'aérosol (10) selon l'une quelconque des revendications précédentes et un article de génération d'aérosol (16) comprenant un substrat formant aérosol.

Fig. 1

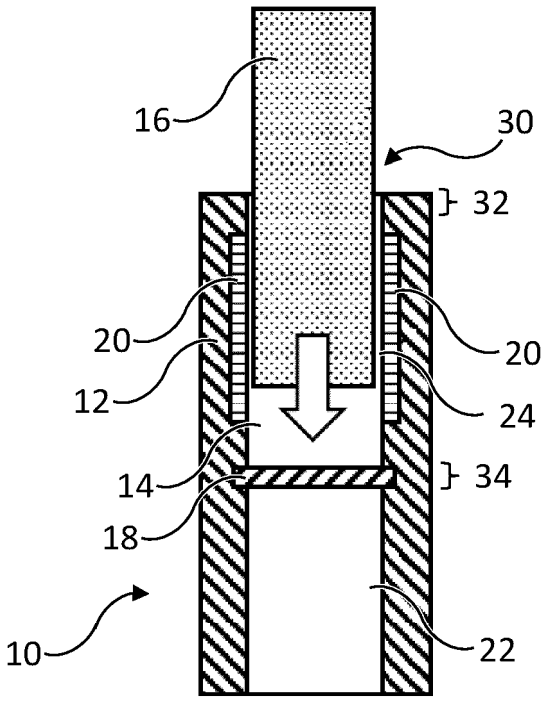


Fig. 1A

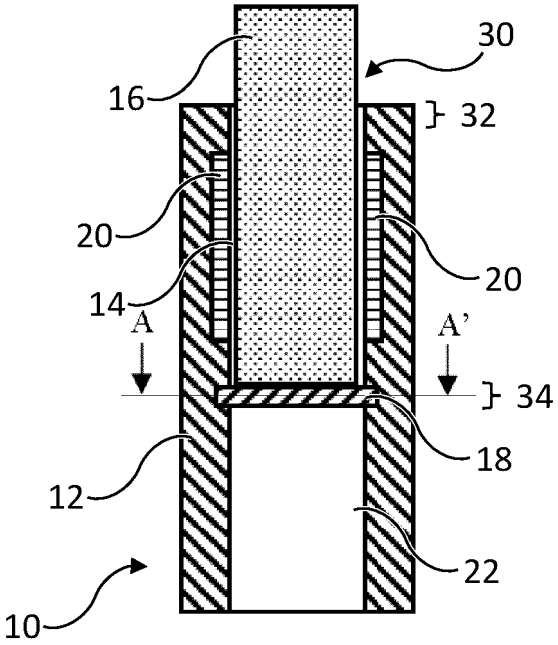


Fig. 1B

Fig. 2

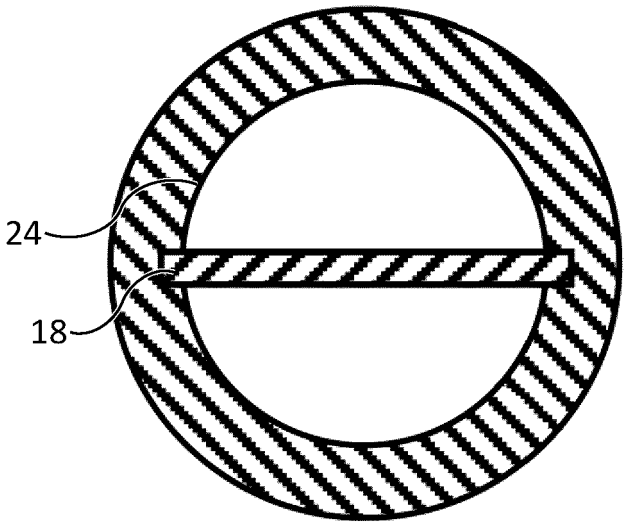


Fig. 3

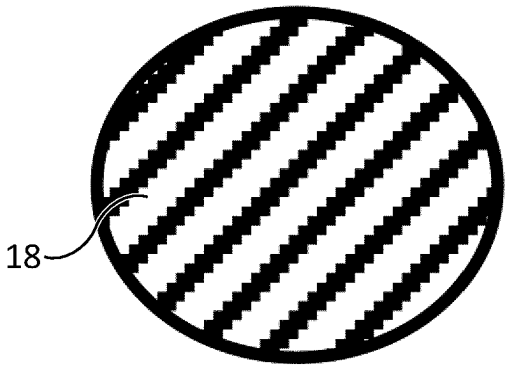


Fig. 4

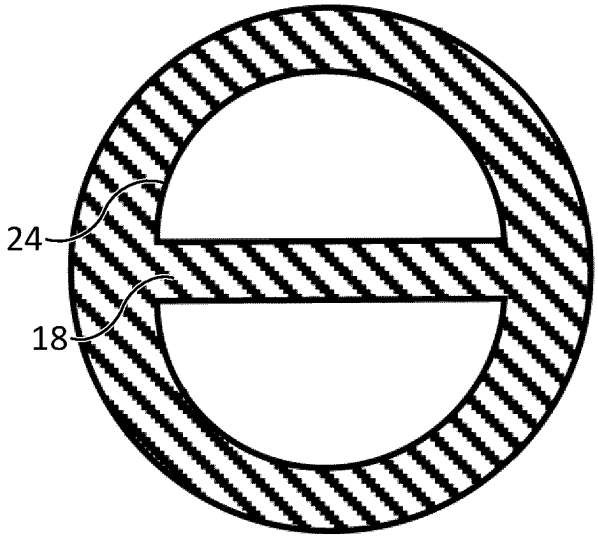


Fig. 5

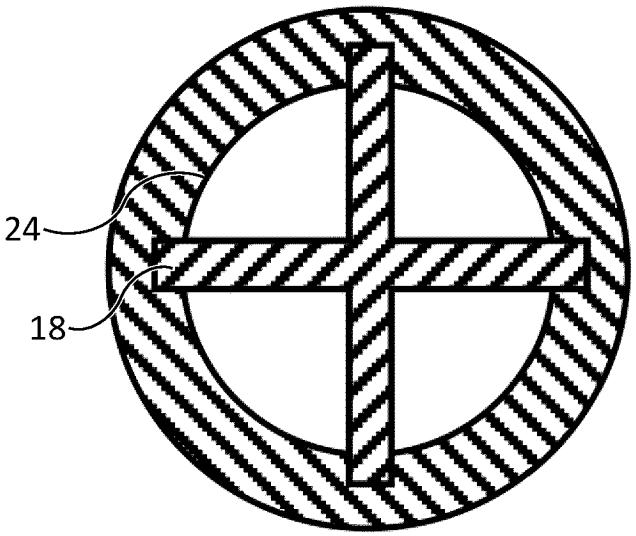


Fig. 6

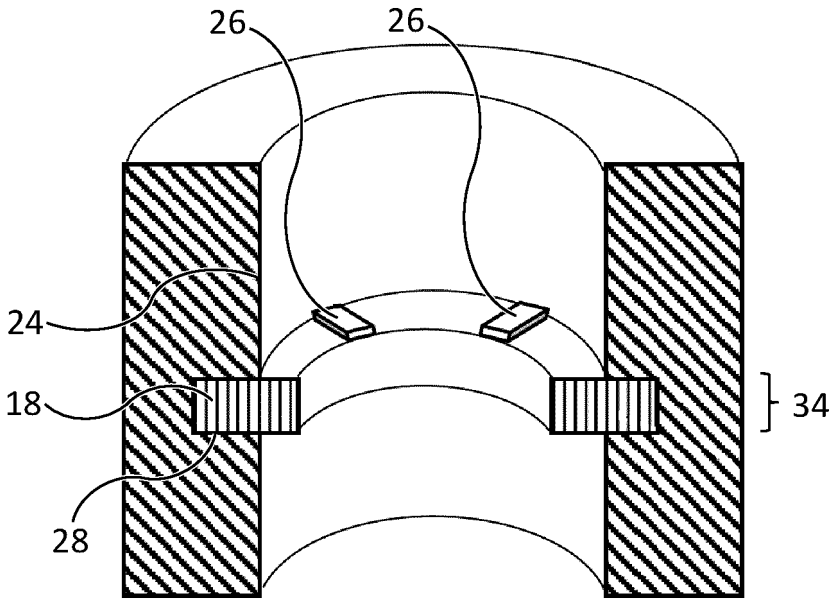
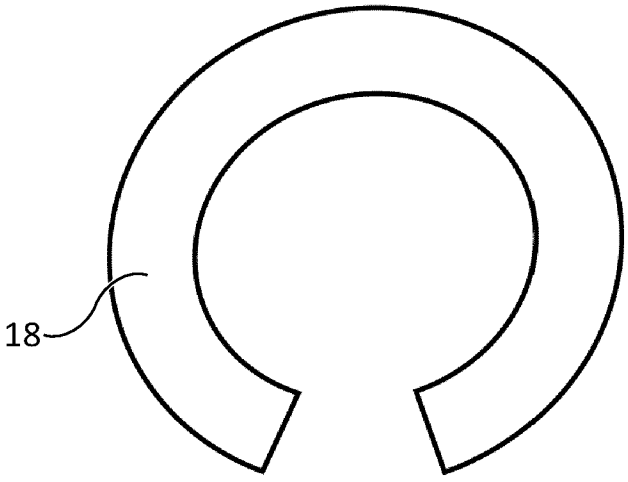


Fig. 7



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Patent documents cited in the description

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