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(54) **SMOKING SUBSTITUTE CONSUMABLE**

RAUCHERSATZARTIKEL

ARTICLE DE SUBSTITUTION DU TABAC

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Description

Field of the Disclosure

[0001] The present disclosure relates to a consumable for use in a smoking substitute system and particularly, although not exclusively, to a heat-not-burn (HNB) consumable.

Background

[0002] The smoking of tobacco is generally considered to expose a smoker to potentially harmful substances. It is generally thought that a significant amount of the potentially harmful substances are generated through the heat caused by the burning and/or combustion of the tobacco and the constituents of the burnt tobacco in the tobacco smoke itself.

[0003] Conventional combustible smoking articles, such as cigarettes, typically comprise a cylindrical rod of tobacco comprising shreds of tobacco which is surrounded by a wrapper, and usually also a cylindrical filter axially aligned in an abutting relationship with the wrapped tobacco rod. The filter typically comprises a filtration material which is circumscribed by a plug wrap. The wrapped tobacco rod and the filter are joined together by a wrapped band of tipping paper that circumscribes the entire length of the filter and an adjacent portion of the wrapped tobacco rod. A conventional cigarette of this type is used by lighting the end opposite to the filter, and burning the tobacco rod. The smoker receives mainstream smoke into their mouth by drawing on the mouth end or filter end of the cigarette.

[0004] Combustion of organic material such as tobacco is known to produce tar and other potentially harmful byproducts. There have been proposed various smoking substitute systems (or "substitute smoking systems") in order to avoid the smoking of tobacco.

[0005] Such smoking substitute systems can form part of nicotine replacement therapies aimed at people who wish to stop smoking and overcome a dependence on nicotine.

[0006] Smoking substitute systems include electronic systems that permit a user to simulate the act of smoking by producing an aerosol (also referred to as a "vapour") that is drawn into the lungs through the mouth (inhaled) and then exhaled. The inhaled aerosol typically bears nicotine and/or flavourings without, or with fewer of, the odour and health risks associated with traditional smoking.

[0007] In general, smoking substitute systems are intended to provide a substitute for the rituals of smoking, whilst providing the user with a similar experience and satisfaction to those experienced with traditional smoking and with combustible tobacco products. Some smoking substitute systems use smoking substitute articles that are designed to resemble a traditional cigarette and are cylindrical in form with a mouthpiece at one end.

[0008] The popularity and use of smoking substitute systems has grown rapidly in the past few years. Although originally marketed as an aid to assist habitual smokers wishing to quit tobacco smoking, consumers are increasingly viewing smoking substitute systems as desirable lifestyle accessories.

[0009] There are a number of different categories of smoking substitute systems, each utilising a different smoking substitute approach.

[0010] One approach for a smoking substitute system is the so-called "heat not burn" ("HNB") approach in which tobacco (rather than an "e-liquid") is heated or warmed to release vapour. The tobacco may be leaf tobacco or reconstituted tobacco. The vapour may contain nicotine and/or flavourings. In the HNB approach the intention is that the tobacco is heated but not burned, i.e. the tobacco does not undergo combustion.

[0011] A typical HNB smoking substitute system may include a device and a consumable. The consumable may include the tobacco material. The device and consumable may be configured to be physically coupled together. In use, heat may be imparted to the tobacco material by a heating element of the device, wherein airflow through the tobacco material causes moisture in the tobacco material to be released as vapour. A vapour may also be formed from a carrier/humectant in the tobacco material (this carrier may for example include propylene glycol and/or vegetable glycerine) and additionally volatile compounds released from the tobacco. The released vapour may be entrained in the airflow drawn through the tobacco.

[0012] As the vapour passes through the consumable (entrained in the airflow) from an inlet to a mouthpiece (outlet), the vapour cools and condenses to form an aerosol for inhalation by the user. The aerosol will normally contain the volatile compounds.

[0013] Known HNB consumables can often provide insufficient mixing of the vapour components i.e. incomplete mixing of the nicotine with the PG/VG because they are vaporised from the tobacco at different temperatures. Unmixed nicotine gas can result in an unpleasant sensation for the user.

[0014] In HNB smoking substitute systems, heating as opposed to burning the tobacco material is believed to cause fewer, or smaller quantities, of the more harmful compounds ordinarily produced during smoking. Consequently, the HNB approach may reduce the odour and/or health risks that can arise through the burning, combustion and pyrolytic degradation of tobacco.

[0015] There is a need for improved design of HNB consumables to enhance the user experience and improve the function of the HNB smoking substitute system e.g. the improve mixing of the vapour components.

[0016] The present disclosure has been devised in the light of the above considerations.

[0017] US2008/0047571 A1 discloses a smoking article including a filter system having an upstream plug of filtering material, an impaction filter and a downstream

plug of filtering material.

[0018] US2012/0048286 A1 suggests a smoking article having a tobacco rod and a filter attached thereto, the filter including a flow restricting segment of smoke impermeable material.

Summary of the Disclosure

[0019] In a first aspect, there is provided an aerosol-forming article (e.g. a smoking substitute article such as an HNB consumable) as set forth in claim 1.

[0020] By providing a flow restrictor element downstream of the aerosol-forming substrate, the various components of the vapour are forced to co-locate and thus mix as they pass through the flow restrictor element. This means that the user is not exposed to unmixed nicotine gas.

[0021] Optional features will now be set out. These are applicable singly or in any combination with any aspect.

[0022] The flow restrictor element may comprise a disc or rod having at least one axial perforation or channel. For example, the flow restrictor element may comprise a disc or rod having a single perforation or channel e.g. at its axial centre. The or each perforation/channel may have a diameter of between 0.5 and 1.5mm e.g. around 1mm.

[0023] During manufacture of the consumable/article, the size of the perforation(s)/channel(s) can be selected depending on the desired nicotine "hit" delivery.

[0024] The flow restrictor element may be formed of a vapour-impermeable material e.g. it may be formed of a metallic foil (e.g. aluminium foil) or a plastic material. In other embodiments, the flow restrictor element may be formed of extruded tobacco or activated carbon.

[0025] In the first aspect, the flow restrictor element may be provided upstream of the spacer element. This allows expansion of the restricted vapour flow into the mixing chamber defined by the spacer element which further improves mixing of the vapour components. In some embodiments, the restrictor element is provided immediately upstream of the spacer element i.e. interposed between the upstream filter element and the spacer element.

[0026] The aerosol-forming article of the first aspect is preferably a heat-not-burn (HNB) consumable.

[0027] The aerosol-forming substrate is capable of being heated to release at least one volatile compound that can form an aerosol. The aerosol-forming substrate may be located at the upstream end of the article/consumable.

[0028] As used herein, the terms "upstream" and "downstream" are intended to refer to the flow direction of the vapour/aerosol i.e. with the downstream end of the article/consumable being the mouth end or outlet where the aerosol exits the article/consumable for inhalation by the user. The upstream end of the article/consumable is the opposing end to the downstream end. The term "axial flow direction" refers to a direction from the upstream end of the article/consumable to the downstream end.

[0029] In order to generate an aerosol, the aerosol-forming substrate comprises at least one volatile compound that is intended to be vaporised/aerosolised and that may provide the user with a recreational and/or medicinal effect when inhaled. Suitable chemical and/or physiologically active volatile compounds include the group consisting of: nicotine, cocaine, caffeine, opiates and opioids, cathine and cathinone, kavalactones, mysticin, beta-carboline alkaloids, salvinorin A together with any combinations, functional equivalents to, and/or synthetic alternatives of the foregoing.

[0030] The aerosol-forming substrate may comprise plant material. The plant material may comprise least one plant material selected from the list including *Amaranthus dubius*, *Arctostaphylos uva-ursi* (Bearberry), *Argemone mexicana*, *Amica*, *Artemisia vulgaris*, Yellow Tees, *Galea zacatechichi*, *Canavalia maritima* (Baybean), *Cecropia mexicana* (Guamora), *Cestrum nocturnum*, *Cynoglossum virginianum* (wild comfrey), *Cytisus scoparius*, *Damiana*, *Entada rheedii*, *Eschscholzia californica* (California Poppy), *Fittonia albivenis*, *Hippobroma longiflora*, *Humulus japonica* (Japanese Hops), *Humulus lupulus* (Hops), *Lactuca virosa* (Lettuce Opium), *Lagdera alata*, *Leonotis leonurus*, *Leonurus cardiaca* (Motherwort), *Leonurus sibiricus* (Honeyweed), *Lobelia cardinalis*, *Lobelia inflata* (Indian tobacco), *Lobelia siphilitica*, *Nepeta cataria* (Catnip), *Nicotiana species* (Tobacco), *Nymphaea alba* (White Lily), *Nymphaea caerulea* (Blue Lily), Opium poppy, *Passiflora incarnata* (Passionflower), *Pedicularis densiflora* (Indian Warrior), *Pedicularis groenlandica* (Elephant's Head), *Salvia divinorum*, *Salvia dorrii* (Tobacco Sage), *Salvia species* (Sage), *Scutellaria galericulata*, *Scutellaria lateriflora*, *Scutellaria nana*, *Scutellaria species* (Skullcap), *Sida acuta* (Wireweed), *Sida rhombifolia*, *Silene capensis*, *Syzygium aromaticum* (Clove), *Tagetes lucida* (Mexican Tarragon), *Tarchonanthus camphoratus*, *Tumera diffusa* (Damiana), *Verbascum* (Mullein), *Zamia latifolia* (Maconha Brava) together with any combinations, functional equivalents to, and/or synthetic alternatives of the foregoing.

[0031] Preferably, the plant material is tobacco. Any type of tobacco may be used. This includes, but is not limited to, flue-cured tobacco, burley tobacco, Maryland Tobacco, dark-air cured tobacco, oriental tobacco, dark-fired tobacco, perique tobacco and rustica tobacco. This also includes blends of the above mentioned tobaccos.

[0032] Any suitable parts of the tobacco plant may be used. This includes leaves, stems, roots, bark, seeds and flowers.

[0033] The tobacco may comprise one or more of leaf tobacco, stem tobacco, tobacco powder, tobacco dust, tobacco derivatives, expanded tobacco, homogenised tobacco, shredded tobacco, extruded tobacco, cut rag tobacco and/or reconstituted tobacco (e.g. slurry recon or paper recon).

[0034] The aerosol-forming substrate may comprise a gathered sheet of homogenised (e.g. paper/slurry recon) tobacco or gathered shreds/strips formed from such a

sheet.

[0035] In some embodiments, the sheet used to form the aerosol-forming substrate has a grammage greater than or equal to 100 g/m², e.g. greater than or equal to 110 g/m² such as greater than or equal to 120 g/m².

[0036] The sheet may have a grammage of less than or equal to 300 g/m² e.g. less than or equal to 250 g/m² or less than or equal to 200 g/m².

[0037] The sheet may have a grammage of between 120 and 190 g/m².

[0038] The aerosol-forming substrate may comprise at least 50 wt% plant material, e.g. at least 60 wt% plant material e.g. around 65 wt% plant material. The aerosol-forming substrate may comprise 80 wt% or less plant material e.g. 75 or 70 wt% or less plant material.

[0039] The aerosol-forming substrate may comprise one or more additives selected from humectants, flavourants, fillers, aqueous/non-aqueous solvents and binders.

[0040] Humectants are provided as vapour generators - the resulting vapour helps carry the volatile active compounds and increases visible vapour. Suitable humectants include polyhydric alcohols (e.g. propylene glycol (PG), triethylene glycol, 1,2-butane diol and vegetable glycerine (VG)) and their esters (e.g. glycerol mono-, di- or tri-acetate). They may be present in the aerosol-forming substrate in an amount between 1 and 50 wt%.

[0041] The humectant content of the aerosol-forming substrate may have a lower limit of at least 1 % by weight of the plant material, such as at least 2 wt %, such as at least 5 wt %, such as at least 10 wt %, such as at least 20 wt %, such as at least 30 wt %, or such as at least 40 wt %.

[0042] The humectant content of the aerosol-forming substrate may have an upper limit of at most 50 % by weight of the plant material, such as at most 40 wt %, such as at most 30 wt %, or such as at most 20 wt %.

[0043] Preferably, the humectant content is 1 to 40 wt % of the aerosol-forming substrate, such as 1 to 20 wt %

[0044] Suitable binders are known in the art and may act to bind together the components forming the aerosol-forming substrate. Binders may comprise starches and/or cellulosic binders such as methyl cellulose, ethyl cellulose, hydroxypropyl cellulose, hydroxyethyl cellulose and methyl cellulose, gums such as xanthan, guar, arabic and/or locust bean gum, organic acids and their salts such as alginic acid/ sodium alginate, agar and pectins.

[0045] Preferably the binder content is 5 to 10 wt% of the aerosol-forming substrate e.g. around 6 to 8 wt%.

[0046] Suitable fillers are known in the art and may act to strengthen the aerosol-forming substrate. Fillers may comprise fibrous (non-tobacco) fillers such as cellulose fibres, lignocellulose fibres (e.g. wood fibres), jute fibres and combinations thereof.

[0047] Preferably, the filler content is 5 to 10 wt% of the aerosol-forming substrate e.g. around 6 to 9 wt%.

[0048] The aerosol-forming substrate may comprise an aqueous and/or non-aqueous solvent. In some embodiments, the aerosol forming substrate has a water

content of between 5 and 10 wt% e.g. between 6-9 wt% such as between 7-9 wt%.

[0049] The flavourant may be provided in solid or liquid form. It may include menthol, liquorice, chocolate, fruit flavour (including e.g. citrus, cherry etc.), vanilla, spice (e.g. ginger, cinnamon) and tobacco flavour. The flavourant may be evenly dispersed throughout the aerosol-forming substrate or may be provided in isolated locations and/or varying concentrations throughout the aerosol-forming substrate.

[0050] The aerosol-forming substrate may be formed in a substantially cylindrical shape such that the article/consumable resembles a conventional cigarette. It may have a diameter of between 5 and 10mm e.g. between 6 and 9mm or 6 and 8mm e.g. around 7 mm. It may have an axial length of between 10 and 15mm e.g. between 11 and 14mm such as around 12 or 13mm.

[0051] The aerosol-forming substrate may be circumscribed by a wrapping layer e.g. a paper wrapping layer. The wrapping layer may overlie an inner foil layer or may comprise a paper/foil laminate (with the foil innermost).

[0052] The article of the first aspect comprises an upstream filter element and a terminal filter element. The upstream filter element is upstream of the terminal filter element (but downstream of the aerosol-forming substrate). The terminal filter element may be at the downstream/mouth end of the article/consumable.

[0053] One or both of the filter elements may be comprised of cellulose acetate or polypropylene tow. One or both of the filter elements may be comprised of activated charcoal. One or both of the filter elements may be comprised of paper. One or both filter elements may be circumscribed with a respective plug wrap e.g. a paper plug wrap.

[0054] The filter elements may each have a substantially cylindrical shape with a diameter substantially matching the diameter of the aerosol-forming substrate (with or without its associated wrapping layer). The axial length of one or each filter element may be less than 20mm, e.g. between 8 and 15mm, for example between 9 and 13 mm e.g. between 10 and 12mm.

[0055] Both the filter elements are hollow bore filter elements. The or each hollow bore filter may have a bore diameter of between 1 and 5 mm, e.g. between 2 and 4 mm or between 2 and 3 mm. The upstream filter element is a hollow bore filter element, the bore diameter is preferably greater than the diameter of the flow restrictor perforation i.e. preferably greater than 1.5 mm.

[0056] The upstream filter element may be at least partly (e.g. entirely) circumscribed by the (paper) wrapping layer.

[0057] The terminal filter element (at the downstream end of the article/consumable) may be joined to the upstream elements forming the article/consumable by a circumscribing tipping layer e.g. a tipping paper layer. The tipping paper may have an axial length longer than the axial length of the terminal filter element such that the tipping paper completely circumscribes the terminal filter

element plus the wrapping layer surrounding the adjacent upstream element e.g. the adjacent upstream spacer element.

[0058] The spacer element defines a space or cavity or chamber between the aerosol-forming substrate and the downstream end of the article/consumable. The spacer acts to allow both cooling and mixing of the aerosol.

[0059] The spacer element may comprise a cardboard tube. The spacer element may be at least partly (e.g. entirely) circumscribed by the (paper) wrapping layer.

[0060] The spacer element may have an external diameter of between 5 and 10mm e.g. between 6 and 9mm or 6 and 8mm e.g. around 7 mm. It may have an axial length of between 10 and 15mm e.g. between 12 and 14 mm or 13 and 14mm e.g. around 14mm

[0061] In some embodiments, the article/consumable may further comprise an aerosol-cooling element which is adapted to cool the aerosol generated from the aerosol-forming substrate (by heat exchange) before being inhaled by the user.

[0062] The aerosol-cooling element will be downstream from the aerosol-forming substrate. For example, it may be between the aerosol-forming substrate and the upstream filter element or between two filter elements. The aerosol cooling element may be at least partly (e.g. completely) circumscribed by the (paper) wrapping layer.

[0063] The aerosol-cooling element may be formed of a plastics material selected from the group consisting of polylactic acid (PLA), polyvinyl chloride (PVC), polyethylene (PE) and polyethylene terephthalate (PET). The aerosol-cooling element may be formed of a crimped/gathered sheet of material to form a structure having a high surface area with a plurality of longitudinal channels to maximise heat exchange and cooling of the aerosol.

[0064] In a second aspect, there is provided a smoking substitute system comprising an aerosol-forming article according to the first aspect and a device comprising a heating element.

[0065] The device may be a HNB device i.e. a device adapted to heat but not combust the aerosol-forming substrate.

[0066] The device may comprise a main body for housing the heating element. The heating element may comprise an elongated e.g. rod, tube-shaped or blade heating element. The heating element may project into or surround a cavity within the main body for receiving the article/consumable described above.

[0067] The device (e.g. the main body) may further comprise an electrical power supply e.g. a (rechargeable) battery for powering the heating element. It may further comprise a control unit to control the supply of power to the heating element.

[0068] In a third aspect, there is provided a method of using a smoking substitute system according to the second aspect, the method comprising:

inserting the article/consumable into the device; and heating the article/consumable using the heating element.

[0069] In some embodiments, the method comprises inserting the article/consumable into a cavity within the main body and penetrating the article/consumable with the heating element upon insertion of the article/consumable. For example, the heating element may penetrate the aerosol-forming substrate in the article/consumable.

[0070] The skilled person will appreciate that except where mutually exclusive, a feature or parameter described in relation to any one of the above aspects may be applied to any other aspect. Furthermore, except where mutually exclusive, any feature or parameter described herein may be applied to any aspect and/or combined with any other feature or parameter described herein.

Summary of the Figures

[0071] So that the invention may be understood, and so that further aspects and features thereof may be appreciated, embodiments illustrating the principles of the invention will now be discussed in further detail with reference to the accompanying figures, in which:

Figure 1 shows a first embodiment of an HNB consumable;

Figure 2 shows a second embodiment of an HNB consumable

Figure 3 shows a third embodiment of an HNB consumable; and

Figure 4 shows the first embodiment within a device forming an HNB system.

Detailed Description of the Figures

[0072] As shown in Figure 1, the HNB consumable 1 comprises an aerosol-forming substrate 2 at the upstream end of the consumable 1.

[0073] The aerosol-forming substrate comprises reconstituted tobacco which includes nicotine as a volatile compound.

[0074] The aerosol-forming substrate 2 comprises 65 wt% tobacco which is provided in the form of gathered shreds produced from a sheet of slurry/paper reconstituted tobacco. The tobacco is dosed with 20wt% of a humectant such as propylene glycol (PG) or vegetable glycerine (VG) and has a moisture content of between 7-9 wt%. The aerosol-forming substrate further comprises cellulose pulp filler and guar gum binder.

[0075] The aerosol-forming substrate 2 is formed in a substantially cylindrical shape such that the consumable resembles a conventional cigarette. It has diameter of

around 7mm and an axial length of around 12 mm.

[0076] The aerosol-forming substrate 2 is circumscribed by a paper wrapping layer 3.

[0077] The consumable 1 comprises an upstream filter element 4 and a downstream (terminal) filter element 5. The two filter elements 4, 5 and spaced by a cardboard tube spacer 6. Both filter elements 4, 5 are formed of cellulose acetate tow and wrapped with a respective paper plug layer (not shown).

[0078] Both filter elements have a substantially cylindrical shape. The diameter of the upstream filter 4 matches the diameter of the aerosol-forming substrate 2. The diameter of the terminal filter element 5 is slightly larger and matches the combined diameter of the aerosol-forming substrate 2 and the wrapping layer 3. The upstream filter element is slightly shorter in axial length than the terminal filter element at an axial length of 10mm compared to 12mm for the terminal filter element.

[0079] The cardboard tube spacer 6 is longer than each of the two filter portions having an axial length of around 14mm.

[0080] Each filter element 4, 5 is a hollow bore filter element with a hollow, longitudinally extending bore. The diameter of the bore in the upstream filter is slightly larger than the diameter of the bore in the terminal filter having a diameter of 3mm compared to 2 mm for the terminal filter element.

[0081] The cardboard tube spacer 6 and the upstream filter portion 4 are circumscribed by the wrapping layer 3.

[0082] The terminal filter element 5 is joined to the upstream elements forming the consumable by a circumscribing paper tipping layer 7. The tipping layer 7 encircles the terminal filter portion and has an axial length of around 20mm such that it overlays a portion of the cardboard tube spacer 6.

[0083] A flow restrictor element 13 in the form of a foil disc with a single perforation 14 having a 1mm diameter is provided at the downstream of the of the upstream filter element 4 i.e. it is interposed between the upstream filter element 4 and the cardboard tube spacer 6.

[0084] Figure 2 shows a second embodiment of a consumable 1' which is the same as that shown in Figure 1 except that the terminal filter element 5 is a solid filter element and comprises a crushable capsule 8 (crush-ball) having a shell wall containing a liquid menthol or cherry or vanilla flavourant. The capsule 8 is spherical and has a diameter of 3.5mm. It is positioned within the axial centre of the terminal filter portion 5.

[0085] Figure 3 shows a third embodiment of a consumable 1" which is the same as the first embodiment except that the wrapping layer 3 does not completely circumscribe the cardboard tube spacer 6 such that there is an annular gap 9 between the tipping layer 7 and the cardboard tube spacer 6 downstream of the end of the wrapping layer 3.

[0086] Figure 4 shows the first embodiment inserted into an HNB device 10 comprising a rod-shaped heating element (not shown). The heating element projects into

a cavity 11 within the main body 12 of the device. The consumable 1 is inserted into the cavity 11 of the main body 12 of the device 10 such that the heating rod penetrates the aerosol-forming substrate 2. Heating of the reconstituted tobacco in the aerosol-forming substrate 2 is effected by powering the heating element (e.g. with a rechargeable battery (not shown)). As the tobacco is heated, moisture and nicotine from within the tobacco and the humectant are released as a vapour and entrained within an airflow generated by inhalation by the user at the terminal filter portion 5.

[0087] After the vapour passes through the upstream filter 4, the nicotine, moisture and humectant are forced to co-locate as they pass through the perforation 14 in the flow restrictor element 13 thus effecting good mixing. The vapour flow path then increases in cross-sectional area within the cardboard tube spacer 6 which further effects efficient mixing of the vapour components.

[0088] As the vapour cools within the cardboard tube spacer 6, it condenses to form an aerosol containing the volatile compounds for inhalation by the user.

[0089] Throughout this specification, including the claims which follow, unless the context requires otherwise, the words "have", "comprise", and "include", and variations such as "having", "comprises", "comprising", and "including" will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

[0090] It must be noted that, as used in the specification and the appended claims, the singular forms "a," "an," and "the" include plural referents unless the context clearly dictates otherwise. Ranges may be expressed herein as from "about" one particular value, and/or to "about" another particular value. When such a range is expressed, another embodiment includes from the one particular value and/or to the other particular value. Similarly, when values are expressed as approximations, by the use of the antecedent "about," it will be understood that the particular value forms another embodiment. The term "about" in relation to a numerical value is optional and means, for example, +/- 10%.

[0091] The words "preferred" and "preferably" are used herein refer to embodiments of the invention that may provide certain benefits under some circumstances. It is to be appreciated, however, that other embodiments may also be preferred under the same or different circumstances. The recitation of one or more preferred embodiments therefore does not mean or imply that other embodiments are not useful, and is not intended to exclude other embodiments from the scope of the disclosure, or from the scope of the claims.

Claims

1. An aerosol-forming article (1) comprising, in axial flow arrangement, an aerosol-forming substrate (2),

an upstream filter element (4), a spacer element (6) and a terminal filter element (5), wherein the article (1) further comprises a flow restrictor element (13) upstream of the terminal filter element (5) and downstream of the aerosol-forming substrate (2), wherein the flow restrictor element (13) comprises a disc or rod having at least one axial perforation or channel (14);

wherein the upstream filter element (4) is a hollow bore filter element having a bore diameter which is greater than the diameter of the at least one axial perforation or channel (14) of the flow restrictor (13); and

characterised in that the terminal filter element (4, 5) is a hollow bore filter element.

2. An article according to claim 1 wherein the flow restrictor element (13) has a single perforation or channel at its axial centre having a diameter of between 0.5 and 1.5 mm.
3. An article according to any one of the preceding claims wherein the flow restrictor element (13) is formed of a vapour-impermeable material.
4. An article according to claim 1 or claim 2 wherein the flow restrictor element (13) is formed of extruded tobacco.
5. An article according to any one of claims 1 to 4 wherein the flow restrictor element (13) is provided upstream of the spacer element (6).
6. An article according to claim 5 wherein the restrictor element (13) is interposed between the upstream filter element (4) and the spacer element (6).
7. An article according to any one of claims 1 to 6 wherein the upstream filter element (4) is a hollow bore filter having a bore diameter greater than 1.5 mm.
8. An article according to any one of the preceding claims wherein the aerosol-forming article (2) is a heat-not-burn consumable.
9. A system comprising an aerosol-forming article (1) according to any one of the preceding claims and a device (10) comprising a heating element.
10. A system according to claim 9 wherein the device (10) comprises a main body (12) for housing the heating element and the heating element comprises an elongated heating element.
11. A method of using the system according to claim 9 or 10, the method comprising:

inserting the article (1) into the device (10); and heating the article (1) using the heating element.

12. A method according to claim 11 comprising inserting the article (1) into a cavity within a main body (12) of the device (10) and penetrating the article (1) with the heating element upon insertion of the article (1).

10 Patentansprüche

1. Aerosolbildender Artikel (1), umfassend ein aerosolbildendes Substrat (2), ein stromaufwärtiges Filterelement (4), ein Beabstandungselement (6) und ein End-Filterelement (5) in axialer Strömungsanordnung, wobei der Artikel (1) ferner ein Strömungsbegrenzungselement (13) stromaufwärts des End-Filterelements (5) und stromabwärts des aerosolbildenden Substrats (2) umfasst, wobei das Strömungsbegrenzungselement (13) eine Scheibe oder einen Stab umfasst, die/der zumindest eine axiale Perforation oder einen Kanal (14) aufweist;

wobei das stromaufwärtige Filterelement (4) ein Hohlbohrungsfilterelement mit einem Bohrungsdurchmesser ist, der größer ist als ein Durchmesser der zumindest einen axialen Perforation oder des Kanals (14) des Strömungsbegrenzungselements (13); und
dadurch gekennzeichnet, dass das End-Filterelement (4, 5) ein Hohlbohrungsfilterelement ist.
2. Artikel nach Anspruch 1, wobei das Strömungsbegrenzungselement (13) eine einzelne Perforation oder einen Kanal an dessen axialer Mitte mit einem Durchmesser von zwischen 0,5 und 1,5 mm aufweist.
3. Artikel nach einem der vorangegangenen Ansprüche, wobei das Strömungsbegrenzungselement (13) aus einem dampfundurchdringlichen Material ausgebildet ist.
4. Artikel nach Anspruch 1 oder Anspruch 2, wobei das Strömungsbegrenzungselement (13) aus extrudiertem Tabak ausgebildet ist.
5. Artikel nach einem der Ansprüche 1 bis 4, wobei das Strömungsbegrenzungselement (13) stromaufwärts des Beabstandungselements (6) angeordnet ist.
6. Artikel nach Anspruch 5, wobei das Begrenzungselement (13) zwischen dem stromaufwärtigen Filterelement (4) und dem Beabstandungselement (6) angeordnet ist.
7. Artikel nach einem der Ansprüche 1 bis 6, wobei das

stromaufwärtige Filterelement (4) ein Hohlbohrungsfilter ist, der einen Bohrungsdurchmesser von mehr als 1,5 mm aufweist.

8. Artikel nach einem der vorangegangenen Ansprüche, wobei der aerosolbildende Artikel (2) eine Erhitzen-anstatt-Verbrennen-Verbrauchsware ist.

9. System, umfassend einen aerosolbildenden Artikel (1) nach einem der vorangegangenen Ansprüche und eine Vorrichtung (10) umfassend ein Heizelement.

10. System nach Anspruch 9, wobei die Vorrichtung (10) einen Hauptkörper (12) zum Einhausen des Heizelements umfasst und das Heizelement ein längliches Heizelement umfasst.

11. Verfahren zur Verwendung eines Systems nach Anspruch 9 oder 10, wobei das Verfahren Folgendes umfasst:

Einsetzen des Artikels (1) in die Vorrichtung (10); und
Erhitzen des Artikels (1) unter Verwendung des Heizelements.

12. Verfahren nach Anspruch 11, umfassend das Einsetzen des Artikels (1) in einen Hohlraum innerhalb eines Hauptkörpers (12) der Vorrichtung (10) und Durchstoßen des Artikels (1) mit dem Heizelement beim Einsetzen des Artikels (1).

Revendications

1. Article de formation d'aérosol (1) comprenant, dans un agencement d'écoulement axial, un substrat de formation d'aérosol (2), un élément de filtre amont (4), un élément d'espacement (6) et un élément de filtre terminal (5), dans lequel l'article (1) comprend en outre un élément de restriction d'écoulement (13) en amont de l'élément de filtre terminal (5) et en aval du substrat de formation d'aérosol (2), dans lequel l'élément de restriction d'écoulement (13) comprend un disque ou une tige présentant au moins une perforation ou un canal axial(e) (14) ;

dans lequel l'élément de filtre amont (4) est un élément de filtre à alésage creux présentant un diamètre d'alésage qui est supérieur au diamètre de la au moins une perforation axiale ou du au moins un canal axial (14) du restricteur d'écoulement (13) ; et

caractérisé en ce que l'élément de filtre terminal (4, 5) est un élément de filtre à alésage creux.

2. Article selon la revendication 1, dans lequel l'élément

de restriction d'écoulement (13) présente une perforation ou un canal unique au niveau de son centre axial présentant un diamètre compris entre 0,5 et 1,5 mm.

3. Article selon l'une quelconque des revendications précédentes, dans lequel l'élément de restriction d'écoulement (13) est formé d'un matériau imperméable à la vapeur.

4. Article selon la revendication 1 ou la revendication 2, dans lequel l'élément de restriction d'écoulement (13) est formé de tabac extrudé.

5. Article selon l'une quelconque des revendications 1 à 4, dans lequel l'élément de restriction d'écoulement (13) est prévu en amont de l'élément d'espacement (6).

6. Article selon la revendication 5, dans lequel l'élément de restriction (13) est interposé entre l'élément de filtre amont (4) et l'élément d'espacement (6).

7. Article selon l'une quelconque des revendications 1 à 6, dans lequel l'élément de filtre amont (4) est un filtre à alésage creux présentant un diamètre d'alésage supérieur à 1,5 mm.

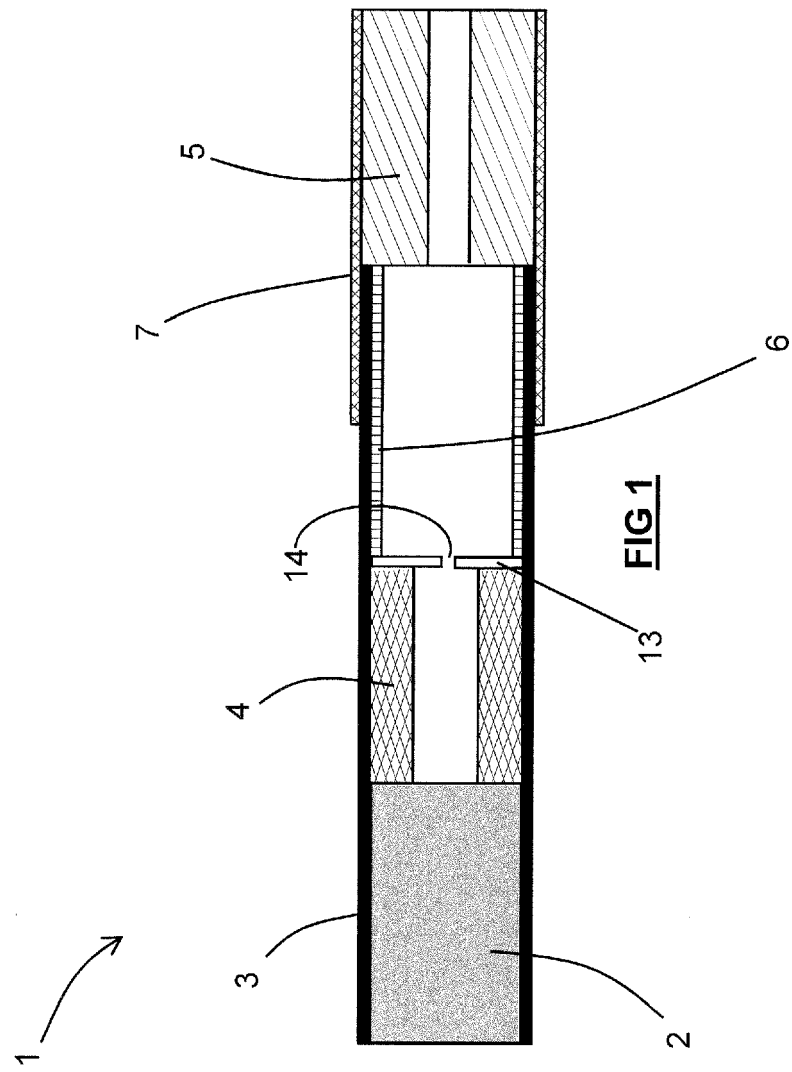
8. Article selon l'une quelconque des revendications précédentes, dans lequel l'article de formation d'aérosol (2) est un consommable chauffé sans combustion.

9. Système comprenant un article de formation d'aérosol (1) selon l'une quelconque des revendications précédentes et un dispositif (10) comprenant un élément chauffant.

10. Système selon la revendication 9, dans lequel le dispositif (10) comprend un corps principal (12) pour loger l'élément chauffant, et l'élément chauffant comprend un élément chauffant allongé.

11. Procédé d'utilisation du système selon la revendication 9 ou 10, le procédé comprenant les étapes consistant à : insérer l'article (1) dans le dispositif (10) ; et chauffer l'article (1) en utilisant l'élément chauffant.

12. Procédé selon la revendication 11, comprenant une insertion de l'article (1) dans une cavité à l'intérieur d'un corps principal (12) du dispositif (10), et une pénétration de l'article (1) avec l'élément chauffant lors de l'insertion de l'article (1).



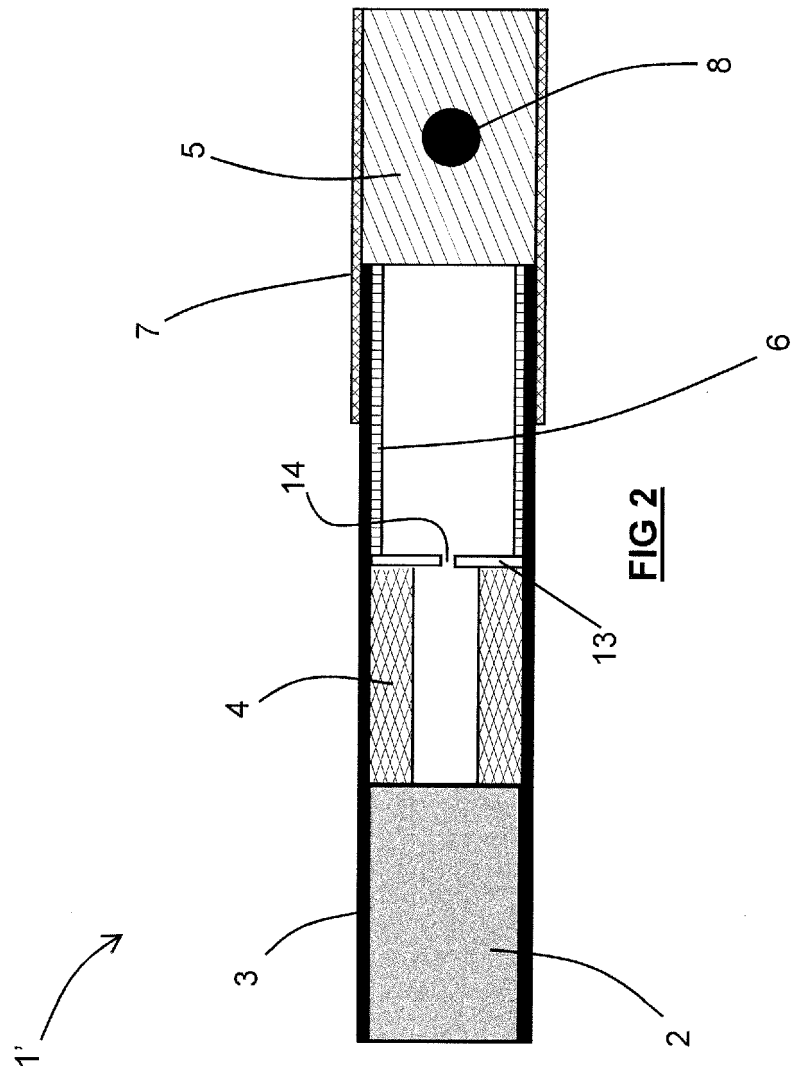
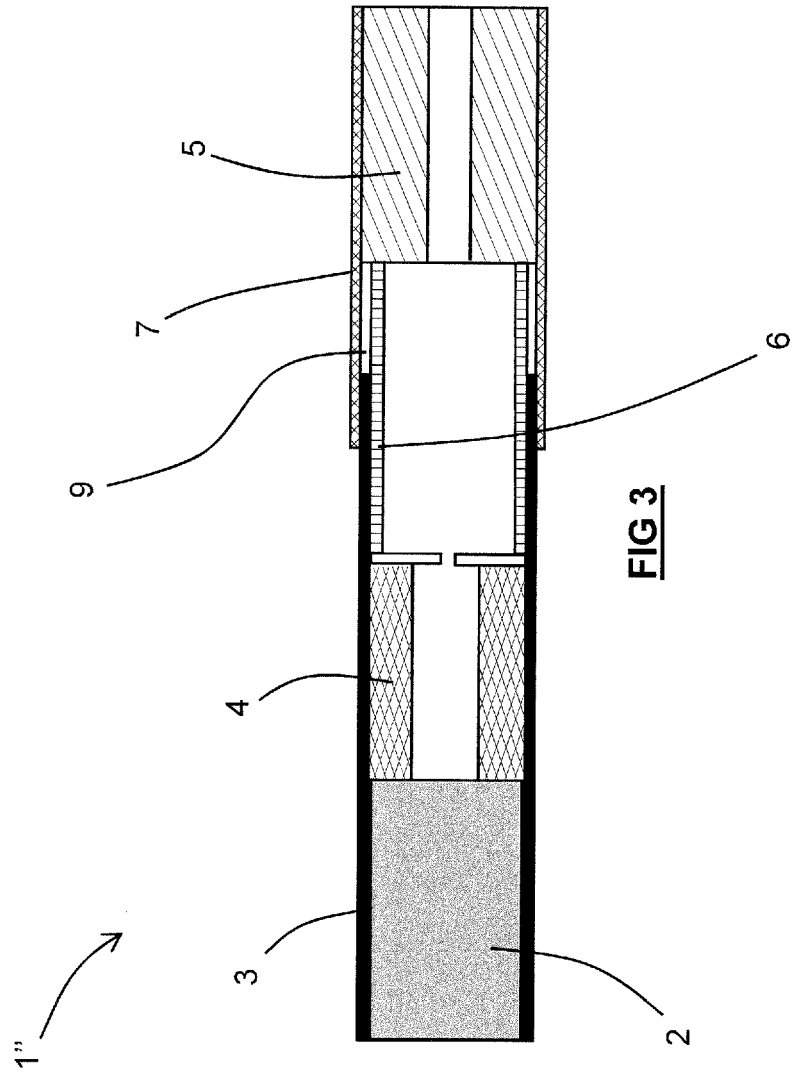
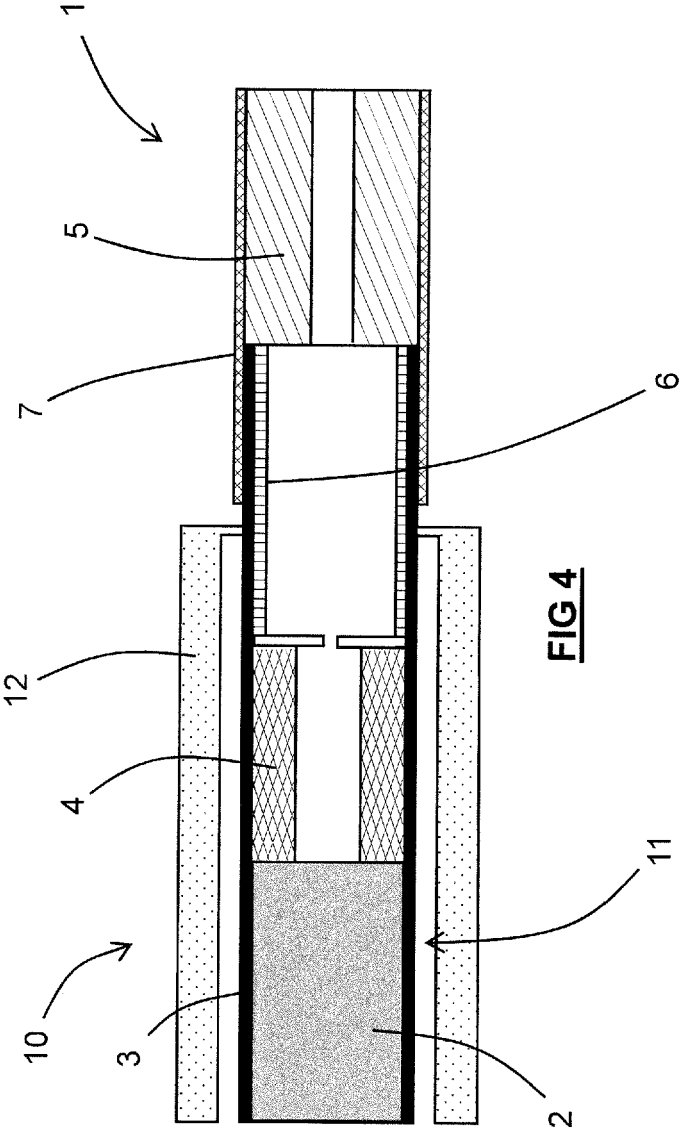


FIG 2





REFERENCES CITED IN THE DESCRIPTION

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