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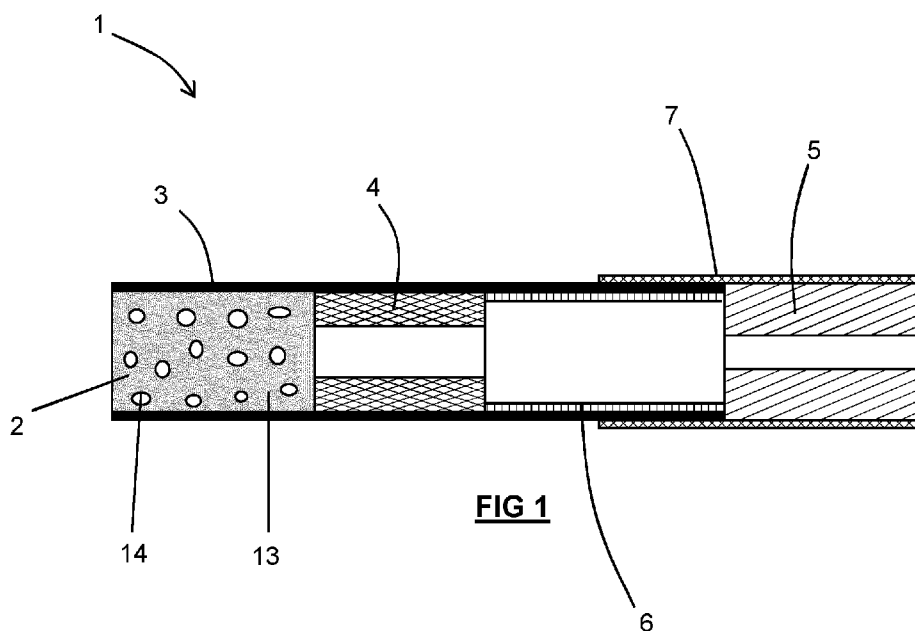
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(54) Title: SMOKING SUBSTITUTE CONSUMABLE



(57) Abstract: The present disclosure relates to an HNB consumable comprising an aerosol-forming substrate wherein the aerosol-forming substrate comprises at least one discrete region, and preferably a plurality of discrete regions of a first aerosol-forming material (e.g. extruded tobacco) within a matrix of a second aerosol-forming material (e.g. reconstituted tobacco).



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## ***Smoking substitute consumable***

### ***Field of the Disclosure***

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.

### **5 *Background***

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.

10 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  
15 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.

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

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.

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  
25 (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.

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.

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.

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

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.

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 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.

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.

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.

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.

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

## **Summary of the Disclosure**

At its most general, the present disclosure relates to an aerosol-forming article e.g. a smoking substitute article such as an HNB consumable comprising two different aerosol-forming materials.

5 According to a first aspect, the present invention provides an aerosol-forming article e.g. a smoking substitute article such as an HNB consumable comprising an aerosol-forming substrate wherein the aerosol-forming substrate comprises at least one discrete region of a first aerosol-forming material within a matrix of a second aerosol-forming material.

By providing an aerosol-forming substrate having discrete regions of a first aerosol-forming material within a matrix of a second aerosol-forming material, the user experience can be tailored and thereby enhanced.  
10 The two different aerosol-forming materials can be selected such that during the smoking of a single article/consumable the user is exposed to a mix of two vapours/aerosols having different properties e.g. different flavours and/or different strengths of volatile compounds.

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

15 In some embodiments, there is a plurality of discrete regions of the first aerosol-forming material dispersed within the matrix of the second aerosol-forming material.

Reference to "discrete region(s)" of the first aerosol-forming material means that the concentration/dispersion of the first aerosol-forming material within the second aerosol-forming material is not uniform. This is in contrast to substrates formed from homogenised blends of two different types of aerosol-forming materials. Instead of being homogenised, the first aerosol-forming material is concentrated  
20 into one or more discrete regions within the second aerosol-forming material matrix.

The plurality of discrete regions of first aerosol-forming material may be evenly spaced within the matrix of the second aerosol-forming material. At least some and possibly all of the plurality of discrete regions of first aerosol-forming material may be entirely embedded within i.e. entirely surrounded by the matrix of the second aerosol-forming material.

25 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.

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.

In order to generate an aerosol, each of the first and second aerosol-forming materials 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.

The first and/or second aerosol-forming material 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* (Guamura), *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), *Laggera 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), *Tarhonanthus camphoratus*, *Tumera diffusa* (Damiana), *Verbascum* (Mullein), *Zamia latifolia* (Maconha Brava) together with any combinations, functional equivalents to, and/or synthetic alternatives of the foregoing.

In preferred embodiments, the first aerosol-forming material and the second aerosol-forming material each comprise tobacco which will contain nicotine as a volatile compound. 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.

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

The second aerosol-forming material may comprise one or more of leaf tobacco, stem tobacco, tobacco powder, tobacco dust, tobacco derivatives, expanded tobacco, shredded tobacco, homogenised tobacco, extruded tobacco, cut rag tobacco and/or reconstituted tobacco (e.g. slurry recon or paper recon). In preferred embodiments, the second aerosol-forming material is reconstituted tobacco.

- 5 The first aerosol-forming material may comprise a different (relative to the first aerosol-forming material) one of leaf tobacco, stem tobacco, tobacco powder, tobacco dust, tobacco derivatives, expanded tobacco, shredded tobacco, homogenised tobacco, extruded tobacco, cut rag tobacco and/or reconstituted tobacco (e.g. slurry recon or paper recon).

10 The first aerosol-forming material preferably comprises extruded tobacco. For example, the first aerosol-forming material may comprise pellets, granules or chips of extruded tobacco. The extruded tobacco will provide a vapour having a higher nicotine content than the reconstituted tobacco.

Each pellet/chip/granule may form one of the plurality of discrete regions within the matrix of the first aerosol-forming material. In contrast to blends of different types of powdered tobacco, each pellet/chip/granule is of macroscopic size.

- 15 Extruded tobacco can be produced by forming a liquid mixture of powdered tobacco and a binding agent such as a gum (e.g. xanthan, guar, arabic and/or locust bean gum). The liquid mixture is heated and then extruded through a die. The extrudate is dried and then may be subsequently cut into pellets, chips or granules.

20 In some embodiments, the second aerosol-forming material comprises reconstituted tobacco and the first aerosol-forming material comprises extruded tobacco (e.g. pellet/chips/granules of extruded tobacco).

The aerosol-forming substrate e.g. the second aerosol-forming material may comprise one or more additives selected from humectants, flavourants, fillers, aqueous/non-aqueous solvents and binders.

25 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%.

30 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 %.

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 %.

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

5 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.

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

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.

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

15 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%.

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  
20 flavourant may be evenly dispersed throughout the aerosol-forming substrate (e.g. throughout the second aerosol-forming material) or may be provided in isolated locations and/or varying concentrations throughout the aerosol-forming substrate/second aerosol-forming substrate.

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  
25 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. around 12mm.

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).

The article/consumable may comprise at least one filter element. There may be a terminal filter element at the downstream/mouth end of the article/consumable.

5 The or at least one of the filter element(s) (e.g. the terminal filter element) may be comprised of cellulose acetate or polypropylene tow. The at least one filter element (e.g. the terminal filter element) may be comprised of activated charcoal. The at least one filter element (e.g. the terminal element) may be comprised of paper. The or each filter element may be at least partly (e.g. entirely) circumscribed with a plug wrap e.g. a paper plug wrap.

10 The or each filter element may 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 the 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.

The or at least one of the filter element(s) may be a solid filter element. The or at least one of the filter element(s) may be a hollow bore filter element. 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.

15 There may be a plurality of e.g. two filter elements which may be adjacent one another or which may be spaced apart. Any filter element(s) upstream of the terminal filter element may be circumscribed by the (paper) wrapping layer.

20 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 any adjacent upstream element.

25 The or at least one of the filter elements e.g. the terminal filter element may include a capsule e.g. a crushable capsule (crush-ball) containing a liquid flavourant e.g. a liquid flavourant as described above. The capsule can be crushed by the user during smoking of the article/consumable to release the flavourant. The capsule may be located at the axial centre of the terminal filter element.

In some embodiments, the article/consumable may 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.

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

5 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.

10 The article/consumable may comprise a spacer element that defines a space or cavity between the aerosol-forming substrate and the downstream end of the article/consumable. The spacer element may comprise a cardboard tube. The spacer element may be circumscribed by the (paper) wrapping layer.

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.

15 In a second aspect, there is provided a smoking substitute system comprising an article/consumable according to the first aspect and a device comprising a heating element.

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

20 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.

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.

25 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.

30 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.

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  
5 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***

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  
10 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***

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

The aerosol-forming substrate 2 comprises a matrix of reconstituted tobacco 13 throughout which discrete regions 14 of extruded tobacco are interspersed. The extruded tobacco is in the form of macroscopic  
20 granules/chips/pellets 14.

The extruded tobacco granules/chips/pellets 14 are evenly spaced and entirely embedded within the matrix of reconstituted tobacco 13.

The aerosol-forming substrate 2 is dosed with 20 wt% 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  
25 further comprises cellulose pulp filler and guar gum binder.

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.

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

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 spacer tube 6. Both filter elements 4, 5 are formed of cellulose acetate tow and wrapped with a respective paper plug layer (not shown).

5 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.

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

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.

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

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.

20 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 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.

25 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 spacer tube 6 such that there is an annular gap 9 between the tipping layer 7 and the cardboard spacer tube 6 downstream of the end of the wrapping layer 3.

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 volatile compound (e.g. nicotine) within the tobacco and the humectant  
5 are released as a vapour and entrained within an airflow generated by inhalation by the user at the terminal filter portion 5.

As the vapour cools within the upstream filter element 4 and the cardboard spacer tube 6, it condenses to form an aerosol containing the volatile compounds for inhalation by the user.

The features disclosed in the foregoing description, or in the following claims, or in the accompanying  
10 drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for obtaining the disclosed results, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

While the invention has been described in conjunction with the exemplary embodiments described above, many equivalent modifications and variations will be apparent to those skilled in the art when given this  
15 disclosure. Accordingly, the exemplary embodiments of the invention set forth above are considered to be illustrative and not limiting. Various changes to the described embodiments may be made without departing from the spirit and scope of the invention.

For the avoidance of any doubt, any theoretical explanations provided herein are provided for the purposes of improving the understanding of a reader. The inventors do not wish to be bound by any of  
20 these theoretical explanations.

Any section headings used herein are for organizational purposes only and are not to be construed as limiting the subject matter described.

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  
25 “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.

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  
30 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

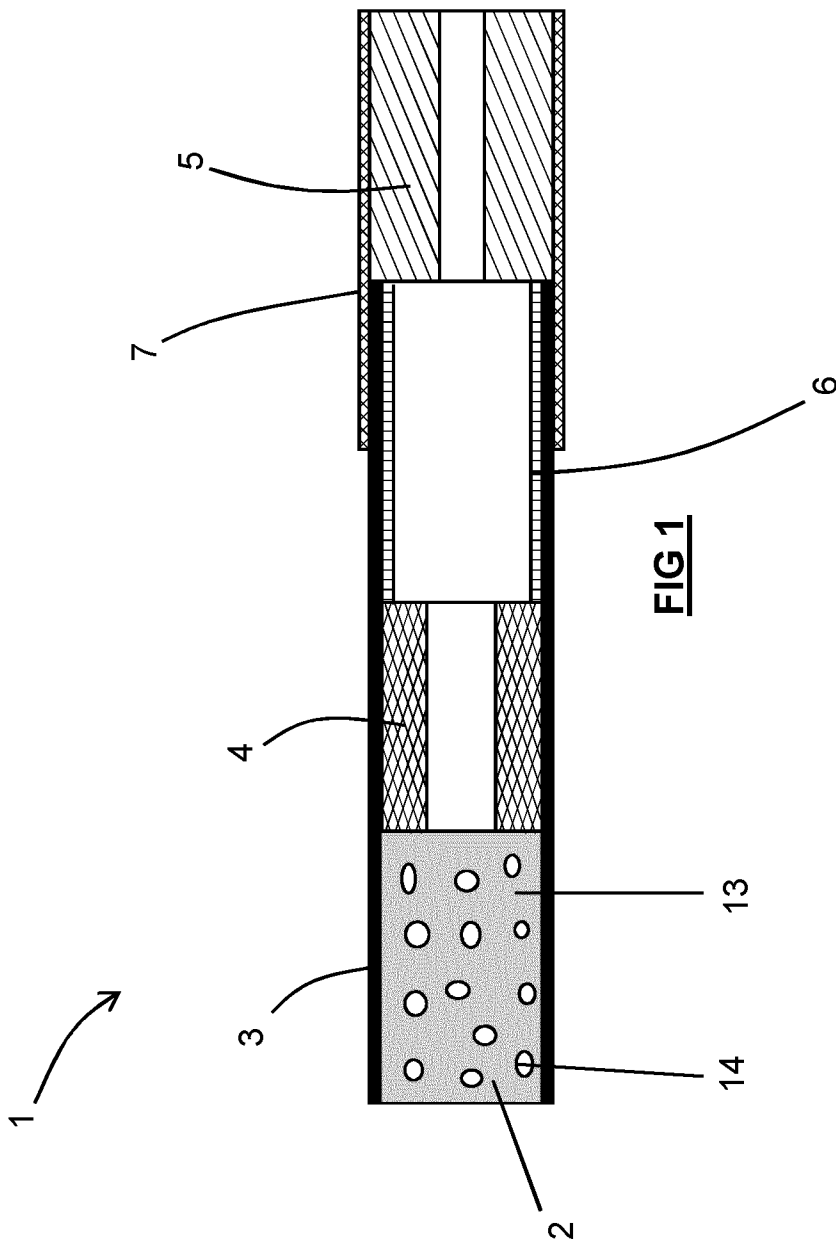
will be understood that the particular value forms another embodiment. The term "about" in relation to a numerical value is optional and means, for example, +/- 10%.

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  
5 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.

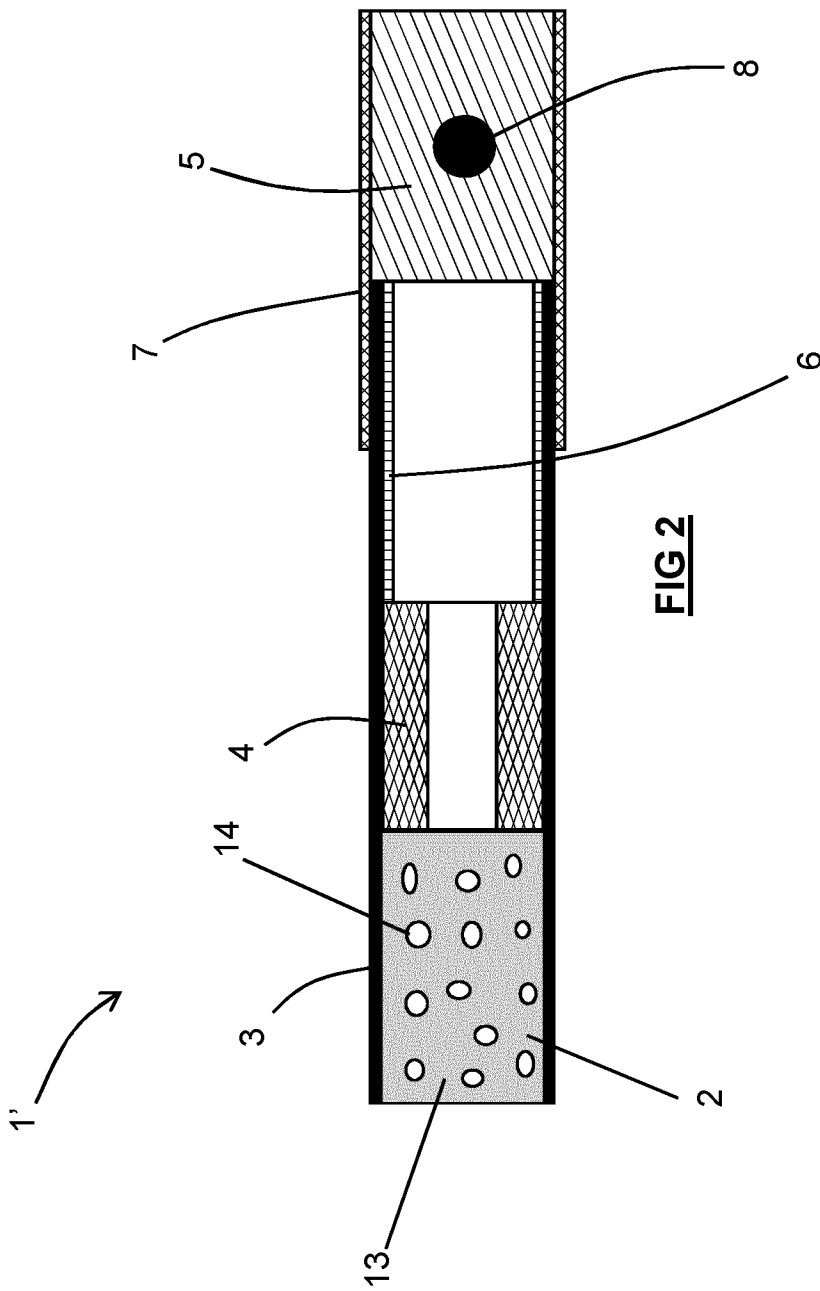
**Claims:**

1. An aerosol-forming article comprising an aerosol-forming substrate wherein the aerosol-forming substrate comprises at least one discrete region of a first aerosol-forming material within a matrix of a second aerosol-forming material.
- 5 2. An article according to claim 1 comprising a plurality of discrete regions of the first aerosol-forming material dispersed within the matrix of the second aerosol-forming material.
3. An article according to claim 2 wherein the plurality of discrete regions of first aerosol-forming material is evenly spaced within the matrix of the second aerosol-forming material.
4. An article according to claim 2 or 3 wherein the plurality of discrete regions of first aerosol-forming  
10 material are entirely embedded within the matrix of the second aerosol-forming material.
5. An article according to any one of the preceding claims wherein the first and/or second aerosol-forming material each comprise plant material.
6. An article according to claim 5 wherein the first aerosol-forming material and the second aerosol-forming material each comprises tobacco.
- 15 7. An article according to claim 6 wherein the second aerosol-forming material comprises one or more of tobacco, tobacco derivatives, expanded tobacco, shredded tobacco and/or reconstituted tobacco.
8. A smoking substitute article according to claim 6 or 7 wherein the first aerosol-forming material comprises extruded tobacco.
9. An article according to claim 8 wherein the second aerosol-forming material comprises  
20 reconstituted tobacco and the first aerosol-forming material comprises extruded tobacco.
10. An article according to claim 8 or 9 wherein the first aerosol-forming material comprises pellet, granules or chips of extruded tobacco.
11. An article according to any one of the preceding claims wherein the aerosol-forming substrate comprises one or more additives selected from humectants, flavourants and/or binders.
- 25 12. A smoking substitute system comprising an article according to any one of the preceding claims and a device comprising a heating element.
13. A system according to claim 12 wherein the device comprises a main body for housing the heating element and the heating element comprises an elongated heating element.

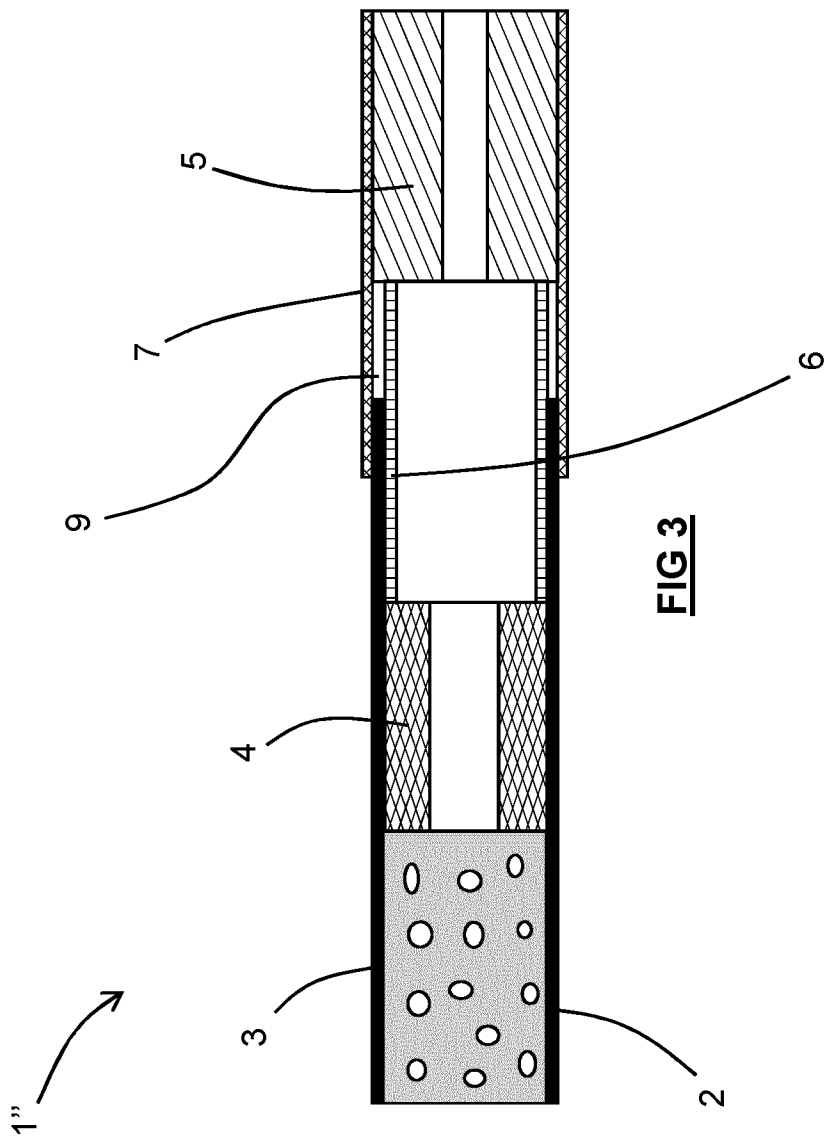
14. A method of using the system according to claim 12 or 13, the method comprising:  
inserting the article into the device; and  
heating the article using the heating element.
15. A method according to claim 14 comprising inserting the article into a cavity within a main body of  
5 the device and penetrating the article with the heating element upon insertion of the article.

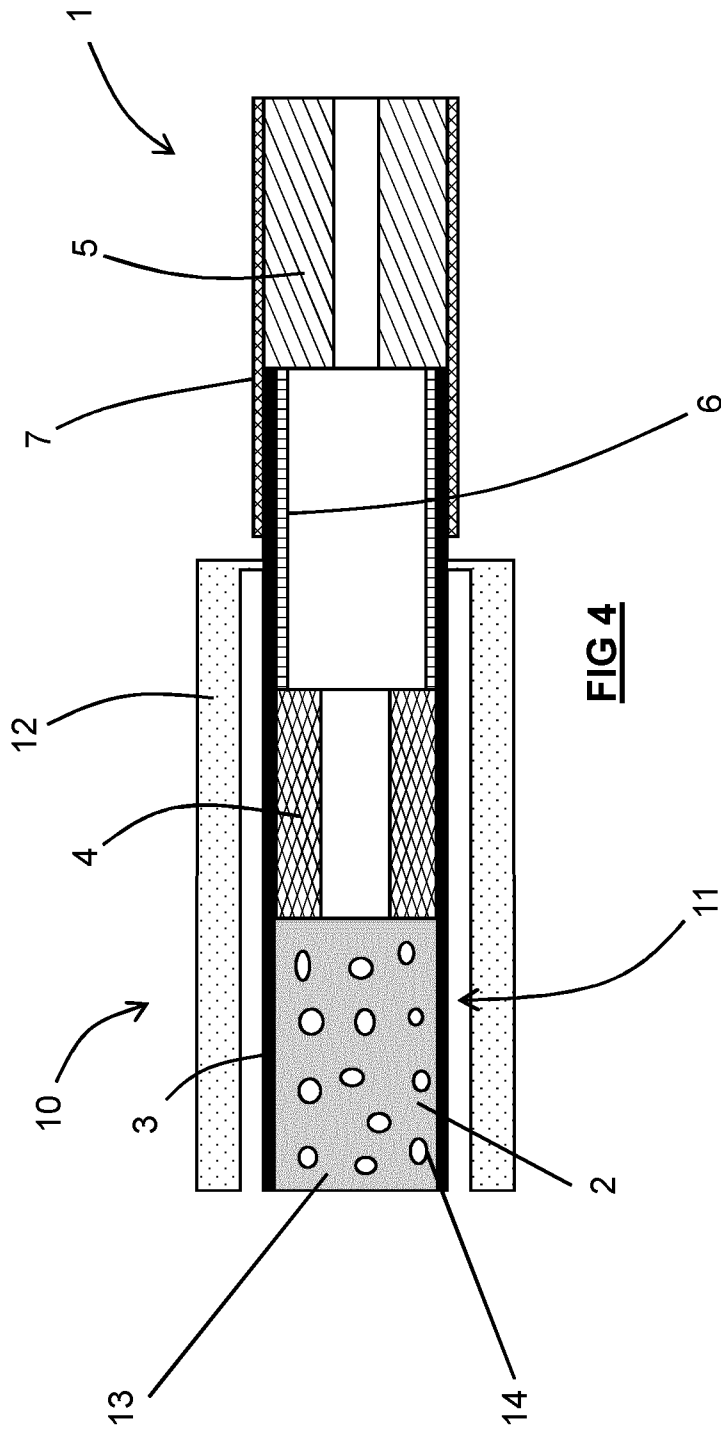


**FIG 1**



**FIG 2**





**FIG 4**

INTERNATIONAL SEARCH REPORT

International application No  
PCT/EP2019/079164

A. CLASSIFICATION OF SUBJECT MATTER  
INV. A24D1/20 A24B15/12 A24B15/18  
ADD.  
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED  
Minimum documentation searched (classification system followed by classification symbols)  
A24D A24B  
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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X	WO 2015/177247 A1 (PHILIP MORRIS INC) 26 November 2015 (2015-11-26) pages 4-6 - page 9; figures 1,2 -----	1,7-15
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Further documents are listed in the continuation of Box C.

See patent family annex.

\* Special categories of cited documents :

<p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier application or patent but published on or after the international filing date</p> <p>"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p>	<p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art</p> <p>"&amp;" document member of the same patent family</p>
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Date of the actual completion of the international search  30 January 2020	Date of mailing of the international search report  10/02/2020
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Name and mailing address of the ISA/ European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Authorized officer  Schwertfeger, C
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International application No  
PCT/EP2019/079164

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
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International application No

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