(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 096 945 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
03.10.2012 Bulletin 2012/40

(21) Application number: **07824649.3**

(22) Date of filing: **20.11.2007**

(51) Int Cl.:
A24D 3/04 *(2006.01)*

(86) International application number:
PCT/GB2007/004435

(87) International publication number:
WO 2008/074977 (26.06.2008 Gazette 2008/26)

(54) SMOKING ARTICLE FILTER

RAUCHARTIKELFILTER

FILTRE POUR ARTICLE À FUMER

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC MT NL PL PT RO SE SI SK TR

(30) Priority: **21.12.2006 GB 0625818**

(43) Date of publication of application:
09.09.2009 Bulletin 2009/37

(73) Proprietor: **British American Tobacco (Investments) Limited**
London WC2R 3LA (GB)

(72) Inventor: **DUKE, Martin, Graham**
Southampton SO15 8TL (GB)

(74) Representative: **Bruce, Alexander Richard Henry et al**
Venner Shipley LLP
200 Aldersgate
London EC1A 4HD (GB)

(56) References cited:
WO-A-99/65343
WO-A-2006/082525
GB-A- 2 135 865
GB-A- 2 150 413
GB-A- 2 170 695
GB-A- 2 203 324
GB-A- 2 260 477
GB-A- 2 261 152

EP 2 096 945 B1

Description

[0001] The present invention relates to a filter for a smoking article and smoking articles incorporating a filter element.

[0002] Smoking articles, and filters therefore, can vary significantly from one market to another as a result of many different factors including consumer preference and tradition. In certain markets there is a preference for a filter having a recess at the mouth end, which may be used to lengthen the filter as a whole. The recess is achieved by overwrapping the plug of filtration material with a plugwrap that extends beyond the end of the plug of filtration material at the mouth end of the filter. In order to minimise the susceptibility of the overhanging portion of the plugwrap to damage and deformation, for example as may result from the packaging process or during handling and smoking by a consumer, a plugwrap which is thicker than a conventional cigarette plugwrap is used. Such a plugwrap has up to four times the base weight of a conventional plugwrap and thus is significantly more resistant to deformation and adds a high level of rigidity at the mouth end of the filter. However, the need for such a thick plugwrap means that conventional (more economical) plugwrap s cannot be used on filters having a recessed end and also add significant problems to the process of ventilating the filter, and in particular to the process of online laser perforation of the filter, thus not allowing high levels of ventilation to be attained.

[0003] Various known filter arrangements are disclosed in: GB2203324; GB2170695; GB 2150415; GB 2150413; GB 2135865; GB 0781654; WO 99/65343 and US 3396733.

[0004] GB 2,203,324 describes a ventilated tobacco smoke filter comprising an upstream core component and a downstream core component which may be a tube. An adsorbent, e.g. active carbon, may be located between spaced first and second core components.

[0005] The present invention provides a filter for a smoking article comprising a first and a second section, the first section being at a mouth end of the filter and comprising a cylindrical element having a hollow portion extending therethrough and being circumscribed by a wrapper, and the second section being longitudinally aligned with and adjacent to the first section and comprising a filtration material. The second section comprises a particulate material in a circumferential region thereof, the particulate material extending to the end of the second section immediately adjacent the first section.

[0006] The use of particulate materials, such as carbon or activated carbon, in tobacco smoke filter elements to reduce vapour phase constituents of smoke has been known for some while. A known way of including carbon or other additives in filters is to adhere particles of the additive to a wrapper surrounding the filter element. GB 2,260,477 and GB 2,261,152 describe various configurations of additive adhesion. In some circumstances, particulate carbon, when provided in a mouth end filter section, may be liable to fall out of the end of the filter. This is highly undesirable as it is possible that particulate carbon may become loose and enter the mouth of the consumer. The provision of a first filter section at the mouth end of the filter having a hollow portion extending therethrough helps to prevent the fall out of the particulate material whilst maintaining the appearance of a recessed filter.

[0007] The particulate material may extend over the full longitudinal length of the second section. The particulate material may also extend over the full width of the wrapper. In this instance the particulate material may cover the entire surface of the wrapper, although a seam may be left uncovered to allow adhesive to be applied and the wrapper to be sealed about the filtration material. Alternatively, the particulate material may extend over only a portion of the longitudinal length of the wrapper. Similarly, the particulate material may extend over only a portion of the width of the wrapper.

[0008] The particulate material may extend over two or more portions of the second section. The two or more portions are preferably spaced circumferentially from one another.

[0009] Alternatively, the two or more portions may comprise three, four, five, six, seven or eight portions.

[0010] In some embodiments, the filtration material of the second section may further comprise a particulate material interspersed in the filtration material.

[0011] The particulate material of the filtration material may be the same as the particulate material provided at the circumferential region of the second section of the plugwrap. Alternatively, the particulate material of the filtration material may be different from the particulate material provided at the circumferential region of the second section of the plugwrap.

[0012] In some embodiments, the wrapper may further comprise ventilation means. For example, the ventilation means may comprise one or more ventilation holes provided in gaps between the two or more portions.

[0013] The cylindrical element will generally have a thickness (in the radial direction) sufficient to occlude at least part of the particulate material. In other words, the cylindrical element acts as a physical barrier located at the mouth end of the particulate material to prevent the particular material from escaping from the second section of the filter. The thickness of the cylindrical element may be from 1-4mm, and is preferably in the range 1-3mm.

[0014] Suitably the cylindrical element is circumscribed by a wrapper, which is preferably a plugwrap. This plugwrap may have a base weight of less than 50g/m^2, less than 45 g/m^2, less than 40g/m^2, less than 35 g/m^2, less than 30 g/m^2. This plugwrap may have a base weight equivalent to a conventional plugwrap (wrapper), namely approximately 23 to approximately 27g/m^2.

[0015] A second aspect of the present invention provides a smoking article comprising a filter according to the invention.

[0016] Preferably the particulate material includes sorbents (e.g. selected from activated carbon, charcoal, silica gel, sepiolite, alumina, ion exchange material etc.), pH modifiers (e.g. alkaline materials such as Na_2CO_3, acidic materials), flavourants, other solid additives and mixtures thereof.

[0017] Advantageously the particulate material is selected from a group of relatively high surface area materials capable of adsorbing smoke constituents without a high degree of specificity. Suitable general adsorbents can be selected from the group consisting of carbon, activated carbon, activated charcoal, activated coconut carbon, activated coal-based carbon or charcoal, zeolite, silica gel, meerschaum, aluminium oxide (activated or not), carbonaceous resin or combinations thereof.

[0018] An example of a suitable coal-based charcoal is one made from semi-anthracite coal with a density about 50% greater than coconut-based charcoal (available from Calgon Carbon, Pittsburgh, PA, WA).

[0019] An example of a suitable carbonaceous resin is one derived from the pyrolysis of sulphonated styrene-divinyl benzene, such as Ambersorb 572 or Ambersorb 563 (available from Rohm and Haas). To enhance the efficiency of the general adsorbent metal oxides or other metal based complexes may optionally be included in or impregnated on the general adsorbent section.

[0020] In one embodiment, preferably the particulate material used herein is carbon, for instance activated carbon, or charcoal or other absorbent material. In one embodiment, preferably the activated carbon is activated coconut carbon.

[0021] Any particulate material used may be a single substance or a mixture, and/or may be in admixture with other material.

[0022] In one embodiment preferably the particulate material is disposed in two separate regions spaced circumferentially from one another. Alternatively, the particulate material may be disposed in 3, 4, 5, 6, 7 or 8 separate regions each spaced circumferentially from one another. Further, a greater number of regions may be used if required.

[0023] Each separate region or portion of particulate material may be comprised of particulate material which is the same as or different from the other separate regions. In one embodiment preferably the particulate material in the separate regions is the same.

[0024] In one embodiment, suitably the particulate material may be applied to two or more portions of the longitudinal inner face of the wrapper.

[0025] In one embodiment the particulate material is disposed around the inner circumference of the wrapper such that the wrapper has an overlapping longitudinal edge which is free of said particulate material and which provides a lapped and stuck seam holding the wrapper around the core.

[0026] The particulate material may extend continuously over the full longitudinal length of said wrapper. By continuously it is meant that the particulate material is applied such that the loading at any one point on the longitudinal length of the wrapper is the same (or substantially the same) as the loading at any other point on the same longitudinal length of the wrapper. By continuously it is meant that at no point along the longitudinal length of the wrapper is there a portion of the wrapper without particulate material if the particulate material is present at another point along the same longitudinal length of the wrapper. Preferably, the particulate material is applied longitudinally to the wrapper (e.g. plugwrap) in a continuous manner. Preferably along the longitudinal axis of the wrapper the particulate material is present as a continuous stream (i.e. without breaks or spaces). In other words, the particulate material extends in a continuous manner along the longitudinal axis of the wrapper.

[0027] The particulate material may extend continuously over the full width of said wrapper.

[0028] In some embodiments the particulate material may be present as patches.

[0029] The wrapper of the filter element is preferably a paper wrapper. Preferably the wrapper is a conventional plugwrap.

[0030] In one embodiment the wrapper may be a conventional plugwrap which covers 360° of the core, in which case the plugwrap has a lapped and stuck seam holding the wrapper around the core.

[0031] In one embodiment, preferably the filter element according to the present invention has a filtration material comprising particulate material interspersed with the filtration material and has a plugwrap which covers 360° of the filtration material.

[0032] In another embodiment the wrapper (in particular plugwrap) preferably does not extend 360° around the filtration material. In other words, in one embodiment preferably the wrapper is a split wrapper. A split wrapper is one which extends circumferentially about the filtration material, but extends less than 360° around the circumference of the filtration material. In such an embodiment, there is not lapped and stuck seam holding the wrapper around the filtration material. Instead, the split wrapper may be held in place by other known means, such as by bonding the wrapper directly to the filtration material for instance.

[0033] The wrapper for use in the filter element may be porous or non-porous.

[0034] The wrapper for use in the filter element may be ventilated or unventilated.

[0035] Advantageously the filtration material of the second section may comprise (or consist of) conventional fibrous cellulose acetate, polypropylene or polyethylene material or gathered paper material.

[0036] Preferably the filtration material comprises cellulose acetate.

[0037] In one embodiment, the filtration material of the second section is a Dalmatian-type filter material.

[0038] The particulate material may be interspersed throughout the filtration material. Alternatively, the particulate material may be interspersed in some parts (but

not all) of the filtration material. The parts may be evenly or unevenly distributed.

[0039] The particulate material adhered to the wrapper may be homogenous - in the sense that it is made up of substantially the same component (for some embodiments, preferably all of the same). Alternatively, the particulate material adhered to the wrapper may be heterogeneous - in the sense that it is made up of two or more different components. The particulate material adhered to the wrapper may be in contact with the filtration material. Preferably, some or all of the particulate material adhered to the wrapper is in contact with the filtration material. For some embodiments, preferably substantially all of the particulate material adhered to the wrapper is in contact with the filtration material.

[0040] The filter is preferably interattached with a smokable filler (e.g. tobacco) rod by way of a tipping wrapper. Advantageously the tipping wrapper is a paper.

[0041] In one embodiment the filter may comprise additional filter section(s). The additional filter section(s) will be at the tobacco rod end of the filter. Suitably, one, two, three or more additional filter sections may be provided in the filter. The additional filter section(s) may be any type of filter section known to those skilled in the art. Suitably the filter sections are arranged longitudinally of one another with the end of each filter element abutting the next.

[0042] Suitably the wrapper surrounding the second section of the filter is preferably pre-coated with the particulate material.

[0043] The particulate material may be adhered to the wrapper by hot melt adhesive (e.g. various polyester adhesives), high m.p. polyethylene glycol, or emulsion-type adhesive such as PVA.

[0044] The particulate material may be directly or indirectly adhered to the wrapper. An example of direct adherance is wherein the particulate material is affixed to the wrapper (such as the inner surface thereof) by means of a suitable adhesive. An example of indirect adherance is wherein the particulate material is affixed to an intermediate layer (which may be made of paper or other suitable support matrix - such as a textile material - or combinations thereof) by means of a suitable adhesive and wherein the intermediate layer is affixed to the wrapper (such as the inner surface thereof) by means of a suitable adhesive.

[0045] Suitably the additional filter section(s) of the filter may be comprised of conventional fibrous cellulose acetate, polypropylene or polyethylene material or gathered paper material. The additional filter section(s) may optionally comprise one or more additives, for instance disposed upon or within the material of the filter element may be further flavouring materials, as described above, which are released or eluted from the filter element during use.

[0046] The cylindrical element of the first section at the mouth end may be made from a variety of materials, for example, cellulose acetate tow, cellulose, paper, cotton, polypropylene web, polypropylene tow, polyester web, polyester tow or combinations thereof. It is preferred that the element comprises cellulose acetate.

[0047] In addition, the pressure drop and/or mechanical filtration efficiency of the filter sections can be selected to achieve the desired smoking mechanics and filtration characteristics as may be required with the specific product design desired.

[0048] A part of the filter may comprise a catalyst. Advantageously the catalyst facilitates the conversion of carbon monoxide (CO) to carbon dioxide (CO_2) in the vapour phase of the smoke. It is much by preference that the catalyst is highly selective for carbon monoxide. Suitably the catalyst may be one of the group consisting of transition metal oxides, silica, alumina, zeolites, impregnated carbon, for example, carbon impregnated with metals.

[0049] Suitably the filter and/or smoking article according to the present invention may comprise ventilation means. For example, the ventilation means may comprise one or more holes in the wrapper engaged around the filtration material of the second section. The holes may advantageously be positioned in regions of the wrapper to which the particulate material is not adhered. Ventilation holes are often formed in filter wrappers by laser piercing. Carbon granules in the region where ventilation is required can cause the laser to produce sparks when the holes are being made. Positioning the ventilation holes in gaps between the portions of particulate material addresses this problem.

[0050] The ventilation means may comprise perforation holes in the tipping wrapper used to interattach the filter and the rod of wrapped smokable filler (e.g. tobacco) material.

[0051] Alternatively the ventilation means may be provided by the use of a porous tipping wrapper used in conjunction with a perforated plugwrap. The porous tipping wrapper may be porous over its full extent or over only a localised extent, which extent is in registration with the underlying perforated plugwrap.

[0052] The ventilation means may further be provided at or close to the end of the rod of wrapped smokable filler (e.g. tobacco) material. The ventilation means may be provided in the tipping wrapper or in the cigarette paper wrapper enwrapping the smokable filler (e.g. tobacco) material.

[0053] Suitably, the filter may be attached to a wrapped smokable filler material rod (i.e. a wrapped tobacco rod for instance) by conventional tipping overwrap to form a smoking article. The tipping overwrap may be ventilating or non-ventilating overwrap.

[0054] The length of the smoking material rod is advantageously at least 60 mm and the rod should preferably yield not less than six puffs, and more preferably not less than seven puffs when smoked under standard machine smoking conditions. The rod is preferably of uniform cross-sectional shape and dimensions throughout the length of the rod.

[0055] The wrapper enwrapping the smoking article may comprise a burn additive, such as sodium and/or potassium citrate, for example. Other suitable burn additives, such as sodium or potassium salts, such as acetate and tartrate; mono-ammonium phosphate, and disodium hydrogen phosphate, for example, will be known to the skilled man. The burn additive may be present in the range of 0.5-2.5% by weight of the wrapper. The wrapper may also have a base weight in the range of 20-40g/m^2.

[0056] The wrapper of the smoking article may alternatively or in addition be a non-paper wrapper, such as the wrappers described in International Patent Applications, Publications Nos. WO 96/07336 and WO 01/41590. Such wrappers assist in the reduction of sidestream smoke components, but still provide a smoking article which has burning and ashing characteristics similar to conventional products, i.e. the wrappers allow the smoking article to burn down and ash in a similar way to conventional products.

[0057] Suitably, the smokable filler material may be tobacco-containing material or a tobacco substitute material. Preferably the smokable material is a tobacco material. Suitably the tobacco material comprises one or more of stem, lamina, tobacco dust and reconstituted tobacco. It is preferred that the tobacco material comprises one or more of the following types: Virginia or fluecured tobacco, Burley tobacco, Oriental tobacco, reconstituted tobacco. It is much by preference that the smokable material comprises a blend of tobacco material. Advantageously the smokable material comprises 10-80% Virginia tobacco, 10-60% Burley tobacco, 0-20% Oriental tobacco, 0-120% reconstituted tobacco and 0-30% expanded tobacco.

[0058] The term 'carbon' as used herein can be taken to cover a material which is substantially solely carbon and any carbon precursors, such as carbonaceous material. As used herein the term carbonaceous includes material which has been pyrolysed, which material preferably contains carbon, although some incomplete combustion products may still be present. Ready pyrolysed coconut fibre may, for example, be the carbonaceous material from which carbon is derived.

[0059] As used herein, the term 'smoking material' or 'smokable filler material' means any material which can be used in a smoking article. It does not necessarily mean that the material itself will necessarily sustain combustion.

[0060] As used herein, the term 'smoking article' means any product that is used in the tobacco industry and includes smokable products or similar products for delivering an aerosol to the consumer. Smoking articles include cigarettes, cigars, cigarillos and similar articles.

[0061] In order that the present invention may be clearly understood and readily carried into effect reference will now be made, by way of example, to the accompanying drawings in which:

Figure 1 shows a longitudinal cross-sectional view of a filter having a recess at the mouth end according to the prior art;

Figure 2 shows a longitudinal cross-sectional view of a filter according to one embodiment of the present disclosure;

Figure 3 shows an end view from the mouth end of a filter according to one embodiment of the present disclosure;

Figure 4 shows a longitudinal cross-sectional view of a filter according to a further embodiment of the present invention; and

Figure 5 shows a longitudinal cross-sectional view of a filter according to an alternative arrangement of the present invention.

[0062] Figure 1 shows a known filter 1 attached to a tobacco rod 2 (only a portion of which is shown) to form a cigarette. Filter 1 consists of a plug of cellulose acetate 3 (filtation material) circumscribed by a plugwrap 4. The plugwrap 4 is longer than the plug of cellulose acetate 3 and overhangs the plug of cellulose acetate at the mouth end of the filter 1 to create a recess having a depth typically of approximately 5mm. The length of overhang of the plugwrap 4 is designated in Figure 1 by the reference character x. The filter 1 is attached to the tobacco rod by a tipping wrapper 5 in the conventional manner. The plugwrap 4 is typically a wrapper having a high base weight, for example 100g/m^2 to provide rigidity to the filter 1.

[0063] Figure 2 shows a filter 1 in accordance with the present disclosure in which a first section at the mouth end of the filter 1 comprises a tubular plug of cellulose acetate 6 having a hollow central core, designated by reference numeral 7 in Figure 2. The filter 1 also consists of a second section at the tobacco rod end of the filter 1 and adjacent the first section. The second section comprises a plug of cellulose acetate filtration material 3 circumscribed by a plugwrap 4, which plugwrap 4 may also circumscribe the cellulose acetate plug 6 of the first section. Alternatively the plugs 3, 6 may each be circumscribed by a respective individual plugwrap. The filter 1 is attached to a tobacco rod 2 to form a cigarette by a standard tipping wrapper 5. The plugwrap 4 and/or the tipping wrapper 5 may be ventilated (not shown) at any point over their surface and to a varying amount dependent on the particular product. The plug of cellulose acetate 6 of the first filter section may for instance be 7mm in length and provides rigidity to the mouth end of the filter 1 and allows a conventional plugwrap 4 to be used without reducing strength.

[0064] Figure 3 shows the filter of Figure 2 in end view from the mouth end thereof. The cylindrical plug of cellulose acetate 6 defines a hollow core 7 longitudinally along the centre of the plug 6. The plug of cellulose acetate filtration material 3 of the second section can be seen at the far end of the hollow core 7. The thickness of the cylindrical plug of cellulose acetate 6 is defined by the outer surface of the plug 9 and by the inner surface

of the plug 8. This thickness, designated by reference character z in Figure 3, may vary depending on the desired size of the recess at the mouth end of the filter 1. The cylindrical plug of cellulose acetate 6 is circumscribed by a plugwrap (not shown) and is surrounded by a tipping wrapper (not shown) to join the filter 1 to a tobacco rod in a formed cigarette. The inner-surface of the plug of the first filter section may be of any desired shape and thus serve to create a recognizable shape for the hollow core 7.

[0065] The filter 1 of Figure 4 comprises all of the features of Figure 2, and same reference numerals are used to denote equivalent features, with the addition of a particulate activated carbon 10 adhered to the inner surface of the plugwrap 4 circumscribing the plug of cellulose acetate 3 of the second filter section. The carbon 10 extends the entire longitudinal length of the second section, being for instance 20mm in length. The thickness of the wall of the plug of cellulose acetate of the first filter section is sufficient to cover the carbon at the position of abutment between the first and second filter sections and prevent any carbon 10 becoming loose and escaping into the first filter section or beyond the mouth end of the filter 1.

[0066] Figure 5 shows a filter 1 which comprises all of the features of Figure 4, with the alteration in the length of the layer of carbon 10. Particulate activated carbon 10 extends over only a portion of the plugwrap 4 which circumscribes the plug of cellulose acetate 3 of the second filter section. The carbon 10 extends from the end of the plug of cellulose acetate 3 nearest the mouth end of the filter 1 to a position part way along the plug 3 towards the tobacco rod 2.

[0067] Various modifications and variations of the described methods and system of the present invention will be apparent to those skilled in the art without departing from the scope of the present invention. Although the present invention has been described in connection with specific preferred embodiments, it should be understood that the invention as claimed should not be unduly limited to such specific embodiments. Indeed, various modifications of the described modes for carrying out the invention which are obvious to those skilled in the art are intended to be within the scope of the following claims.

Claims

1. A filter (1) for a smoking article comprising:

a first (6) and a second section, the first section (6) being at a mouth end of the filter and comprising a cylindrical element having a hollow portion (7) extending therethrough and being circumscribed by a wrapper, and the second section being longitudinally aligned with and adjacent to the first section and comprising a filtration material (3),

wherein the second section comprises a particulate material in a circumferential region thereof, the particulate material extending to an end of the second section immediately adjacent the cylindrical element of the first section,

wherein the cylindrical element covers the particulate material at the position of abutment between the first and second sections,

wherein a wrapper (4) surrounds the second section and the particulate material (10) is adhered to an inner surface of the wrapper.

2. A filter according to Claim 1, wherein the particulate material (10) extends over a full longitudinal length of the second section.

3. A filter according to Claim 1 or 2, wherein two or more portions of the circumferential region of the second section comprise particulate material (10).

4. A filter according to Claim 3, wherein the two or more portions are spaced circumferentially from one another.

5. A filter according to Claim 4, wherein the two or more portions are arranged symmetrically around the second section.

6. A filter according to any preceding Claim, wherein the particulate material (10) is an adsorbent.

7. A filter according to Claim 6, wherein the particulate material (10) is activated carbon.

8. A filter according to any preceding Claim, wherein the second section further comprises a particulate material (10) interspersed in the filtration material (3).

9. A filter according to any preceding Claim, wherein the cylindrical element has a wall defined by the outer surface of the element and the hollow portion (7) extending therethorough, the wall being of a thickness to at least partly occlude the particulate material in a circumferential region of the second section at the point of abutment of the first and second sections.

10. A filter according to any preceding Claim, wherein the wrapper circumscribing the first section (6) is a plugwrap.

11. A filter according to Claim 10, wherein the plugwrap has a base weight of less than $50g/m^2$.

12. A filter according to any preceding Claim, wherein the cylindrical element of the first section comprises cellulose acetate.

13. A filter according to any preceding Claim, further

comprising at least one additional filter section at the tobacco rod end of the filter.

14. A smoking article comprising a filter according to any one of claims 1-13.

Patentansprüche

1. Ein Filter (1) für einen Rauchartikel, bestehend aus:

einem ersten (6) und einem zweiten Abschnitt, wobei sich der erste Abschnitt (6) am Mundende des Filters befindet und aus einem zylindrischen Element mit einem sich durch dieses erstrekkenden und durch eine Hülle umgebenen hohlen Teil (7) besteht, und der zweite Abschnitt in Längsrichtung am ersten Abschnitt ausgerichtet ist, sich angrenzend an den ersten Abschnitt befindet und aus einem Filtermaterial (3) besteht,
in welchem der zweite Abschnitt aus Partikelmaterial in einem zirkumferenziellen Bereich desselben besteht, wobei sich das Partikelmaterial bis zu einem unmittelbar neben dem zylindrischen Element des ersten Abschnitts befindlichen Ende des zweiten Abschnitts erstreckt,
in welchem das zylindrische Element das Partikelmaterial an der Position des Anschlags zwischen dem ersten Abschnitt und dem zweiten Abschnitt bedeckt,
in welchem eine Hülle (4) den zweiten Abschnitt umgibt und das Partikelmaterial (10) an einer inneren Oberfläche der Hülle anhaftet.

2. Ein Filter nach Anspruch 1, in welchem sich das Partikelmaterial (10) über die volle Länge des zweiten Abschnitts in Längsrichtung erstreckt.

3. Ein Filter nach Anspruch 1 oder 2, in welchem zwei oder mehr Teile des zirkumferenziellen Bereichs des zweiten Abschnitts aus Partikelmaterial (10) bestehen.

4. Ein Filter nach Anspruch 3, in welchem zwei oder mehr Teile zirkumferenziell mit Abständen zueinander versehen sind.

5. Ein Filter nach Anspruch 4, in welchem zwei oder mehr Teile symmetrisch um den zweiten Abschnitt herum angeordnet sind.

6. Ein Filter nach einem beliebigen vorhergehenden Anspruch, in welchem das Partikelmaterial (10) ein Adsorptionsmittel ist.

7. Ein Filter nach Anspruch 6, in welchem das Partikelmaterial (10) Aktivkohle ist.

8. Ein Filter nach einem beliebigen vorhergehenden Anspruch, in welchem der zweite Abschnitt darüber hinaus aus in das Filtermaterial (3) eingestreutem Partikelmaterial (10) besteht.

9. Ein Filter nach einem beliebigen vorhergehenden Anspruch, in welchem das zylindrische Element eine Wand besitzt, die durch die äußere Oberfläche des Elements und durch den sich durch dieses erstrekkenden hohlen Teil (7) begrenzt wird, wobei die Wand eine Stärke aufweist, die zumindest zum Teil das in einem zirkumferenziellen Bereich des zweiten Abschnitts am Punkt des Anschlags des ersten und zweiten Abschnitts befindliche Partikelmaterial verdeckt.

10. Ein Filter nach einem beliebigen vorhergehenden Anspruch, in welchem die den ersten Abschnitt (6) umgebende Hülle ein Filterumhüllungspapier ist.

11. Ein Filter nach Anspruch 10, in welchem das Filterumhüllungspapier ein Basisgewicht von weniger als 50g/m^2 aufweist.

12. Ein Filter nach einem beliebigen vorhergehenden Anspruch, in welchem das zylindrische Element des ersten Abschnitts aus Celluloseacetat besteht.

13. Ein Filter nach einem beliebigen vorhergehenden Anspruch, ferner bestehend aus mindestens einem zusätzlichen Filterabschnitt am Tabakende des Filters.

14. Ein Rauchartikel, umfassend einen Filter nach einem beliebigen der Ansprüche 1 - 13.

Revendications

1. Filtre (1) pour un article à fumer comprenant :

un première (6) et une seconde section, la première section (6) se trouvant à une extrémité buccale du filtre et comprenant un élément cylindrique comportant une partie creuse (7) le traversant et entourée par un papier d'enveloppe, et la seconde section étant alignée longitudinalement avec la première section et jointive avec celle-ci et comprenant une matière de filtration (3),
dans lequel la seconde section comprend une matière particulaire dans une région circonférentielle de celle-ci, la matière particulaire s'étendant jusqu'à une extrémité de la seconde section immédiatement jointive avec l'élément cylindrique de la première section,
dans lequel l'élément cylindrique couvre la matière particulaire à la position de butée entre les

première et seconde sections,
dans lequel un papier d'enveloppe (4) entoure la seconde section et la matière particulaire (10) est collée à une surface interne du papier d'enveloppe.

2. Filtre selon la revendication 1, dans lequel la matière particulaire (10) s'étend par-dessus une longueur longitudinale maximale de la seconde section.

3. Filtre selon la revendication 1 ou 2, dans lequel deux ou plusieurs parties de la région circonférentielle de la seconde section comprennent la matière particulaire (10).

4. Filtre selon la revendication 3, dans lequel les deux ou plusieurs parties sont espacées circonférentiellement les unes des autres.

5. Filtre selon la revendication 4, dans lequel les deux ou plusieurs parties sont agencées symétriquement autour de la seconde section.

6. Filtre selon l'une quelconque des revendications précédentes, dans lequel la matière particulaire (10) est un adsorbant.

7. Filtre selon la revendication 6, dans lequel la matière particulaire (10) est du charbon actif.

8. Filtre selon l'une quelconque des revendications précédentes, dans lequel la seconde section comprend en outre une matière particulaire (10) intercalée dans la matière de filtration (3).

9. Filtre selon l'une quelconque des revendications précédentes, dans lequel l'élément cylindrique comporte une paroi définie par la surface externe de l'élément et la partie creuse (7) le traversant, la paroi étant d'une épaisseur servant à occlure au moins partiellement la matière particulaire dans une région circonférentielle de la seconde section au point de butée des première et seconde sections.

10. Filtre selon l'une quelconque des revendications précédentes, dans lequel le papier d'enveloppe entourant la première section (6) est un papier filtre.

11. Filtre selon la revendication 10, dans lequel le papier filtre a un poids de base de moins de $50 g/m^2$.

12. Filtre selon l'une quelconque des revendications précédentes, dans lequel l'élément cylindrique de la première section comprend de l'acétate de cellulose.

13. Filtre selon l'une quelconque des revendications précédentes, comprenant en outre au moins une section de filtre supplémentaire, à l'extrémité du filtre en contact avec le bâtonnet de tabac.

14. Article à fumer comprenant un filtre selon l'une quelconque des revendications 1 à 13.

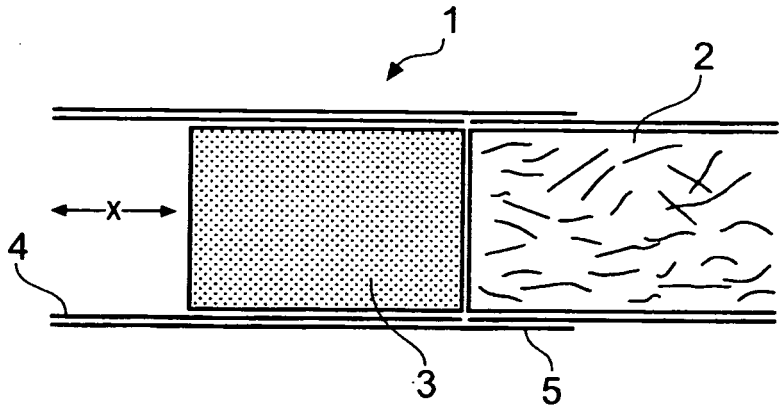

FIG. 1

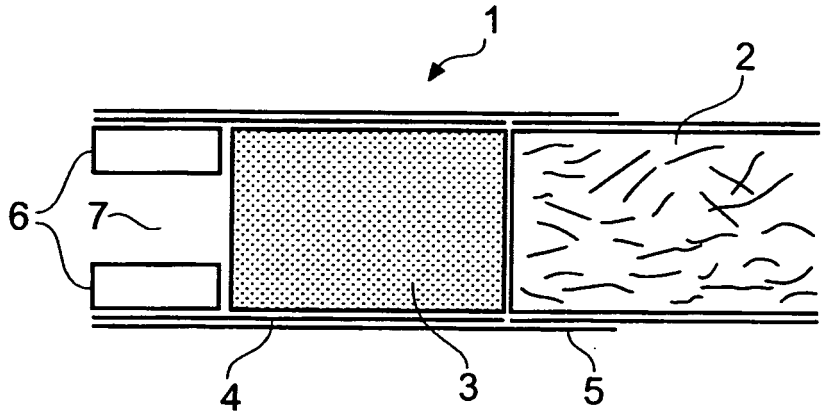

FIG. 2

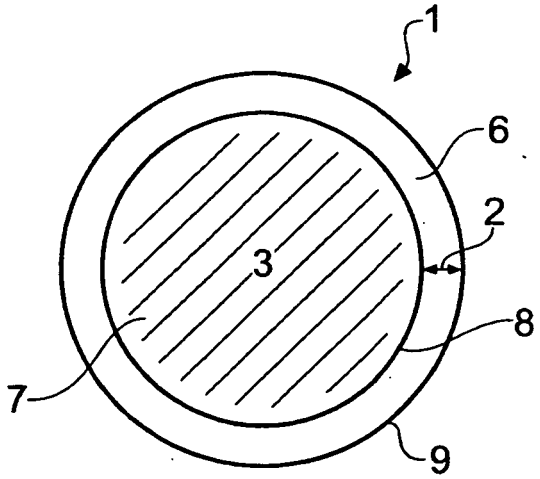

FIG. 3

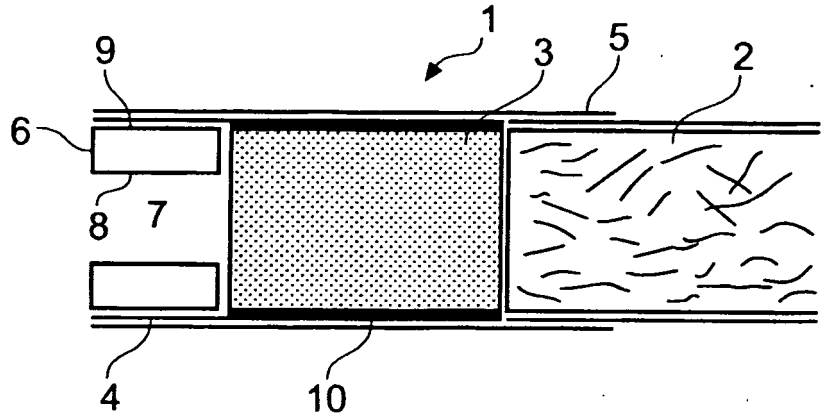

FIG. 4

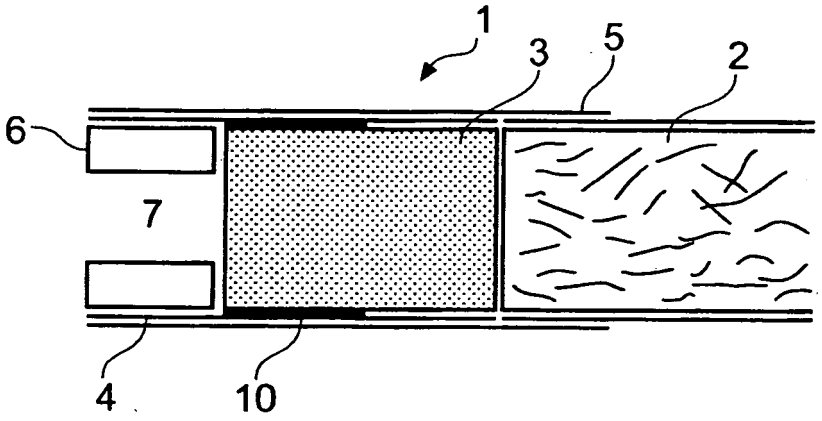

FIG. 5

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- GB 2203324 A **[0003] [0004]**
- GB 2170695 A **[0003]**
- GB 2150415 A **[0003]**
- GB 2150413 A **[0003]**
- GB 2135865 A **[0003]**
- GB 0781654 A **[0003]**
- WO 9965343 A **[0003]**
- US 3396733 A **[0003]**
- GB 2260477 A **[0006]**
- GB 2261152 A **[0006]**
- WO 9607336 A **[0056]**
- WO 0141590 A **[0056]**