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(54) **SMOKING ARTICLE**

RAUCHARTIKEL

ARTICLE À FUMER

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(56) References cited:
EP-A1- 0 196 775
EP-A1- 1 208 757
WO-A1-2007/010249
US-A- 5 615 694
US-A1- 2004 237 979

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Description

Field of the Invention

[0001] The present invention relates to a smoking article including a wrapped rod of smoking material.

Background of the Invention

[0002] Some smoking articles comprise a rod of smoking material having an outer wrapper and a sheet or wrap disposed between the rod of smoking material and the outer wrapper.

[0003] For example, WO 2005/082180 discloses smoking articles comprising a rod of smoking material with a wrapper about the rod and a web of material comprising an adsorbent material and a flavourant, the web material being positioned between the rod of smoking material and the wrapper.

[0004] WO 2006/023281 and WO 2006/014995 disclose cigarettes comprising a tobacco column surrounded by an outer wrap paper, and a partial inner wrap extending longitudinally of the tobacco column. The inner wrap material may contain a humectant.

[0005] US 6,997,190 discloses smoking articles comprising a rod of smoking material wrapped in a wrapping material. The wrapping material comprises a base sheet having a major surface and a plurality of bands applied to that major surface in the form of a pattern, each band possessing at least two web material layers with at least one of the web material layers incorporating a flavourant. The wrapping material may have a coating applied thereto which coating may contain a humectant, for example 1-5% humectant by weight of the coating composition.

[0006] US 2003/0178039 discloses cigarettes comprising a smokable material wrapped in a circumscribing wrapping material to form a smokable rod. The circumscribing wrapping material may comprise a humectant up to 10% by weight. However, there is no disclosure of the use of adsorbent in such wrapping material.

[0007] US 6,257,243 discloses cigarettes which comprise a rod having an inner segment of smokable material, a covering for the inner segment, an outer segment of smokable material and a covering for the outer segment. However, there is no disclosure as to the use of adsorbent in the coverings.

[0008] However, despite these teachings there remains in the art a need for providing improved smoking articles.

Summary of the Invention

[0009] It is therefore an object of the present invention to provide an improved smoking article.

[0010] According to the invention, a smoking article, comprises:

a rod of smokeable material; and
a first sheet material comprising at least one diluent and at least one adsorbent,
wherein said diluent is present in an amount effective to dilute emissions from the rod of smokeable material during combustion.

[0011] The at least one diluent is preferably present in the first sheet material in an amount of from about 5 to 80% by weight of the sheet material, preferably from about 5 to 70%, more preferably from about 10 to 60%, more preferably from about 20 to 50%. Preferably, the diluent is at least one aerosol forming agent selected from the group consisting of: polyhydric alcohols, glycerol, propylene glycol, triethylene glycol, esters, triethyl citrate, triacetin, high boiling point hydrocarbons, non-polyols, glycols, sorbitol, and lactic acid. Triacetin is particularly preferred.

[0012] Preferably, said first sheet material further comprises at least one diluent stabilising means. Said diluent stabilising means or the adsorbent are preferably an integral component within the first sheet material. Preferably, said diluent stabilising means or adsorbent is selected from the group consisting of zeolite, sepiolite, clay, silica gel, activated alumina, minerals, resin, and carbon, and particularly preferably the adsorbent is activated carbon. The activated carbon may preferably be in granular, powder or particulate form and have a mean particle size of less than 250μm, preferably less than 100μm, preferably less than 50μm, preferably less than 20μm. The activated carbon may have any level of activity and generally a higher activity carbon is beneficial. Preferably, the activated carbon has an activity level of 30-180% carbon tetrachloride, and more preferably 60-120%.

[0013] Preferably, the adsorbent or diluent stabilising means has a loading level less than 80% by weight of the first sheet material, preferably less than 50%, more preferably between about 10 to 45%.

[0014] The smoking article may have a number of configurations. In one embodiment the first sheet material extends over the entire length of the rod of smokeable material and is wrapped around the outside of the rod of smokeable material. In this embodiment, the first sheet material contains the diluent and acts as a wrapper providing support for the rod of smokeable material.

[0015] In another embodiment, the smoking article further comprises a second sheet material which preferably does not contain diluent, wherein said second sheet material is wrapped around the entire length of the rod of smokeable material. Thus the second sheet material acts as a wrapper for the smoking article, providing support for the rod of smokeable material. When the second sheet material is provided, the first sheet material may also extend over the entire length of the rod of smokeable material, or may extend only over a portion or a plurality of discrete portions of the length of the rod of smokeable material as the second sheet material is present as a wrapper to provide the mechanical support for the rod of smokeable material. The use and positioning of smaller portions will provide flexibility of cigarette design by impacting on wrapper diffusivity, tar propensity and diluent release.

[0016] If both first and second sheet material layers are provided, the second sheet material is preferably located outside said first sheet material relative to the axis of the rod of smokeable material. In one embodiment, the first sheet material is positioned directly between said rod of smokeable material and said second sheet material. In another embodiment, the first sheet material is located inside the rod of smokeable material, such that smokeable material is positioned between the first sheet material and the second sheet material which acts as an outer wrapper, in a co-axial arrangement. The first sheet material may be rolled (in a "Swiss-roll" type arrangement ot twisted spill arrangement in which a rolled/twisted spill of paper is provided in the centre of the rod) and located within the rod of smokeable material co-axially with the second sheet material.

[0017] Preferably, at least one of said first and second sheet materials has a thickness of from 20 to 300μm.

Brief Description of the Drawing Figures

[0018] In order that the subject invention may be easily understood and readily carried into effect, reference will now be made, by way of example, to the accompanying diagrammatic drawings, in which:

Figures 1-8 show enlarged cross-sectional side views of smoking articles incorporating the present invention;
Figures 9-11 show enlarged views from the non-filter end of a smoking article according to the invention; and
Figure 12 shows an exploded perspective view of a smoking article incorporating the present invention.

Detailed Description

[0019] Applicant has now found that, if a smoking article is produced including a rod of smoking material and a first sheet material comprising diluent(s) and optional adsorbent(s) and/or diluent stabilising means, the ratio of smoke components arising from the smoking material to total tar yield is reduced by dilution through eluted diluent. Also, levels of smoke components arising from the smoking material may be reduced by the presence of the first smoking material. In addition to providing a medium for containing the diluent, the first sheet material may additionally act as a wrapper, enwrapping the entire length of the rod of smoking material so that no additional wrapper is required. Alternatively, a second sheet material may additionally be provided. If a second sheet material forms a wrapper outside the first sheet material, applicant has found that the presence of diluent(s) in the first sheet material does not lead to unsightly spotting of the second sheet material.

[0020] Thus a new and inventive solution to the ongoing problem of the prior art, trying to improve upon known smokable materials, has been elucidated.

[0021] If present, the second sheet material may be a wrapper material comprising a web or cast material known to those skilled in the art, for example cellulosic paper web or reconstituted tobacco sheet material. It may incorporate a coating, treatment, or chemical modification such as those intended to reduce sidestream smoke or lower ignition propensity. The second sheet material may be with or without fillers that may or may not be adsorbents and/or diluent stabilising means.

[0022] It is typically the case that wrapper materials are continuous about the outer circumference of a smoking material rod. Generally, the ends of the rod are not provided with wrapper material; however, such a configuration would still fall within the scope of the present invention.

[0023] The second sheet material may have a thickness from 5 to 500μm, for example 10 to 300μm or 20 to 60μm.

[0024] The first sheet material may be any web material known to those skilled in the art, for example cellulosic paper web or reconstituted tobacco sheet materials. It may incorporate a coating, treatment, or chemical modification. The first sheet material may be provided with fillers. It may include adsorbents and/or diluent stabilising means.

[0025] According to various embodiments, the first sheet material may be coextensive with the second sheet material, or it may only be provided at one or more discrete portions of the length of the smoking material rod. The first sheet material may be located between the second sheet material and the smokeable material, which could be referred to as 'inside' the second sheet material, or it may be provided on the surface of the second sheet material opposite the smokable material, or 'outside' the second sheet material. According to an embodiment the first sheet material forms a single patch which extends over only a part of the inner surface of the second sheet material, around the whole of the

circumference.

[0026] When the first sheet material is in the form of a plurality of portions or patches, such patches may be in any form. For example, such patches may be in the form of a plurality of bands which are spaced in the longitudinal direction of the smoking material rod. Alternatively, such patches may be in the form of circumferentially spaced strips which extend along the whole or a part of the length of the smoking material rod. Still further, the patches may be a combination of such bands and strips. Said combination of bands and strips may be located on the inner, outer or both surfaces of the second sheet material.

[0027] Where more than one sheet material is used within the said smoking article, for example where a plurality of strips, patches or full wraps exists, each of the sheet materials may be the same or different in composition from any of the other sheet materials.

[0028] The first sheet material may have a thickness from 5 to 500μm, for example 10 to 300μm or 20 to 60μm. However, materials having a greater thickness may be used in some configurations, for example longitudinally extending strips.

[0029] The first sheet material comprises one or more diluents. The incorporation of diluents allows the production of a smoking article which, upon smoking, generates an aerosol comprising smokable material-derived smoke, e.g. tobacco smoke, and one or more eluted diluents.

[0030] Suitable diluents for use in the first sheet material include aerosol forming means utilising a wide range of classes of substances known to those skilled in the art. For example, polyhydric alcohols, such as glycerol, propylene glycol, sorbitol and triethylene glycol; esters, such as diacetin, triethyl citrate, isopropyl myristate or triacetin, high boiling point hydrocarbons, or lactic acid. A combination of diluents may be used, in equal or differing proportions. Preferably, the diluent is triacetin, triethyl citrate or isopropyl myristate.

[0031] The diluent(s), and, where present, adsorbent material and/or diluent stabilising means may be provided in any suitable form. Examples include liquids and solids, such as in granular, powder, crystalline or other particulate forms, e.g. nanoparticles, molecular cage structures, clathrates.

[0032] The one or more adsorbent material and/or diluent stabilising means may be selected from any suitable material as known to skilled workers. Examples include zeolite, sepiolite, clay, activated alumina, minerals, resins, silica gel and carbon. In preferred embodiments, the adsorbent material and/or diluent stabilising means is carbon, such as activated carbon. Where activated carbon is used, the activation level can be measured by evaluating the percent carbon tetrachloride (CTC) as is known in the art. Briefly, carbon is weighed, exposed to CTC and then the weight of the carbon remeasured. The increase in weight of the carbon is calculated as a percentage.

[0033] For optimum use in the present invention, the activated carbon will preferably have a high activity and may have an activity of up to 180% CTC. More preferably the carbon has an activity of 40-160% CTC. In connection with selection of the one or more adsorbent material or diluent stabilising means, it is to be understood that the adsorbent (s) or diluent stabilising means present in the first sheet material layer, may be the same or different in each of such web material layers. That is, where a plurality of web material layers, strips, or bands is used, the adsorbent(s) and/or diluent stabilising means or combinations of adsorbent(s) and/or diluent stabilising means may be the same or different in each web material layer, strip, or band.

[0034] A first sheet material comprising one or more adsorbent material and/or diluent stabilising means may be in the form of a paper containing activated carbon.

[0035] In a further embodiment of the present invention the rod of smokeable material comprises a central core of smokable material, fully wrapped along its length, with an annular rod of smoking material enwrapping the central core. The central core may be wrapped in the first sheet material along its entire length, or may be wrapped in a third sheet material having portions of first sheet material supported by the third sheet material, either inside or outside the first sheet material. The third sheet material used to wrap the central core may be the same or different from that of the second sheet material which enwraps the annular rod of smoking material. The smoking article may further include portions of first sheet material which may be bands, strips or a combination thereof located on the inner, outer or both surfaces of the second sheet material enwrapping the annular rod of smoking material.

[0036] The smokeable material, whether a solid rod or central core with annular rod, can be any smokeable material as is considered appropriate in the art. For example, it may be a tobacco-containing smoking material, a modified tobacco smoking material, e.g. expanded tobacco, extracted tobacco, physically, chemically and/or biochemically modified tobacco or a non-tobacco-containing smoking material. It may be a foamed and/or extruded material. Preferably, the smoking material is a tobacco-containing material in combination with non-tobacco smoking material, or comprised solely of a tobacco material. Suitably, the tobacco material comprises one or more of stem, lamina and tobacco dust. An example of a tobacco material is one containing one or more of the following tobacco types: Virginia or flue-cured tobacco, Burley tobacco, Oriental tobacco, reconstituted tobacco, stem and modified tobacco. Preferably, the smoking material comprises a blend of tobacco material or a blend of tobacco material and non-tobacco material. Where present, a central core may contain a different smokable material from that in the annular rod.

[0037] The smoking article may additionally comprise a filter element located at one end of the smoking material rod.

Such filter element may, for example, comprise an adsorbent material. The filter element may be a multiple filter comprising multiple sections such as, for example, a dual or triple filter. Suitable filters are well known to those skilled in the art. Such filters known in the art include Dalmatian filters in which a particulate adsorbent material is interspersed in fibrous filter material, for example fibrous cellulosic material, and cavity filters in which a cavity portion of the multi-segment filter contains adsorbent material.

[0038] The smoking article according to the present invention, can be readily prepared by techniques known in the art.

[0039] As noted above, Figures 1-8 show enlarged cross-sectional side views of smoking articles of the present invention. Like materials or structures are represented by the same reference numeral in the various figures.

[0040] Figure 1 shows a smoking article 10 comprising a rod of smokeable material 11 encased in a first sheet material 13 and a wrapper comprising a second sheet material 12. The second sheet material 12 extends approximately over the entire circumferential surface of rod of smokeable material 11. In the Figure 1 embodiment the first sheet material 13 is located along approximately the entire inner surface of the second sheet material 12, separating second sheet material 12 from rod of smokable material 11.

[0041] In an alternative embodiment, if the first sheet material 13 has suitable strength and rigidity to support the rod of smoking material 11, the second sheet material 12 may be omitted, so that the first sheet material 12 extends along the entire length of the rod of smokeable material 11 and acts both as a wrapper and a diluent containing medium.

[0042] The Figure 1 smoking article has a general cigarette form, meaning a filter rod 14 is provided. Filter rod 14 is enwrapped in plug wrap 15 and the wrapped filter rod is joined to the wrapped smokable material rod with tipping paper 16. The component materials and preparation of filter rod 14, plug wrap 15, and tipping paper 16, are conventional as is well known in the art.

[0043] Figure 2 shows a smoking article 10 having a first sheet material 13 located between a second sheet material 12 and a rod of smokeable material 11. In this embodiment, the first sheet material 13 is in the form of a patch covering a portion of the circumferential and longitudinal length of rod of smokeable material 11.

[0044] In the embodiment shown in Figure 3, first sheet material 13 is provided as a plurality of patches, some at the filter rod 14 end of the rod of smokeable material 11, some opposite the filter rod 14 end.

[0045] The schematic of Figure 4 shows a smoking article 10 having a first sheet material 13 located outside the second sheet material 12. That is, the second sheet material 12 is positioned between a rod of smokeable material 11 and the first sheet material 13. In this embodiment, the first sheet material 13 covers approximately the entire outer surface of wrapper 12.

[0046] Figure 5 shows an embodiment having a circumferential filter end patch of first sheet material 13 positioned outside the second sheet material 12.

[0047] The embodiments shown in Figures 6 to 8 represent smoking articles 10 having a co-axial core of smokeable material 17 positioned within the rod of smokeable material 11. In Figures 6 and 7 the core of smokeable material 17 is wrapped in first sheet material 13 which extends along the entire length of the rod of smokeable material 11.

[0048] In an alternative embodiment (not shown), a smoking article has the configuration shown in Figure 6, with a co-axial core of smokeable material 17 positioned within the rod of smokeable material 11, but in this embodiment both the inner wrapper and the outer wrapper are formed from diluent containing first sheet material.

[0049] In Figure 8 the core of smokeable material 17 is wrapped in a third sheet material which may be the same as the second sheet material 12. Patches of first sheet material 13 are provided both around the outer circumference of the third sheet material positioned about core of smokeable material 17 and between rod of smokeable material 11 and the second sheet material 12 around the outer circumference of rod of smokeable material 11.

[0050] Figures 9-11 show enlarged views from the non-filter end of a smoking article. Figure 9 shows the embodiment of Figure 1, Figure 10 shows the embodiment of Figure 3, and Figure 11 shows the embodiment of Figure 7.

[0051] Figure 12 shows an exploded perspective view of a smoking article 10 having a rod of smokeable material 11 and a filter rod 14, the rod of smokeable material 11 being provided with a patch of first sheet material 13 at the filter rod 14 end, as well as second sheet material 12 provided outside the entire length of rod of smokeable material 11. Plug wrap 15 and tipping paper 16 are provided.

Example 1

[0052] Cigarettes were manufactured having a 56mm tobacco rod and a 27mm cellulose acetate filter with a circumference of 24.6mm. The cigarettes had no tip ventilation. Specifications for the second sheet material wrapping the tobacco rod was paper comprising of mixed fibres and having 50CU permeability and 2% potassium citrate (burn additive).

[0053] The tobacco rod comprised a blend of flue cured Virginia and burley lamina tobacco.

[0054] A layer of first sheet material containing activated carbon was provided around the full length and circumference of the tobacco rod. On the outside of the first sheet material a wrapper of second sheet material was provided around the full length and circumference of the tobacco rod. A schematic showing a similar cigarette design is shown in Figure 1.

[0055] The carbon-containing first sheet material included 39% fibre and 36% activated carbon. The activated carbon

had a carbon tetrachloride (CTC) activity of 100%.

[0056] Four different levels of triacetin diluent were provided to the carbon paper. First, a control level was manufactured with non-impregnated carbon-containing paper. Test levels included papers impregnated with 10, 19, or 28mg/cigarette of triacetin.

[0057] Approximately two weeks after manufacture the level of triacetin in the smoke was measured (Table 1) and the dilution was calculated (Table 2). The dilution was calculated as [triacetin in smoke (mg/cigarette)/Nicotine free dry particulate matter (mg/cigarette)] x 100. The cigarettes were stored at 22°C and 60% relative and the analyses were repeated at 3 months and 6 months (Tables 1 and 2) showing the triacetin was stable in the cigarettes.

Table 1. Triacetin in smoke (mg/cigarette)

Initial Triacetin loading (mg/cigarette)	Triacetin in smoke (mg/cigarette)		
	Start	3 months	6 months
0	0.3	0.2	0.3
10	0.5	0.5	0.5
19	0.9	0.9	0.9
28	1.4	1.3	1.3

[0058] It is noted that while the control level did not have triacetin diluent in the sheet material, triacetin is present in the cellulose acetate cigarette filters as were used here, accounting for the triacetin levels measured in the control products.

Table 2. Smoke Dilution (%)

Initial Triacetin loading (mg/cigarette)	Smoke Dilution (%)		
	Start	3 months	6 months
0	3.0	3.0	3.7
10	5.7	6.0	6.5
19	10.0	10.3	11.6
28	14.7	14.4	14.4

[0059] Visual assessment of the cigarettes showed them to be free from unsightly spots throughout the duration of the study.

Example 2

[0060] Cigarettes were manufactured which had a 56mm tobacco rod and a 27mm cellulose acetate filter with a circumference of 24.6mm. Specifications for the second sheet material wrapping the tobacco rod was paper comprising mixed fibres and having 50CU permeability and 2% potassium citrate (burn additive). The tobacco rod comprised a blend of flue cured Virginia and burley lamina tobacco.

[0061] A 56mm long tobacco rod having a 16mm circumference was wrapped with a carbon containing first sheet material and located longitudinally within the centre of the cigarette tobacco rod. The carbon containing first sheet material included 39% fibre and 36% activated carbon. The activated carbon had a carbon tetrachloride (CTC) activity of 100%.

[0062] The test cigarette design included impregnation of 16 mg triacetin in the carbon containing first sheet material. A control level was manufactured which was identical but for non-impregnated carbon containing sheet. A schematic showing a similar cigarette design is shown in Figure 6.

[0063] The sample and control cigarettes were tip ventilated to give a nicotine free, dry particulate matter yield of 6mg/cigarette. The level of triacetin in the smoke and the dilution were obtained (Table 3). The dilution was calculated as [triacetin in smoke

[0064] (mg/cigarette)/Nicotine free dry particulate matter (mg/cigarette)] x 100. As is evident from the following data, the test cigarette of Example 2 achieved over 22% dilution of smoke.

Table 3. Results of Analysis

Cigarette	Triacetin in smoke (mg/cigarette)	Smoke Dilution (%)
Control	0.28	4.7
Sample	1.28	22.5

[0065] Visual assessment of the cigarettes showed them to be free from unsightly spots.

[0066] The foregoing description and examples have been set forth merely to illustrate the invention and are not intended to be limiting. Since modifications of the described embodiments incorporating the substance of the invention may occur to persons skilled in the art, the invention should be construed broadly to include all variations within the scope of the appended claims.

Claims

1. A smoking article (10), comprising:

   a rod of smokeable material (11); and
   a sheet material (13) comprising at least one diluent and at least one adsorbent, wherein said diluent is present in an amount effective to dilute emissions from the rod of smokeable material during combustion.

2. A smoking article according to claim 1, wherein the at least one diluent is present in the sheet material in an amount of from about 5 to 80% by weight of the sheet material, preferably from about 5 to 70%, more preferably from about 10 to 60%, more preferably from about 20 to 50%.

3. A smoking article according to claim 1 or 2, wherein said diluent is at least one aerosol forming agent selected from the group consisting of: polyhydric alcohols, glycerol, propylene glycol, triethylene glycol, esters, triethyl citrate, triacetin, high boiling point hydrocarbons, non-polyols, glycols, sorbitol, and lactic acid.

4. A smoking article according to any preceding claim, wherein said adsorbent is an integral component within the sheet material.

5. A smoking article according to any one of the preceding claims, wherein said sheet material further comprises at least one diluent stabilising means.

6. A smoking article according to claim 5, wherein said diluent stabilising means is an integral component within the sheet material.

7. A smoking article according to claim 5 or 6, wherein said diluent stabilising means is selected from the group consisting of zeolite, sepiolite, clay, silica gel, activated alumina, minerals and resin.

8. A smoking article according to any one of claims 5 to 7, wherein the diluent stabilising means has a loading level less than 70% by weight of the sheet material, preferably less than 50%, more preferably between about 10 to 45%.

9. A smoking article according to any preceding claim, wherein the adsorbent is activated carbon.

10. A smoking article according to claim 9, wherein the activated carbon is in granular, powder or particulate form and has a mean particle size of less than 250μm, preferably less than 100μm, preferably less than 50μm, preferably less than 20μm.

11. A smoking article according to claim 9 or 10, wherein the activated carbon has an activity level of 30-180% carbon tetrachloride, preferably 60-120%.

12. A smoking article according to any preceding claim, wherein the adsorbent has a loading level less than 70% by weight of the sheet material, preferably less than 50%, more preferably between about 10 to 45%.

13. A smoking article according to any one of the preceding claims, wherein the sheet material is wrapped around the

circumference of the rod of smokeable material and extends along the entire length of the rod of smokeable material.

14. A smoking article according to any preceding claim, further comprising:

a second sheet material (12) which does not contain diluent, wherein said second sheet material is wrapped around the circumference of the rod of smokeable material and extends along the entire length of the rod of smokeable material.

15. A smoking article according to claim 14, wherein said second sheet material is located outside said sheet material relative to the axis of the rod of smokeable material.

Patentansprüche

1. Rauchartikel bzw. rauchbarer Artikel (10) mit:

einem Strang aus rauchbarem Material (11); und
einem Blattmaterial (13) mit wenigstens einem Verdünnungsmittel und wenigstens einem Adsorptionsmittel, wobei das Verdünnungsmittel in einer Menge vorliegt, die effektiv ist, um Emissionen von dem Strang aus rauchbarem Material während der Verbrennung zu verdünnen.

2. Rauchbarer Artikel nach Anspruch 1, wobei das wenigstens eine Verdünnungsmittel in dem Blattmaterial in einer Menge von ungefähr 5 bis 80 Gew.-% des Blattmaterials vorliegt, bevorzugt von ungefähr 5 bis 70 %, noch mehr bevorzugt von ungefähr 10 bis 60 %, und noch mehr bevorzugt von ungefähr 20 bis 50%.

3. Rauchbarer Artikel nach Anspruch 1 oder 2, wobei das Verdünnungsmittel wenigstens ein ein Aerosol bildendes Mittel ist, das aus der Gruppe ausgewählt ist, die besteht aus: Mehrwertigen bzw. Polyalkoholen, Glycerol bzw. Glyzerin, Propylenglycol, Triethylenglycol, Ester, Triethylcitrat, Triacetin, Kohlenwasserstoffen mit hohem Siedepunkt, Nicht-Polyole bzw. mehrwertige Alkohole, Glycole, Sorbitol und Milchsäure.

4. Rauchbarer Artikel nach einem der vorhergehenden Ansprüche, wobei das Absorptionsmittel eine integrale Komponente in dem Blattmaterial ist.

5. Rauchbarer Artikel nach einem der vorhergehenden Ansprüche, wobei das Blattmaterial weiterhin wenigstens eine verdünnungsmittel-stabilisierende Anordnung aufweist.

6. Rauchbarer Artikel nach Anspruch 5, wobei die verdünnungsmittel-stabilisierende Anordnung eine integrale Komponente in dem Blattmaterial ist.

7. Rauchbarer Artikel nach Anspruch 5 oder 6, wobei die verdünnungsmittel-stabilisierende Anordnung aus der Gruppe ausgewählt ist, die aus Zeolit, Sepiolit, Ton, Kiesel- bzw. Silicagel, aktiviertem bzw. Aktiv-Aluminiumoxid, Mineralen und Harz besteht.

8. Rauchbarer Artikel nach einem der Ansprüche 5 bis 7, wobei die das Verdünnungsmittel stabilisierende Anordnung einen Beladungspegel von weniger als 70 Gew,-% des Blattmaterials, bevorzugt von weniger als 50 %, besonders bevorzugt zwischen ungefähr 10 bis 45 % hat.

9. Rauchbarer Artikel nach einem der vorhergehenden Ansprüche, wobei das Absorptionsmittel Aktivkohle ist.

10. Rauchbarer Artikel nach Anspruch 9, wobei die Aktivkohle in granularer, Pulver- oder Teilchenform vorliegt und eine mittlere Partikelgröße von weniger als 250 μm, bevorzugt von weniger als 100 μm, weiter bevorzugt von weniger als 50 μm und besonders bevorzugt von weniger als 20 μm hat.

11. Rauchbarer Artikel nach Anspruch 9 oder 10, wobei die Aktivkohle einen Aktivitätspegel von 30 bis 180 % Kohlenstofftetrachlorid, bevorzugt von 60 bis 120 % hat.

12. Rauchbarer Artikel nach einem der vorhergehenden Ansprüche, wobei das Adsorptionsmittel einen Beladungspegel bzw. -wert von weniger als 70 Gew.-% des Blattmaterials, bevorzugt von weniger als 50 %, und noch weiter bevorzugt

zwischen ungefähr 10 bis 45 % hat.

13. Rauchbarer Artikel nach einem der vorhergehenden Ansprüche, wobei das Blattmaterial um den Umfang des Strangs aus rauchbarem Material gewickelt ist und sich längs der gesamten Länge des Strangs aus rauchbarem Material erstreckt.

14. Rauchbarer Artikel nach einem der vorhergehenden Ansprüche, weiterhin mit:

Einem zweiten Blattmaterial (12), das kein Verdünnungsmittel enthält, wobei das zweite Blattmaterial rund um den Umfang des Strangs aus rauchbarem Material gewickelt ist und sich längs der gesamten Länge des Strangs aus rauchbarem Material erstreckt.

15. Rauchbarer Artikel nach Anspruch 14, wobei das zweite Blattmaterial außerhalb des Blattmaterials relativ zu der Achse des Strangs aus rauchbarem Material angeordnet ist.

Revendications

1. Article à fumer (10) comprenant :

une tige de matériau pouvant être fumé (11) ; et
un matériau en feuille (13) comprenant au moins un diluant et au moins un adsorbant, dans lequel ledit diluant est présent selon une quantité efficace pour diluer les émissions provenant de la tige de matériau pouvant être fumé pendant la combustion.

2. Article à fumer selon la revendication 1, dans lequel le au moins un diluant est présent dans le matériau en feuille selon une quantité de l'ordre d'environ 5 à 80% en poids de matériau en feuille, de préférence de l'ordre d'environ 5 à 70%, encore de préférence de l'ordre d'environ 10 à 60%, encore de préférence de l'ordre d'environ 20 à 50%.

3. Article à fumer selon la revendication 1 ou 2, dans lequel ledit diluant est au moins un agent de formation d'aérosol sélectionné dans le groupe comprenant : les polyalcools, le glycérol, le propylène glycol, le triéthylène glycol, les esters, le citrate de triéthyle, le triacétate de glycéryle, les hydrocarbures à point d'ébullition élevé, les agents sans polyol, les glycols, le sorbitol et l'acide lactique.

4. Article à fumer selon l'une quelconque des revendications précédentes, dans lequel ledit adsorbant est un composant intégral à l'intérieur du matériau en feuille.

5. Article à fumer selon l'une quelconque des revendications précédentes, dans lequel ledit matériau en feuille comprend en outre au moins un moyen de stabilisation de diluant.

6. Article à fumer selon la revendication 5, dans lequel ledit moyen de stabilisation de diluant est un composant intégral à l'intérieur du matériau en feuille.

7. Article à fumer selon la revendication 5 ou 6, dans lequel ledit moyen de stabilisation de diluant est choisi dans le groupe comprenant la zéolite, la sépiolite, l'argile, le gel de silice, l'alumine active, les minéraux et la résine.

8. Article à fumer selon l'une quelconque des revendications 5 à 7, dans lequel le moyen de stabilisation de diluant a un niveau de chargement inférieur à 70% en poids du matériau en feuille, de préférence inférieur à 50% en poids, encore de préférence compris entre environ 10 et 45%.

9. Article à fumer selon l'une quelconque des revendications précédentes, dans lequel l'adsorbant est du charbon actif.

10. Article à fumer selon la revendication 9, dans lequel le charbon actif se présente sous forme granulaire, pulvérulente ou particulaire et a une taille particulaire moyenne inférieure à 250 μm, de préférence inférieure à 100 μm, de préférence inférieure à 50 μm, de préférence inférieure à 20 μm.

11. Article à fumer selon la revendication 9 ou 10, dans lequel le charbon actif a un niveau d'activité de 30 - 180% de tétrachlorure de carbone, de préférence 60 - 120%.

12. Article à fumer selon l'une quelconque des revendications précédentes, dans lequel l'adsorbant a un niveau de chargement inférieur à 70% en poids du matériau en feuille, de préférence inférieur à 50%, encore de préférence compris entre environ 10 et 45%.

13. Article à fumer selon l'une quelconque des revendications précédentes, dans lequel le matériau en feuille est enroulé autour de la circonférence de la tige du matériau pouvant être fumé et s'étend le long de toute la longueur de la tige de matériau pouvant être fumé.

14. Article à fumer selon l'une quelconque des revendications précédentes, comprenant en outre :

un second matériau en feuille (12) qui ne contient pas de diluant, dans lequel ledit second matériau en feuille est enroulé autour de la circonférence de la tige de matériau pouvant être fumé, et s'étend le long de toute la longueur de la tige de matériau pouvant être fumé.

15. Article à fumer selon la revendication 14, dans lequel ledit second matériau en feuille est positionné à l'extérieur dudit matériau en feuille par rapport à l'axe de la tige de matériau pouvant être fumé.

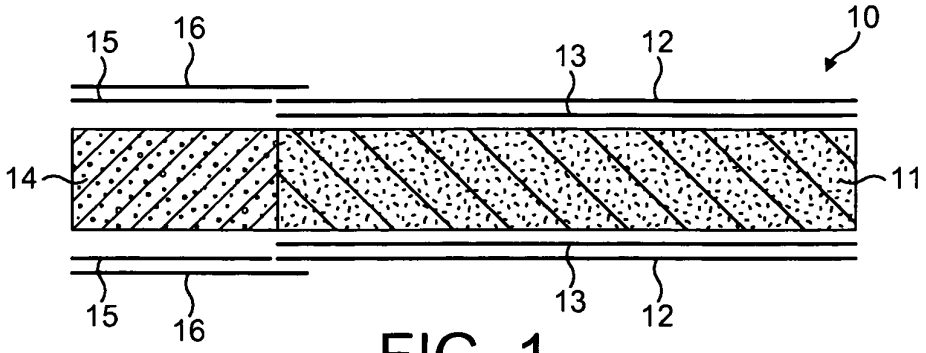


FIG. 1

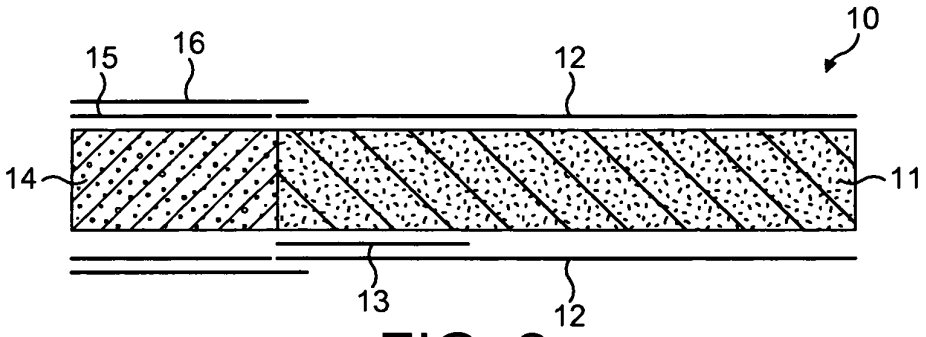


FIG. 2

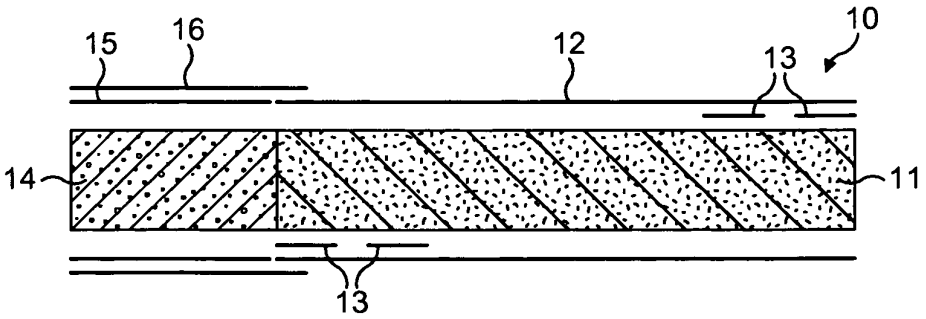


FIG. 3

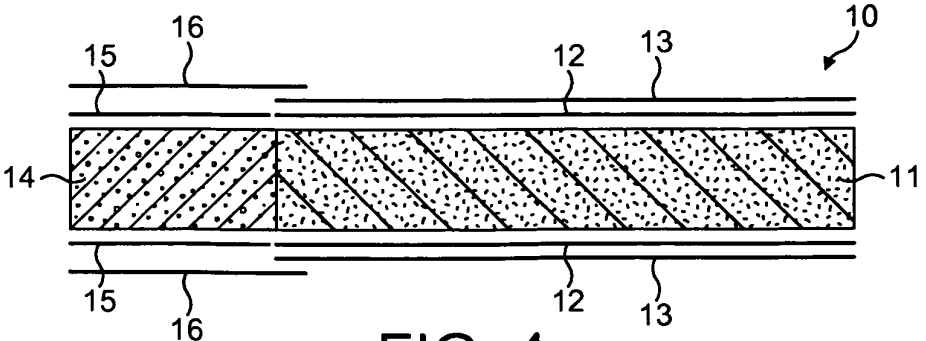


FIG. 4

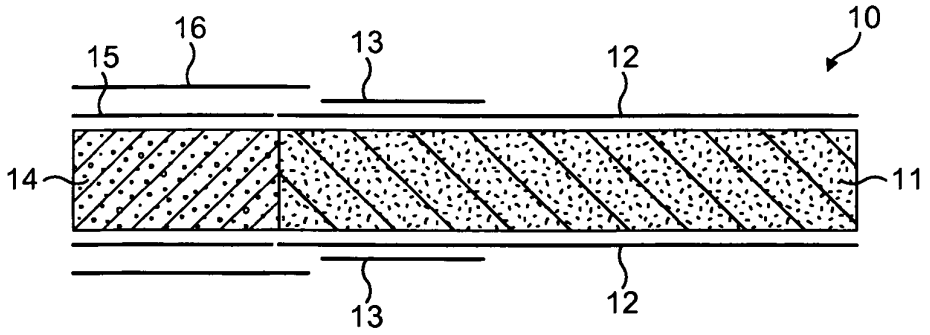
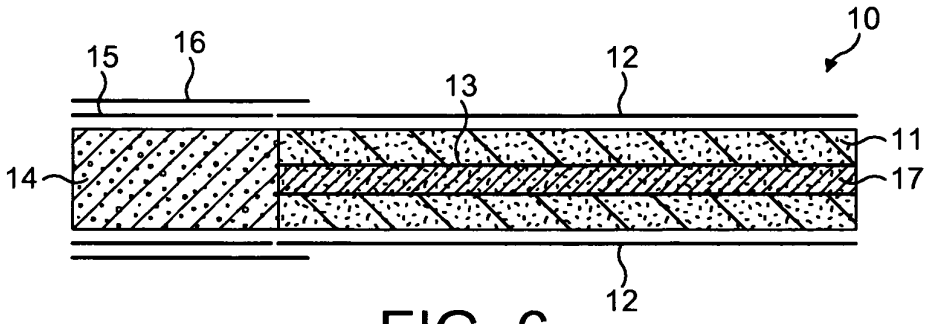


FIG. 5



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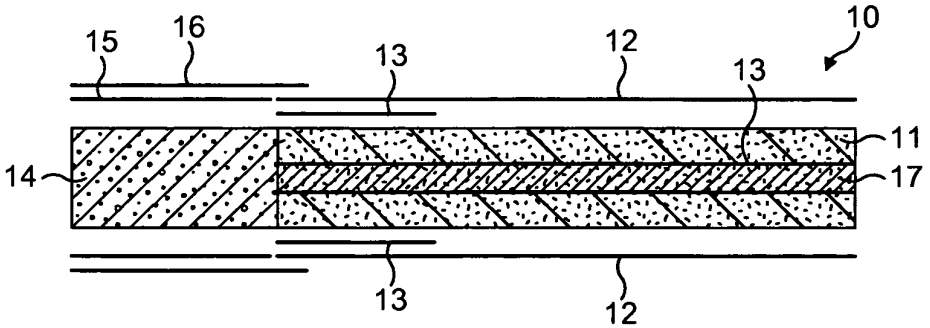

FIG. 7

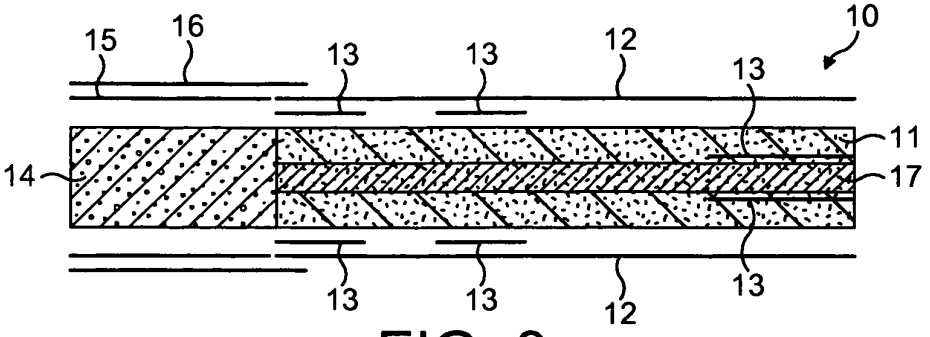

FIG. 8

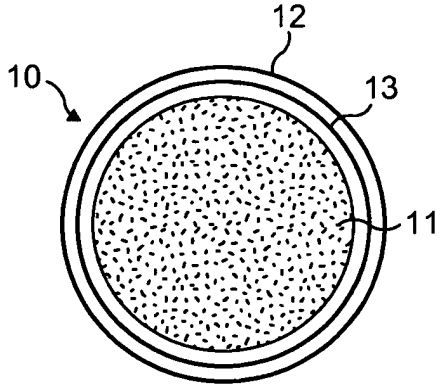

FIG. 9

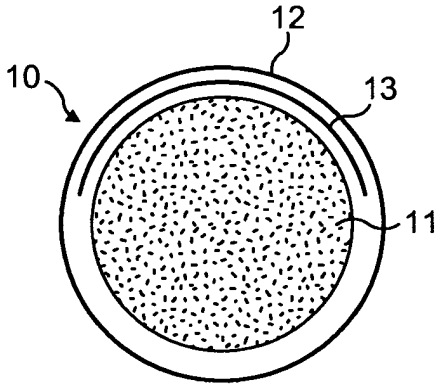

FIG. 10

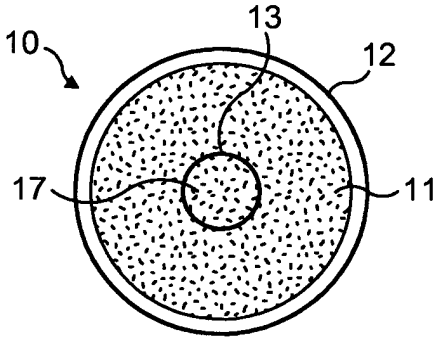

FIG. 11

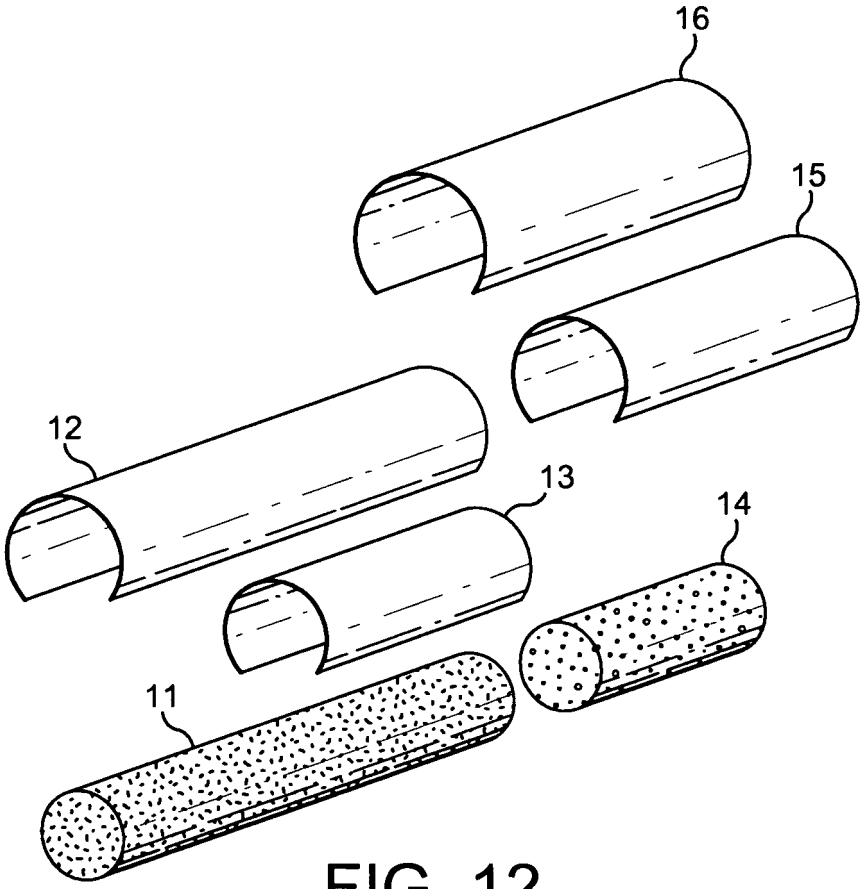

FIG. 12

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2005082180 A **[0003]**
- WO 2006023281 A **[0004]**
- WO 2006014995 A **[0004]**
- US 6997190 B **[0005]**
- US 20030178039 A **[0006]**
- US 6257243 B **[0007]**