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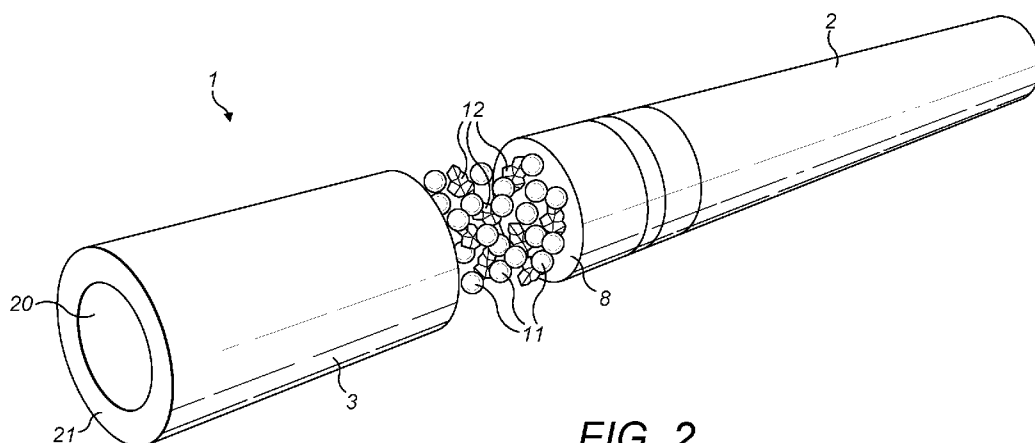


FIG. 2

(57) Abstract: The present invention relates to a tobacco industry product component comprising a wall circumscribing a cavity. A plurality of additive capsules and a plurality of particles are disposed in the cavity. The particles are configured such that, in use, the particles promote breaking of the additive capsules upon the application of an external force to the wall of the tobacco industry product component by a user. The particles may comprise a material having a particle density of at least 1 g/cc. There is also provided a method of manufacturing a tobacco industry product component.



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A Tobacco Industry Product Component and a Method of Manufacturing a Tobacco Industry Product Component

Technical Field

- 5 The present disclosure relates to a tobacco industry product component and to a tobacco industry product comprising the same. The present disclosure also relates to a method of manufacturing a tobacco industry product component.

Background

- 10 It is known in the art to provide a cigarette with a capsule containing flavourant. During use, the user may break the capsule to release flavourant into smoke flowing through the cigarette. Therefore, the user is able to selectively add flavourant to the smoke.

Summary

- 15 There is provided a tobacco industry product component comprising: a wall circumscribing a cavity; a plurality of additive capsules disposed in the cavity; and, a plurality of particles disposed in the cavity and configured such that, in use, the particles promote breaking of the additive capsules upon the application of an external force to the wall of the tobacco industry product component by a user, wherein the
20 particles comprise a material having a particle density of at least 1 g/cc.

The particles may comprise a plasticiser. In one embodiment, the plasticiser comprises triacetin.

- 25 In one embodiment, the particles comprise a polymeric material and, preferably, plastic.

In one embodiment, the particles comprise cellulose acetate. In one embodiment, the particles comprise cellulose acetate chips.

- 30 In one embodiment, the particles comprise one or more surface formations configured to promote breaking of the additive capsules.

- In some embodiments, the particles are optionally formed from a material having a
35 Rockwell hardness of at least 25 on the R-Scale measured according to ASTM D785.

Preferably, the particles are formed from a material having a Rockwell hardness of at least 30, at least 40, at least 50, at least 60, at least 70, at least 80, at least 90, or at least 100 on the R-Scale measured according to ASTM D785.

5 In one embodiment, the particles have an average surface area of less than 50 square metres per gram and, preferably, less than 30, 20, 10, 5 or 3 square metres per gram. The surface area may be measured according to ASTM D1993 – 18 (Standard Test Method for Precipitated Silica-Surface Area by Multipoint BET Nitrogen Adsorption, ASTM International, West Conshohocken, PA, 2018). Particle density may refer to the
10 density of the material of the particles including pores in the material, but excluding voids between particles (which would be the ‘bulk density’).

It has been found that the lower the surface area of the particles, the more robust the particles are, which may be due to the particles being less porous. The particles being
15 more robust helps to promote breakage of the additive capsules upon the application of the external force to the wall of the tobacco industry product component. The particles being more robust also helps to prevent breakage of the capsules during transit. In addition, it has been found that a lower surface area means that the particles adsorb less of the additive of the additive capsules upon rupture, meaning that more of the
20 additive can be delivered to the user.

The particles comprise a material having a particle density of at least 1 g/cc helps to make the particles more robust to encourage breakage of the additive capsules during use and to prevent breakage of the particles during transit. In some embodiments, the
25 particles comprise a material having a particle density of at least 1.1 g/cc or at least 1.2 g/cc, wherein increasing the particle density of the particles helps to increase the robustness of the particles.

In one embodiment, the particles comprise a material having a particle density of less
30 than 5 g/cc and, preferably, less than 2 g/cc, or less than 1.5 g/cc. A lower particle density of the particles results in a lighter tobacco industry product component which is therefore easier to transport.

In some embodiments, the particle density of the particles is between 1 and 2 g/cc, or
35 between 1.1 and 2 g/cc or between 1.1 and 1.5 g/cc.

In one embodiment, the additive capsules have a diameter of between 0.6 and 1.4 mm and, preferably, a diameter of about 1 mm.

5 In one embodiment, the particles have a particle size of between 1 and 2.4 mm and, preferably, a particle size of between 1.4 and 2 mm.

In some embodiments, the particles are generally cylindrical in shape. The particles may be extruded from a rod of material and cut into individual generally cylindrical particles.

10

In some embodiments, the particles have a ball-pan hardness of greater than 95%, and, preferably, greater than 96%, 97%, 98%, or 99%. In some embodiments, the ball- pan hardness of the particles is greater than 99.5%, 99.6%, 99.7%, 99.8% or 99.9%. The ball-pan hardness of the particles can be measured using the ball-pan hardness test
15 described in ASTM D3802 – 16 (Standard Test Method for Ball-Pan Hardness of Activated Carbon, ASTM International, West Conshohocken, PA, 2016). This test is described for testing the hardness of activated carbon. However, it is also suitable for measuring the hardness of other particulate materials. It has been found that increasing the ball-pan hardness of the particles makes the particles more robust and
20 therefore more effective at promoting breakage of the additive capsules during use and also that the particles are less likely to break during transit.

The tobacco industry product component may comprise between 20 and 100 additive capsules and, preferably, between 40 and 80 additive capsules.

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In some embodiments, the additive capsules have an average burst strength of between 3 N and 5 N and, preferably, between 3.5 N and 4.5N. In some embodiments, the additive capsules have an average burst strength of about 4 N. The burst strength (crush strength) is the force required to burst an individual additive capsule.

30

In one embodiment, the cavity has a length of between 4 and 12 mm and, preferably, has a length of between 6 and 10 mm.

In one embodiment, the tobacco industry product component comprises a body of
35 filtration material that comprises the cavity and, preferably, the body comprises first

and second sections of filtration material and the cavity is disposed between the first and second sections.

5 The tobacco industry product component may further comprise a plug wrap that circumscribes the cavity. The plug wrap may comprise an impermeable coating, for example, a coating that is impermeable to the additive of the additive capsules. In some embodiments, the plug wrap has a basis weight of at least 60 gsm. In some embodiments, the plug wrap has a thickness of at least 35 micrometres.

10 In one embodiment, the one or more additive capsules comprise an outer shell and an inner core. The inner core may be a fluid core. The fluid core may be a liquid core. The outer shell may be a solid outer shell. The outer shell may comprise alginate.

15 In one embodiment, the tobacco industry product component further comprises an outer surface comprising an indicator configured to indicate to the user where the external force should be applied to the tobacco industry product component.

In some embodiments, the tobacco industry product component comprises a smoking article component, for example, a filter.

20

There is also provided a tobacco industry product comprising a tobacco industry product component according to the present disclosure.

In some embodiments, the tobacco industry product comprises a smoking article.

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There is also provided a tobacco industry product component comprising: a wall circumscribing a cavity; a plurality of additive capsules disposed in the cavity; and, a plurality of particles disposed in the cavity and configured such that, in use, the particles promote breaking of the additive capsules upon the application of an external force to the wall of the tobacco industry product component by a user. In some
30 embodiments, the particles are cellulose acetate particles. The tobacco industry product component may have any of the features described above including, optionally, that the particles comprise a material having a particle density of at least 1 g/cc, although this feature is not essential.

35

There is also provided a method of manufacturing a tobacco industry product component comprising: providing a plurality of particles; providing a plurality of additive capsules; and, locating the particles and additive capsules in a cavity. The tobacco industry product component may have any of the features described above. The
5 particles may comprise a material having a particle density of at least 1 g/cc, although this feature is not essential.

Brief Description of the Drawings

Embodiments of the invention will now be described, by way of non-limiting example
10 only, with reference to the drawings, in which:

Fig. 1 is a perspective view of an embodiment of a tobacco industry product;
Fig. 2 is a perspective view of the tobacco industry product of Fig. 1, wherein a portion of the tipping paper and plug wrap of the tobacco industry product is omitted for
15 illustrative purposes;
Fig. 3 is a schematic cross-sectional side view of the tobacco industry product of Fig. 1;
Fig. 4 is a cross-sectional side view of an additive capsule of the tobacco industry product of Fig. 1;
Fig. 5 is perspective view of a cellulose acetate particle of the tobacco industry product
20 of Fig. 1;
Fig. 6 is a perspective view of the plug wrap of the tobacco industry product of Fig. 1;
and,
Fig. 7 is a block diagram showing an embodiment of a method of manufacturing a tobacco industry product component.

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Detailed Description

Referring now to Figs. 1 to 6, an embodiment of a tobacco industry product 1 is shown. In the present embodiment, the tobacco industry product 1 is a smoking article 1. However, in alternative embodiments (not shown), the tobacco industry product is of
30 an arrangement other than a smoking article 1.

The smoking article 1 comprises a tobacco rod 2 and a tobacco industry product component 3.

35 An outer wrap 4 circumscribes the smoking article component 3 and a portion of the tobacco rod 2. The outer wrap 4 comprises a tipping paper 4 that attaches the tobacco

rod 2 to the smoking article component 3. The tobacco rod 2 comprises a column of smokeable material 5 circumscribed by a rod wrapper 6.

5 In the present embodiment, the tobacco industry product component 3 comprises a smoking article component 3 in the form of a smoking article filter 3. The smoking article component 3 comprises a body 7 of filter material and a cavity 8. The body 7 comprises first and second sections 9, 10 of filtration material. In the present embodiment, the first and second sections 9, 10 comprise first and second plugs 9, 10 of filtration material, for example, cellulose acetate. The first and second plugs 9, 10 may
10 be generally cylindrical in shape, although a skilled person would recognise that other shapes of plug 9, 10 are possible.

The first and second plugs 9, 10 are spaced in the axial direction of the smoking article 1 such that the cavity 8 is provided between the first and second plugs 9, 10. The second
15 plug 10 is located downstream of the tobacco rod 2. The first plug 9 is located downstream of the second plug 10, on the other side of the cavity 8 to the second plug 10.

The cavity 8 has a length (depicted by arrow 'X' in Fig. 3) of between 4 and 12 mm and,
20 preferably, has a length of between 6 and 10 mm. However, in other embodiments the cavity 8 has a different length.

The cavity 8 of the smoking article component 3 contains a plurality of additive capsules 11 and a plurality of particles 12. In the present embodiment, the particles 12
25 are cellulose acetate (CA) particles 12. Thus, gas flowing through the body 7 passes through the cavity 8 and comes into contact with the additive capsules 11. The additive capsules 11 are configured to selectively entrain additive in the gas flow, as is described in more detail below.

30 A cross-sectional side view of one of the plurality of additive capsules 11 is shown in Fig. 4. Each additive capsule 11 comprises an outer shell 13 and an inner core 14.

The shell 13 of each additive capsule 11 may be solid at room temperature. The shell 13 may comprise, consist of, or essentially consist of, alginate. However, it should be
35 recognised that in alternative embodiments the shell 13 is formed from a different material. For example, the shell 13 may alternatively comprise, consist of, or essentially

consist of, gelatin, carageenans or pectins. The shell 13 may comprise, consist of, or essentially consist of, one or more of alginate, gelatin, carrageenans or pectins.

The inner core 14 of each additive capsule 11 comprises, consist of, or essentially
5 consists of, an additive, for example, a flavourant configured to impart a flavour to gas
flowing through the cavity 8 when the additive is exposed to the gas. However, it should
be recognised that in other embodiments, the additive may alternatively or additionally
comprise a different type of additive such as a humectant. In the present embodiment,
the inner core 14 is a liquid. However, in other embodiments (not shown) the inner core
10 14 may comprise a solid, for example, a powder.

The shell 13 of each additive capsule 11 may be impermeable, or substantially
impermeable, to the additive of the core 14. Therefore, the shell 13 initially prevents the
additive of the core 14 from escaping from the additive capsule 11 and being entrained
15 in gas flowing through the cavity 8. When the user desires to entrain the additive in the
gas, for example, to flavour the gas in embodiments wherein the additive is a
flavourant, the shells 13 of the additives capsules 11 are ruptured such that the additive
can be entrained in the gas.

20 In some embodiments (not shown), the additive capsule 11 further comprises a carrier
material. The carrier material may comprise, for example, gelatin.

The cellulose acetate particles 12 comprise cellulose acetate that has been hardened by
a plasticiser, for example, triacetin. The plasticiser helps to prevent the cellulose acetate
25 particles 12 from breaking down when the user applies a force to the smoking article
component 3 to break the additive capsules 11. Furthermore, the increased hardness of
the additive capsules 11 due to the plasticiser helps to promote breakage of the additive
capsules 11. It should be recognised that the cellulose acetate may alternatively or
additionally be hardened by a different plasticiser, for example, Diacetin, tri-ethyl
30 citrate or PEG.

The cellulose acetate particles 12 may comprise the plasticiser in the range of 15 to 40%
by weight of the cellulose acetate particle 12, and preferably in the range of 20 to 35%
by weight of the cellulose acetate particle 12. The cellulose acetate particles 12 may
35 comprise the plasticiser of at least 15% by weight of the cellulose acetate particle 12 and,
preferably, of at least 20%, by weight of the cellulose acetate particle 12. The cellulose

acetate particles 12 may comprise the plasticiser of less than 40% by weight of the cellulose acetate particle 12 and, preferably, less than 35%, by weight of the cellulose acetate particle 12.

5 In some embodiments, the cellulose acetate particles 12 may be manufactured from a material having a Rockwell hardness of at least 25 on the R-scale measured according to Procedure A of ASTM D785. Preferably, the particles 12 may be manufactured from a material having a Rockwell harness of greater than 30, greater than 40, greater than
10 50, greater than 60, greater than 70, greater than 80, greater than 90, or greater than 100 on the R-Scale. It has been found that a greater Rockwell hardness of the particles 12 prevents the particles 12 from breaking down when the user applies a force to the smoking article component 3 to break the additive capsules 11 and also helps to promote breakage of the additive capsules 11.

15 In one embodiment, the particles have an average surface area of less than 50 square metres per gram and, preferably, less than 30, 20, 10, 5 or 3 square metres per gram. The surface area may be measured according to ASTM D1993 – 18 (Standard Test Method for Precipitated Silica-Surface Area by Multipoint BET Nitrogen Adsorption, ASTM International, West Conshohocken, PA, 2018). Particle density may refer to the
20 density of the material of the particles including pores in the material, but excluding voids between particles (which would be the 'bulk density').

It has been found that the lower the surface area of the particles, the more robust the particles are, which may be due to the particles being less porous. The particles being
25 more robust helps to promote breakage of the additive capsules upon the application of the external force to the wall of the tobacco industry product component. The particles being more robust also helps to prevent breakage of the capsules during transit. In addition, it has been found that a lower surface area means that the particles adsorb less of the additive of the additive capsules upon rupture, meaning that more of the
30 additive can be delivered to the user.

The particles comprise a material having a particle density of at least 1 g/cc helps to make the particles more robust to encourage breakage of the additive capsules during use and to prevent breakage of the particles during transit. In some embodiments, the
35 particles comprise a material having a particle density of at least 1.1 g/cc or at least 1.2

g/cc, wherein increasing the particle density of the particles helps to increase the robustness of the particles.

5 In one embodiment, the particles comprise a material having a particle density of less than 5 g/cc and, preferably, less than 2 g/cc, or less than 1.5 g/cc. A lower particle density of the particles results in a lighter tobacco industry product component which is therefore easier to transport.

10 In some embodiments, the particle density of the particles is between 1 and 2 g/cc, or between 1.1 and 2 g/cc or between 1.1 and 1.5 g/cc.

In some embodiments, the particles are generally cylindrical in shape. The particles may be extruded from a rod of material and cut into individual generally cylindrical particles.

15 In some embodiments, the particles have a ball-pan hardness of greater than 95%, and, preferably, greater than 96%, 97%, 98%, or 99%. In some embodiments, the ball-pan hardness of the particles is greater than 99.5%, 99.6%, 99.7%, 99.8% or 99.9%. The ball-pan hardness of the particles can be measured using the ball-pan hardness test
20 described in ASTM D3802 – 16 (Standard Test Method for Ball-Pan Hardness of Activated Carbon, ASTM International, West Conshohocken, PA, 2016). This test is described for testing the hardness of activated carbon. However, it is also suitable for measuring the hardness of other particulate materials. It has been found that increasing the ball-pan hardness of the particles makes the particles more robust and
25 therefore more effective at promoting breakage of the additive capsules during use and also that the particles are less likely to break during transit.

The cellulose acetate particles 12 may comprise one or more surface formations configured to promote breakage of the additive capsules 11 when the user applies a
30 force to the smoking article component 3. For example, the surface formations may help to cut or pierce the shells 13 of the additive capsules 11 or grind the additive capsules 11. In the present embodiment, the cellulose acetate particles 12 each comprise one or more edges 15A and/or one or more corners 15B. The edges 15A and corners 15B may be formed by, for example, cutting or grinding portions of cellulose acetate to
35 shape the cellulose acetate particles 12. The edges 15A and corners 15B help to cut and rupture the shell 13 of the additive capsules 11. The edges 15A may be angular edges. In

an alternative embodiment (not shown), the cellulose acetate particles 12 do not comprise any edges 15A and/or corners 15B and, for example, may be spherical. In the present embodiment, the cellulose acetate particles 12 comprise cellulose acetate chips 12.

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The smoking article component 3 allows for the user to control the amount of additive that is introduced into the gas flow passing through the smoking article component 3. Initially, the shell 13 of each additive particle 11 is intact and therefore no additive from the core 14 is introduced into the gas flow. When the user desires to introduce additive, 10 he or she applies an external force to the smoking article component 3 to rupture the shells 13 of the additive capsules 11. In one example, the user holds the smoking article component 3 firmly and rolls the smoking article component 3 between his or her fingers. This causes the cellulose acetate particles 12 to rupture the shells 13 of the additive particles 11 such that the additive of the core 14 is released through the shells 15 13 and enters the gas flow. Advantageously, the more that the smoking article component 3 is rolled between the user's fingers, the greater the number of additive capsules 11 that are ruptured and thus the more additive that is released into the gas flow. Therefore, the user is able to control the amount of additive that is added to the gas flow by controlling the amount of time that the smoking article component 3 is 20 rolled between the fingers. Cellulose acetate is a readily available material that is already used in components manufactured by the tobacco industry, for example, as the filtration material of cigarette filters. Thus, the abrasive material of the smoking article component 3 comprising cellulose acetate particles 12 simplifies manufacture of the smoking article component 3.

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In some embodiments, the cellulose acetate particles 12 may be manufactured from a material having a melt flow in the range of 0.2 to 6 g/10 min according to ASTM D1238. In some embodiments, the cellulose acetate particles 12 may be manufactured from a material having a melt flow in the range of 0.25 to 5.5 g/10 min or in the range of 0.5 to 30 4 g/10 min. In some embodiments, the melt flow is less than 5.5 g/10 min.

In one exemplary embodiment, the cellulose acetate particles 12 comprise 28% triacetin and 72% cellulose acetate and the material has a melt flow of 414 mg/3 mins (1.38 g/10 min). In another exemplary embodiment, the cellulose acetate particles 12 comprise 35 25% triacetin and 75% cellulose acetate and the material has a melt flow of 266 mg/3 min (0.89 g/10 min).

The tipping paper 4 comprises one or more indicators 19 that provide a visual indication to the user of where the external force should be applied to the smoking article component 3 to release the additive. For example, the indicators 19 may indicate where the smoking article component 3 should be held and rolled between the fingers to release the additive. The indicators 19 may, for example, be printed onto the tipping paper 4 or may comprise a label that is adhered to the tipping paper 4. The indicators 19 may overlie the cavity 8.

10 The smoking article component 3 further comprises a plug wrap 16 that circumscribes the cavity 8 and at least a portion of the first and/or second plugs 9, 10. In the present embodiment, the plug wrap 16 circumscribes the entire length of both of the first and second plugs 9, 10.

15 The portion of the plug wrap 16 and tipping paper 4 that overlies the cavity 8 form a wall of the smoking article component 3. The wall circumscribes the cavity 8. The wall retains the additive capsules 11 and cellulose acetate particles 12 within the cavity 8. The wall is deformable such that, in use, the user applies an external force to deform the wall radially inwardly to break the additive capsules 11. In the example described above, the user grips the wall and rolls the smoking article component 3 between the fingers such that the cellulose acetate particles 12 rupture the shells 13 of the additive capsules 11 to release the additive therefrom. In embodiments wherein the plug wrap 16 is omitted, the wall may comprise the tipping paper 4. In embodiments wherein the tipping paper 4 is omitted, the wall may comprise the plug wrap 16. In some
25 embodiments, the wall comprises a further sheet of material (not shown) in addition to the tipping paper 4 and/or plug wrap 16.

The plug wrap 16 comprises a paper layer 17 and a sealing layer 18. The sealing layer 18 is impermeable, or substantially impermeable, to the additive of the additive capsules 11. Therefore, when the additive capsules 11 are broken to entrain additive in the gas flow, the sealing layer 18 prevents the additive from seeping through the plug wrap 16. This is advantageous because the smoking article 1 is usually held between the user's fingers in the region of the smoking article component 3 and thus the sealing layer 18 helps to prevent the additive from coming into contact with the user's fingers.

In the present embodiment, the sealing layer 18 is in the form of a coating 18 provided on the paper layer 17. For example, the coating 18 may comprise Ethyl cellulose. In an alternative embodiment (not shown), the sealing layer 18 comprises a layer of material, for example, plastic sheet or foil, that is bonded to the paper layer 17 by an adhesive. In
5 some embodiments, the sealing layer 18 is an oil repellent.

In one embodiment, the sealing layer 18 is provided on the inner surface of the paper layer 17 such that the paper layer 17 is disposed between the sealing layer 18 and the tipping paper 4. Alternatively, the sealing layer 18 may be provided on the outer surface of the paper layer 17 such that the sealing layer 18 is disposed between the paper layer
10 17 and the tipping paper 4.

In one embodiment, the sealing layer 18 is provided over the entire inner and/or outer surface of the paper layer 17. However, in an alternative embodiment, the sealing layer 18 is only provided over a portion of the inner and/or outer surface of the paper layer
15 17, for instance, only over the portion of the paper layer 17 that circumscribes the cavity 8.

When the smoking article component 3 is rolled between the user's fingers the wall deforms radially inwardly such that the additive capsules 11 and cellulose acetate
20 particles 12 are ground together. The plug wrap 16 is configured to provide structural support to the smoking article component 3 to help maintain the structural integrity of the smoking article component 3 during rolling of the smoking article component 3 to release the additive. In some embodiments, the plug wrap 16 has a basis weight of at least 60 gsm, and preferably of at least 80 gsm. This basis weight provides the plug
25 wrap 16 with increased rigidity in order to help maintain the structural integrity of the smoking article component 3 during rolling of the smoking article component 3. In some embodiments the basis weight of the plug wrap 16 is in the range of 60 to 110 gsm and, preferably, is in the range of 80 to 110 gsm. The basis weight of the plug wrap 16 may be in the range of 60 to 100 gsm, or in the range of 80 to 100 gsm.

In one embodiment, the rigidity of the plug wrap 16 is achieved by manufacturing the paper layer 17 from paper having a thickness of at least 35 micrometres, and preferably, at least 50, 60, 70, 80, 90 or 100 micrometres. In some embodiments, the paper layer 17 has a thickness in the range of 35 to 137 micrometres. The rigidity of the plug wrap 16 helps the wall to return to its original shape once the user has finished rolling the
30 smoking article component 3 to release the additive.
35

In some embodiments, the additive capsules 11 have a diameter of at least 0.6 mm. In some embodiments, the additive capsules 11 have a diameter of at least 0.8 mm, and preferably a diameter of about 1 mm.

- 5 In some embodiments, the additive capsules 11 have a diameter of less than 1.4 mm. Preferably, the additive capsules 11 have a diameter of less than 1.2 mm, and preferably a diameter of about 1 mm.

10 It has been found that smaller diameter additive capsules 11 result in a smaller amount of additive being introduced into the gas flow when each additive capsule 11 is ruptured, thereby allowing the user to more accurately control the amount of additive that is added to the gas flow based on the length of time that the smoking article component 3 is rolled between the fingers.

- 15 In some embodiments, the additive capsules 11 have a diameter in the range of 0.6 mm to 1.4 mm, and preferably, in the range of 0.8 to 1.2 mm.

In some embodiments, the additive capsules 11 have a particle size of at least 0.6 mm. The term 'particle size' refers to particle size when measured by sieving. Preferably, the
20 additive capsules 11 have a particle size of at least 0.8 mm. In some embodiments, the additive capsules have a particle size of less than 1.4 mm, and, preferably, a particle size of less than 1.2 mm. In one embodiment, the additive capsules 11 have a particle size in the range of between 0.6 mm to 1.4 mm, and preferably, in the range of 0.8 to 1.2 mm. Preferably, the additive capsules 11 have a particle size of about 1 mm.

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In some embodiments, the cellulose acetate particles 12 have a particle size of at least 1 mm and, preferably, at least 1.4 mm. The term 'particle size' refers to particle size when measured by sieving. Cellulose acetate particles 12 that have a particle size of at least 1 mm, and preferably 1.4 mm, have been found to be particularly effective at promoting
30 rupturing of the additive capsules 11. In some embodiments, the cellulose acetate particles 12 have a particle size of less than 2.4 mm and, preferably, less than 2 mm. Cellulose acetate particles 12 that have a particle size less than 2.4 mm, and preferably less than 2 mm, have been found to be particularly effective at promoting rupturing of the additive capsules 11.

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In some embodiments, the cellulose acetate particles 12 have a particle size in the range of 1 to 2.4 mm and, preferably, a particle size in the range of 1.4 to 2 mm. In one such embodiment, the additive capsules 11 have a diameter/particle size in the range of 0.6 mm to 1.4 mm, and preferably, in the range of 0.8 to 1.2 mm. This combination of size
5 of additive capsules 11 and size of cellulose acetate particles 12 has been found to advantageously increase the effectiveness of the cellulose acetate particles 12 at rupturing the additive capsules 11. In one such embodiment, the smoking article component 3 comprises between 20 to 100 and, preferably, between 40 to 80 cellulose acetate particles 12, or 50 to 70 cellulose acetate particles 12

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The smoking article component 3 may comprise a void 20 at the mouth end of the smoking article component 3. In the embodiment shown in Figs. 1 to 6, the smoking article component 3 is a tube filter 3, wherein an annular portion 21 is provided at the mouth end of the smoking article component 3 such that the void 20 is provided in the
15 hollow centre of the annular portion 21. The annular portion 21 may comprise filtration material, for example, cellulose acetate.

The annular portion 21 is provided downstream of the first plug 9 and is attached thereto by the tipping paper 4 and/or plug wrap 16. In another embodiment, the first
20 plug 9 comprises the annular portion such that the void 20 is provided in the first plug 9. In yet another embodiment (not shown), the smoking article component 3 is a cavity filter 3. The tipping paper 4, plug wrap 16, or a further wrap (not shown) may extend past the mouth end of the first plug 9 of filter material to form a space that comprises the void 20, the annular portion 21 being omitted.

25

In one embodiment, the first and second plugs 9, 10 each comprise a portion of filtration material, for example, cellulose acetate or activated carbon, and each portion is wrapped in its own plug wrap (not shown). The first and second plugs 9, 10 are then wrapped in the plug wrap 16 which also circumscribes the cavity 8. However, in
30 alternative embodiments (not shown), the individual plug wraps of the first and/or second plugs 9, 10 are omitted. In some embodiments (not shown) the plug wrap 16 does not circumscribe the first and/or second plug 9, 10 and, optionally, only circumscribes the cavity 8.

In some alternative embodiments (not shown), the first and/or second plugs 9, 10 are omitted. For instance, the second plug 10 may be omitted such that the cavity 8 is located between the first plug 9 and the tobacco rod 2.

5 In the above described embodiment each additive capsule 11 comprises an outer shell 13 and an inner core 14. However, in alternative embodiments (not shown), the outer shell 13 is omitted. In one embodiment (not shown), each additive capsule 11 comprises a body of material that comprises the additive, wherein no shell surrounds the body. In one embodiment (not shown), each additive capsule 11 comprises a solid material that
10 breaks down, for example, forming a powder, when an external force is applied to the smoking article component 3 to allow the additive to be entrained in gas flowing through the cavity 8. The cellulose acetate particles 12 help to break the additive capsules 11 to form the powder.

15 In some embodiments, the smoking article component 3 comprises between 20 to 100 additive capsules 11. It has been found that this number of additive capsules 11 helps to maximise the proportion of additive capsules 11 that are ruptured when the user applies the force to the smoking article component 3 and thus maximises the amount of additive that is released into the smoke flow. Preferably, the number of additive
20 capsules 11 is between 40 to 80, which has been found to further increase the proportion of additive capsules 11 that are ruptured. In one embodiment, the smoking article component 3 comprises between 50 to 70 additive capsules and may comprise about 60 additive capsules 11. However, it should be recognised that in other embodiments the smoking article component 3 may comprise greater or fewer additive
25 capsules 11. In some embodiments, the smoking article component 3 comprises between 20 to 100 and, preferably, between 40 to 80, or 50 to 70, cellulose acetate particles 12. In some embodiments, the smoking article component 3 comprises between 60 to 140 mg of cellulose acetate particles 12 and, preferably, between 80 to 120 mg of cellulose acetate particles 12. In one embodiment, the smoking article
30 component 3 comprises substantially 100 mg of cellulose acetate particles 12.

A schematic block diagram of a method of manufacturing a smoking article component 3 according to an embodiment is shown in Fig. 7.

The method comprises the steps of providing (step S1) a plurality of cellulose acetate particles 12; providing (step S2) a plurality of additive capsules 11; and, locating (step S3) the cellulose acetate particles 12 and additive capsules 11 in a cavity 8.

5 The method may further comprise providing first and second plugs 9, 10 that are spaced apart such that the cavity 8 is formed therebetween. The first and second plugs 9, 10 may be provided on a plug wrap 16. The step (S1) of providing the cellulose acetate particles 12 in the cavity 8 may comprise locating the cellulose acetate particles 12 on the plug wrap 16 between the plugs 9, 10. The step (S2) of providing the additive
10 capsules 11 in the cavity 8 may comprise locating the additive capsules 11 on the plug wrap 16 between the plugs 9, 10. The additive capsules 11 and cellulose acetate particles 12 may be provided in the cavity 8 in either order, or simultaneously. In one embodiment, the cellulose acetate chips 12 and additive capsules 11 are mixed together and then poured onto the plug wrap 16 between the plugs 9, 10.

15 The method may further comprise enclosing the cavity 8 to retain the cellulose acetate particles 12 and additive capsules 11 within the cavity 8. The step of enclosing the cavity 8 to retain the cellulose acetate chips 12 and additive capsules 11 within the cavity 8 may comprise wrapping the plug wrap 16 about the plugs 9, 10 such that the plug wrap
20 16 circumscribes the cavity 8. The smoking article component 3 may then be attached to a tobacco rod 2 by a tipping paper 4 to form a smoking article 1.

In an alternative embodiment, the plug wrap 16 is wrapped about one of the first and second plugs 9, 10 such that the plug wrap 16 overhangs said one of the first and second
25 plugs 9, 10 to form the cavity 8. The cellulose acetate chips 12 and additive capsules 11 are then poured into the cavity 8, and then the other one of the first and second plugs 9, 10 is inserted into the plug wrap 16 such that the said other one of the first and second plugs 9, 10 is circumscribed by the plug wrap 16 and encloses the cavity 8.

30 In some embodiments, the cellulose acetate particles 12 are formed from extruding plasticised cellulose acetate and then cutting or grinding the extruded plasticised cellulose acetate to form the cellulose acetate particles 12. However, it should be recognised that in alternative embodiments the cellulose acetate particles 12 are formed by a different process, for example, by moulding. In one embodiment, a portion of
35 plasticised cellulose acetate is manufactured that is larger than the cellulose acetate

particles 12 that are to be produced and the cellulose acetate particles 12 are formed by cutting chips from the portion of plasticised cellulose acetate.

The additive may comprise a flavourant. As used herein, the terms “flavour” and
5 “flavourant” refer to materials which, where local regulations permit, may be used to create a desired taste or aroma in a product for adult consumers. They may include extracts (e.g., licorice, hydrangea, Japanese white bark magnolia leaf, chamomile, fenugreek, clove, menthol, Japanese mint, aniseed, cinnamon, herb, wintergreen, cherry, berry, peach, apple, Drambuie, bourbon, scotch, whiskey, spearmint,
10 peppermint, lavender, cardamon, celery, cascarilla, nutmeg, sandalwood, bergamot, geranium, honey essence, rose oil, vanilla, lemon oil, orange oil, cassia, caraway, cognac, jasmine, ylang-ylang, sage, fennel, piment, ginger, anise, coriander, coffee, or a mint oil from any species of the genus *Mentha*), flavour enhancers, bitterness receptor site blockers, sensorial receptor site activators or stimulators, sugars and/or sugar
15 substitutes (e.g., sucralose, acesulfame potassium, aspartame, saccharine, cyclamates, lactose, sucrose, glucose, fructose, sorbitol, or mannitol), and other additives such as charcoal, chlorophyll, minerals, botanicals, or breath freshening agents. They may be imitation, synthetic or natural ingredients or blends thereof. They may be in any suitable form, for example, oil, liquid, or powder.

20

In some embodiments, the particles are abrasive particles.

In the above described embodiments the particles comprise cellulose acetate. However, it should be recognised that in alternative embodiments the particles may comprise a
25 different material, for example, polyethylene (PE), polyvinyl chloride (PVC), polypropylene (PP), Polycarbonate (PC) or acrylic (PMMA).

In the present embodiment, the smoking article component 3 is in the form of a smoking article filter 3. However, it should be recognised that in alternative
30 embodiments (not shown) the smoking article component 3 is of a different configuration. For example, the smoking article component 3 could comprise part of an aerosol generation device such as an e-cigarette, which may not comprise a filter.

As used herein, the term “smoking article” includes smokeable products such as
35 cigarettes, cigars and cigarillos whether based on tobacco, tobacco derivatives, expanded tobacco, reconstituted tobacco or tobacco substitutes and also heat-not-burn

products, tobacco heating devices, and other nicotine delivery product such as aerosol generation devices including e-cigarettes. The smoking article may be provided with a filter for the gaseous flow drawn by the smoker.

5 In order to address various issues and advance the art, the entirety of this disclosure shows by way of illustration various embodiments in which the claimed invention(s) may be practiced and provide for a superior composite web and method of manufacturing a smoking article element component. The advantages and features of the disclosure are of a representative sample of embodiments only, and are not
10 exhaustive and/or exclusive. They are presented only to assist in understanding and teach the claimed features. It is to be understood that advantages, embodiments, examples, functions, features, structures, and/or other aspects of the disclosure are not to be considered limitations on the disclosure as defined by the claims or limitations on equivalents to the claims, and that other embodiments may be utilised and
15 modifications may be made without departing from the scope and/or spirit of the disclosure. Various embodiments may suitably comprise, consist of, or consist essentially of, various combinations of the disclosed elements, components, features, parts, steps, means, etc. In addition, the disclosure includes other inventions not presently claimed, but which may be claimed in future.

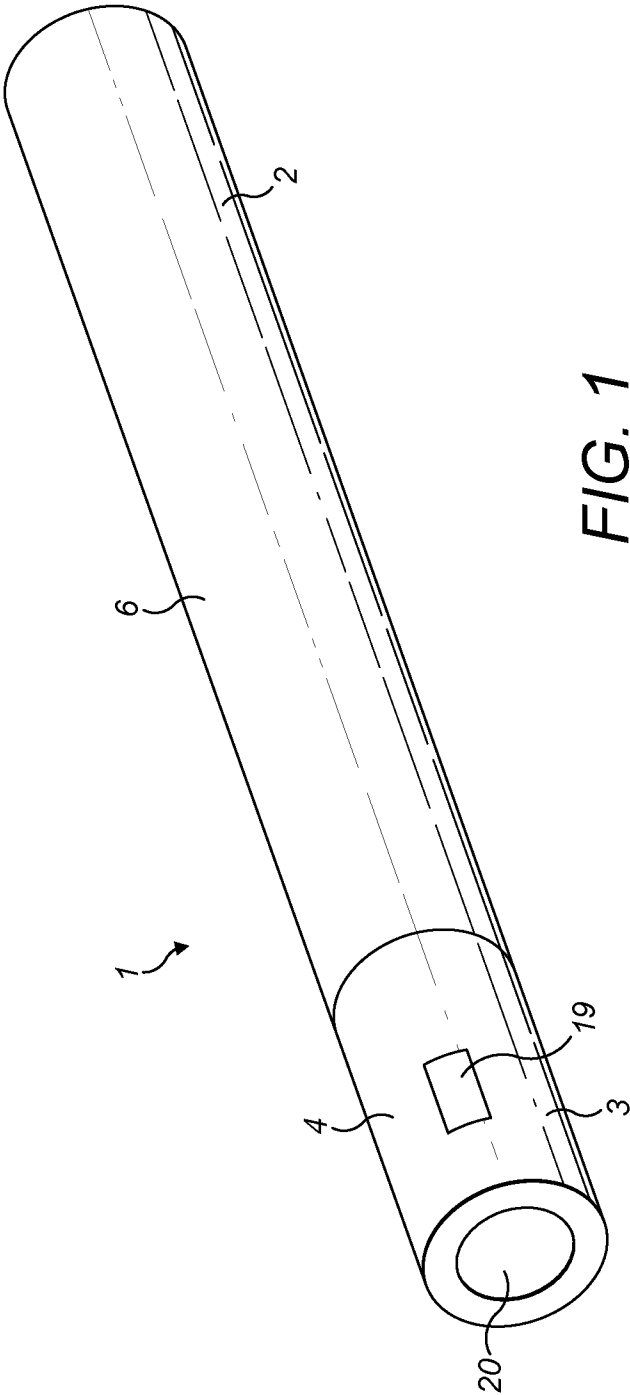
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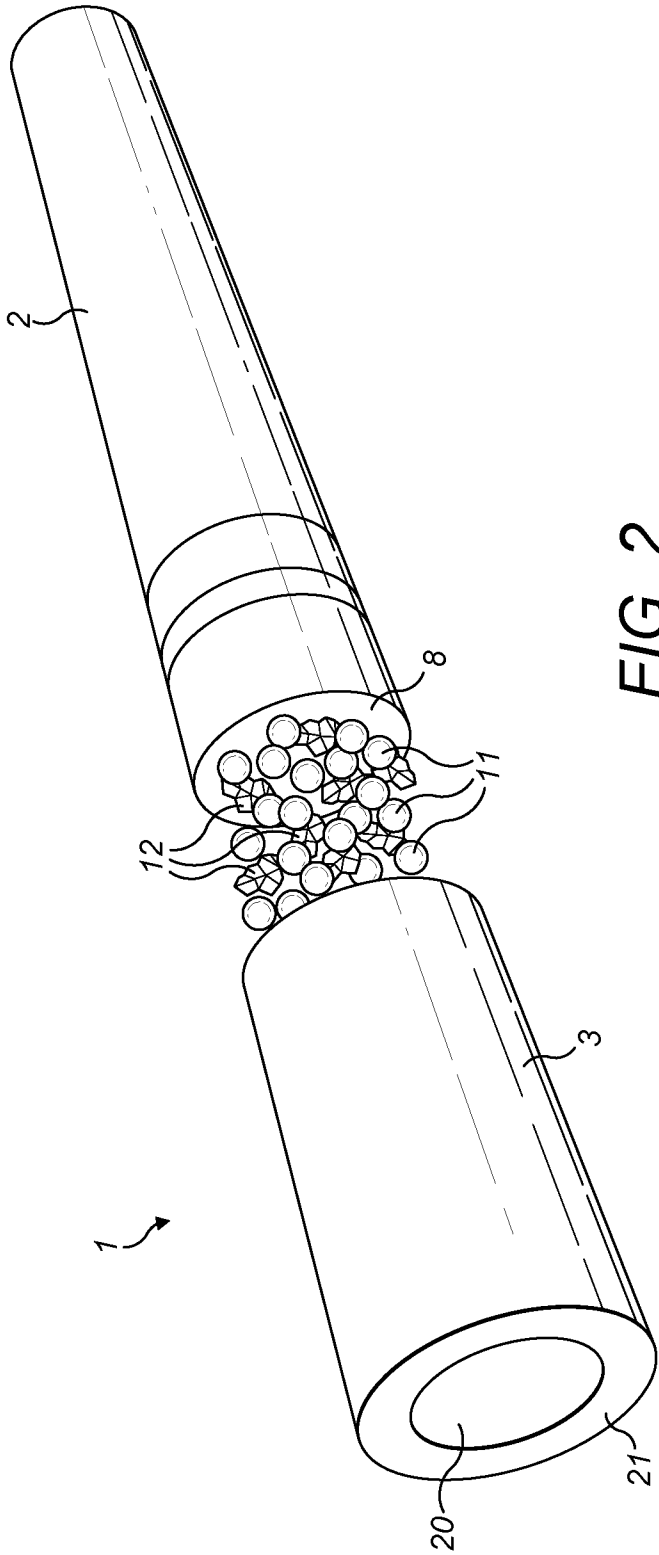
Claims

1. A tobacco industry product component comprising:
a wall circumscribing a cavity;
5 a plurality of additive capsules disposed in the cavity; and,
a plurality of particles disposed in the cavity and configured such that, in use,
the particles promote breaking of the additive capsules upon the application of an
external force to the wall of the tobacco industry product component by a user, wherein
the particles comprise a material having a particle density of at least 1 g/cc.
10
2. A tobacco industry product component according to claim 1, wherein the
particles comprise a plasticiser.
3. A tobacco industry product component according to claim 1 or claim 2, wherein
15 the particles comprise a polymeric material and, preferably, plastic.
4. A tobacco industry product component according to claim 3, wherein the
particles comprise cellulose acetate.
- 20 5. A tobacco industry product component according to claim 4 wherein the
particles comprise cellulose acetate chips.
6. A tobacco industry product component according to any one of claims 1 to 5,
wherein the particles comprise one or more surface formations configured to promote
25 breaking of the additive capsules.
7. A tobacco industry product component according to any one of claims 1 to 6,
wherein the particles have an average surface area of less than 50 square metres per
gram and, preferably, less than 30, 20, 10, 5 or 3 square metres per gram.
30
8. A tobacco industry product component according to any one of claims 1 to 7,
wherein the particles are formed from a material having a Rockwell hardness of at least
25 on the R-Scale and, preferably, at least 30, at least 40, at least 50, at least 60, at least
70, at least 80, at least 90, or at least 100 on the R-Scale.
35

9. A tobacco industry product component according to any one of claims 1 to 8, wherein the particles have a ball-pan hardness of greater than 95% and, preferably, greater than 96%, 97%, 98% or 99%.
- 5 10. A tobacco industry product component according to any one of claims 1 to 9, wherein the additive capsules have a diameter of between 0.6 and 1.4 mm and, preferably, a diameter of about 1 mm.
11. A tobacco industry product component according to any one of claims 1 to 10,
10 wherein the particles have a particle size of between 1 and 2.4 mm and, preferably, a particle size of between 1.4 and 2 mm.
12. A tobacco industry product component according to any one of claims 1 to 11,
15 comprising between 20 and 100 additive capsules and, preferably, between 40 and 80 additive capsules.
13. A tobacco industry product according to any one of claims 1 to 12, wherein the
20 additive capsules have an average burst strength of between 3 N and 5 N and, preferably, between 3.5 N and 4.5N.
14. A tobacco industry product component according to any one of claims 1 to 13,
wherein the cavity has a length of between 4 and 12 mm and, preferably, has a length of
between 6 and 10 mm.
- 25 15. A tobacco industry product component according to any one of claims 1 to 14,
comprising a body of filtration material that comprises the cavity and, preferably,
wherein the body comprises first and second sections of filtration material and the
cavity is disposed between the first and second sections.
- 30 16. A tobacco industry product component according to any one of claims 1 to 15,
further comprising a plug wrap that circumscribes the cavity.
17. A tobacco industry product component according to claim 16, wherein the plug
wrap comprises an impermeable coating.

18. A tobacco industry product component according to claim 16 or claim 17,
wherein the plug wrap has a basis weight of at least 60 gsm.
19. A tobacco industry product component according to any one of claims 16 to 18,
5 wherein the plug wrap has a thickness of at least 35 micrometres.
20. A tobacco industry product component according to any one of claims 1 to 19,
further comprising an outer surface comprising an indicator configured to indicate to
the user where the external force should be applied to the tobacco industry product
10 component.
21. A tobacco industry product comprising a tobacco industry product component
according to any one of claims 1 to 20.
- 15 22. A method of manufacturing a tobacco industry product component comprising:
providing a plurality of particles comprising a material having a particle density
of at least 1 g/cc;
providing a plurality of additive capsules; and,
locating the particles and additive capsules in a cavity.
20
23. A method according to claim 22, wherein the particles have a particle size of
between 1 to 2.4 mm and, preferably a particle size of between 1.4 to 2 mm.
24. A method according to claim 22 or claim 23, wherein the particles comprise
25 cellulose acetate.
25. A method according to any one of claims 22 to claim 24, wherein the particles
comprise a plasticiser.





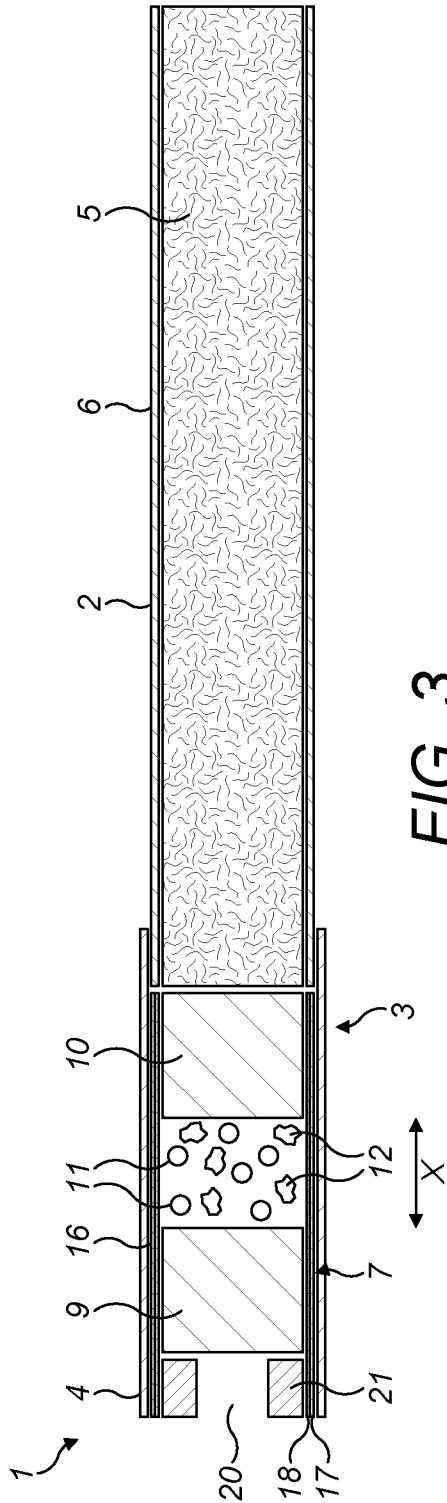


FIG. 3

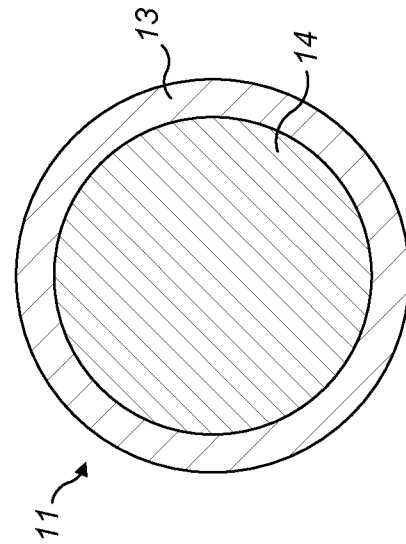


FIG. 4

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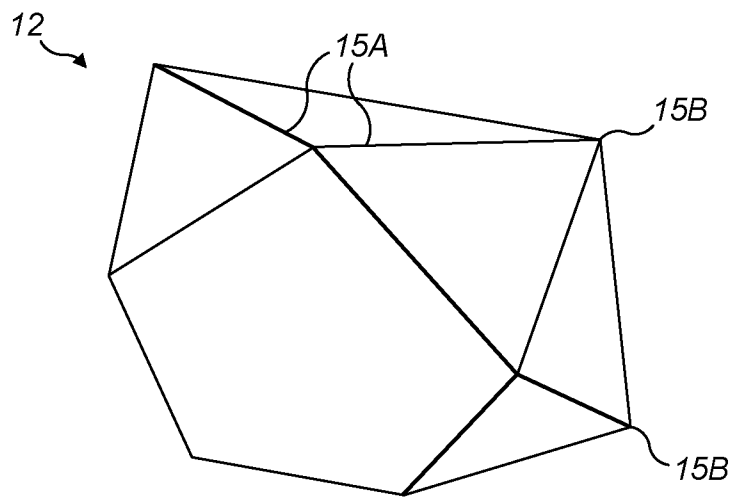


FIG. 5

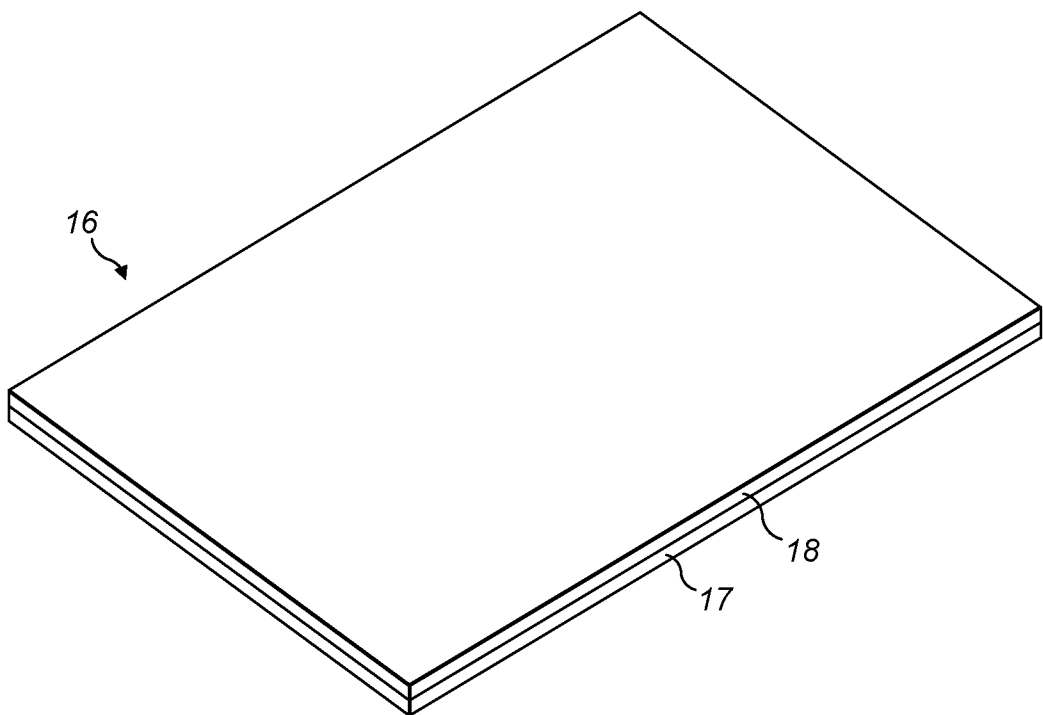


FIG. 6

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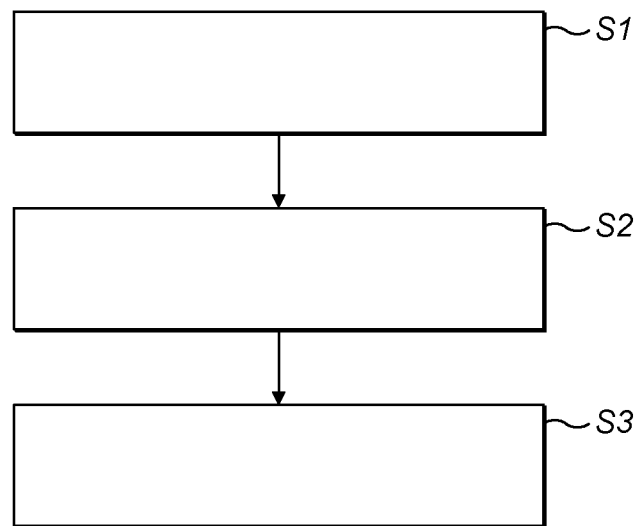


FIG. 7

INTERNATIONAL SEARCH REPORT

International application No
PCT/GB2019/051145

A. CLASSIFICATION OF SUBJECT MATTER INV. A24D3/06 A24D1/02 A24D3/02 A24D3/04 A24D3/10 A24D3/14 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 A24F 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.
X	US 2011/271968 A1 (CARPENTER CAROLYN RIERSON [US] ET AL) 10 November 2011 (2011-11-10) paragraphs [0011], [0013], [0045], [0050], [0059] - [0063]; claims 1,20; figure 2; example 1 -----	1-25
A	WO 2008/084333 A2 (PHILIP MORRIS PROD [CH]) 17 July 2008 (2008-07-17) page 5, line 4 - line 9; figure 3 -----	1-24
☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.		
* Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "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) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "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 "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 "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 "&" document member of the same patent family		
Date of the actual completion of the international search	Date of mailing of the international search report	
1 July 2019	16/07/2019	
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 Villányi Kelemen, K	

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/GB2019/051145

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2011271968	A1	10-11-2011	CN 102933105 A 13-02-2013
			EP 2566357 A1 13-03-2013
			ES 2540881 T3 14-07-2015
			JP 2013526266 A 24-06-2013
			US 2011271968 A1 10-11-2011
			WO 2011140430 A1 10-11-2011

WO 2008084333	A2	17-07-2008	AT 515953 T 15-07-2011
			AU 2007343080 A1 17-07-2008
			BR PI0720983 A2 18-03-2014
			CN 101553140 A 07-10-2009
			CO 6210782 A2 20-10-2010
			DK 2120616 T3 05-09-2011
			EA 200970658 A1 26-02-2010
			EP 2120616 A2 25-11-2009
			ES 2366754 T3 25-10-2011
			JP 5348648 B2 20-11-2013
			JP 2010514437 A 06-05-2010
			KR 20090102790 A 30-09-2009
			MY 145922 A 15-05-2012
			NZ 576771 A 29-06-2012
			PT 2120616 E 01-09-2011
			RS 51953 B 29-02-2012
			SI 2120616 T1 30-09-2011
			UA 96976 C2 26-12-2011
			US 2008163877 A1 10-07-2008
			WO 2008084333 A2 17-07-2008
