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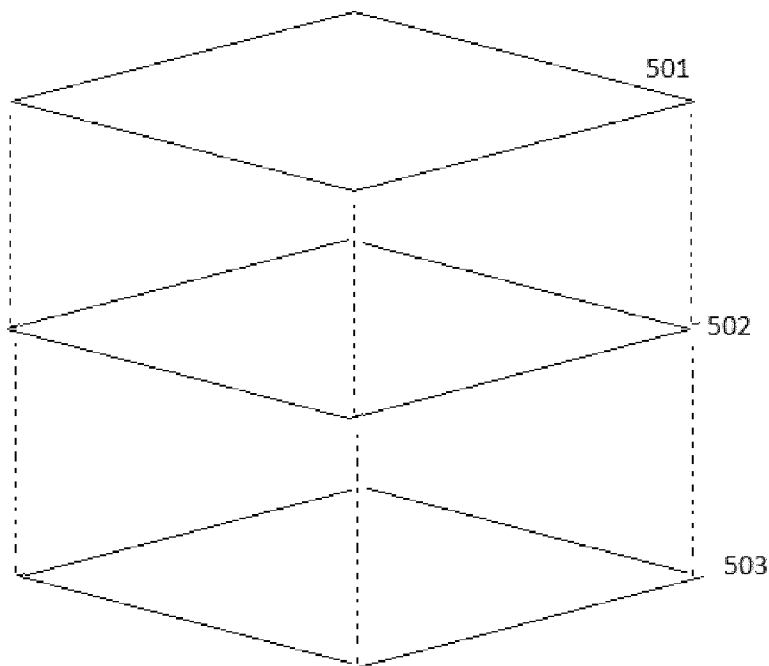


Figure 5

(57) **Abrégé/Abstract:**

There is described an aerosol generating article, the aerosol generating article comprising an aerosol generating material and a laminate wrapper arranged around the aerosol generating material, the laminate wrapper comprising at least three layers; wherein the outermost layer of the laminate wrapper comprises a lacquer, an intermediate layer comprises a non-combustible material, and the innermost layer comprises paper; and wherein at least part of the innermost layer is disposed in contact with the aerosol generating material. The aerosol generating article may serve to prevent a user lighting or igniting the aerosol generating material in the aerosol generating article.



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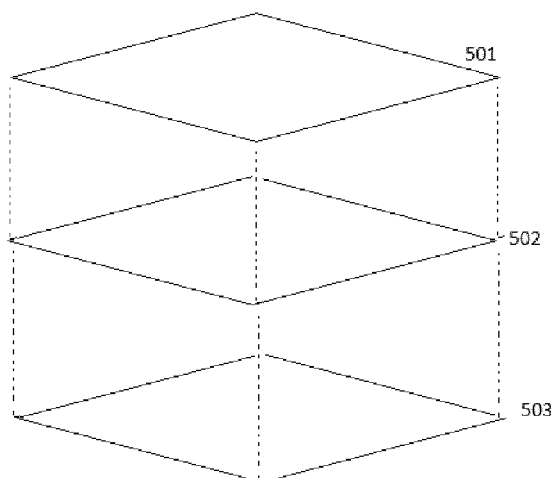


Figure 5

(57) **Abstract:** There is described an aerosol generating article, the aerosol generating article comprising an aerosol generating material and a laminate wrapper arranged around the aerosol generating material, the laminate wrapper comprising at least three layers; wherein the outermost layer of the laminate wrapper comprises a lacquer, an intermediate layer comprises a non-combustible material, and the innermost layer comprises paper; and wherein at least part of the innermost layer is disposed in contact with the aerosol generating material. The aerosol generating article may serve to prevent a user lighting or igniting the aerosol generating material in the aerosol generating article.

WO 2020/173576 A1

## SMOKING ARTICLE

### Technical Field

5 The present invention relates to smoking articles and specifically, although not exclusively, to a wrapper for an aerosol generating material, an aerosol generating article comprising a wrapped aerosol generating material, and an aerosol generating assembly containing an aerosol generating article, the aerosol generating article comprising a wrapped aerosol generating material.

### 10 Background

Smoking articles such as cigarettes, cigars and the like burn tobacco during use to create tobacco smoke. Alternatives to these types of articles, release compounds by heating without burning an aerosol generating material.

15 Apparatus is known that heats aerosol generating material to volatilise at least one component of the aerosol generating material, typically to form an aerosol which can be inhaled, without burning or combusting the aerosol generating material. Such apparatus is sometimes described as a “heat-not-burn” apparatus or a “tobacco heating product” (THP) or a “tobacco heating device” or similar. Various different  
20 arrangements for volatilising at least one component of the aerosol generating material are known.

The material may be for example tobacco, other non-tobacco products or a combination, such as a blended mix, which may or may not contain nicotine.

25

### Summary

The invention provides a wrapper for wrapping an aerosol generating material, wherein the wrapper is a laminate structure comprising at least three layers, and wherein; (a) one of the peripheral layers comprises a lacquer; (b) an intermediate layer  
30 comprises a non-combustible material; and (c) the peripheral layer comprises paper.

The invention also provides an aerosol generating article, the aerosol generating article, the aerosol generating article comprising an aerosol generating material and a laminate wrapper arranged around the aerosol generating material, the laminate wrapper comprising at least three layers;

5            wherein the outermost layer of the laminate wrapper comprises a lacquer, an intermediate layer comprises a non-combustible material, and the innermost layer comprises paper;

            and wherein at least part of the innermost layer is disposed in contact with the aerosol generating material.

10

            In some cases, the lacquer of the outermost layer has a dynamic coefficient of friction greater than or equal to about 0.4. In some cases, the lacquer of the outermost layer has a static coefficient of friction greater than or equal to about 0.4. In some cases, the lacquer of the outermost layer has a dynamic coefficient of friction less than or equal  
15            to about 1.0. In some cases, the lacquer of the outermost layer has a static coefficient of friction less than or equal to about 1.1. In some cases, the lacquer of the outermost layer has a dynamic coefficient of friction of from 0.4 to 1.0. In some cases, the lacquer of the outermost layer has a static coefficient of friction of from 0.4 to 1.1. The coefficient of friction is measured in all cases according to DIN EN ISO 8295.

20

The invention also provides an aerosol generating assembly, the assembly comprising a heater and an aerosol generating article, the aerosol generating article comprising an aerosol generating material and a laminate wrapper arranged around the aerosol generating material, the laminate wrapper comprising at least three layers;

25            wherein the outermost layer of the laminate wrapper comprises a lacquer, an intermediate layer comprises a non-combustible material, and the innermost layer comprises paper;

            and wherein at least part of the innermost layer is disposed in contact with the aerosol generating material.

30

            In some cases, the aerosol generating assembly may be a tobacco heating product (also known as a heat not burn device).

The invention also provides a system comprising an aerosol generating device and an aerosol generating article, the aerosol generating article comprising an aerosol generating material and a laminate wrapper arranged around the aerosol generating material, the laminate wrapper comprising at least three layers;

5           wherein the outermost layer of the laminate wrapper comprises a lacquer, an intermediate layer comprises a non-combustible material, and the innermost layer comprises paper;

          and wherein at least part of the innermost layer is disposed in contact with the aerosol generating material.

10

The invention also provides a process for making an aerosol generating article comprising wrapping an aerosol generating material in a laminate wrapper, the laminate wrapper comprising at least three layers;

          wherein the outermost layer of the laminate wrapper comprises a lacquer, an  
15       intermediate layer comprises a non-combustible material, and the innermost layer comprises paper;

          and wherein at least part of the innermost layer is disposed in contact with the aerosol generating material.

20           The invention also provides a method of preventing a user lighting or igniting an aerosol generating material in aerosol generating article, the method comprising wrapping an aerosol generating material in a laminate wrapper, the laminate wrapper comprising at least three layers;

          wherein the outermost layer of the laminate wrapper comprises a lacquer, an  
25       intermediate layer comprises a non-combustible material, and the innermost layer comprises paper;

          and wherein at least part of the innermost layer is disposed in contact with the aerosol generating material.

30           To the extent that they are compatible, features of the invention described in the context of one aspect are explicitly disclosed in combination with each other aspect.

### Figures

Further features and advantages of the invention will become apparent from the following figures description of examples of the invention, given by way of example only and do not place any limitation on the scope of the claims.

5

Figure 1 is a schematic diagram of a side view of an aerosol generating article according to an example of the invention.

Figure 2 is a schematic diagram of a first end view of an aerosol generating article according to an example of the invention.

10

Figure 3 is a schematic diagram of a first end view of a different aerosol generating article according to an example of the invention.

Figure 4 is a schematic diagram of a side view of an aerosol generating article according to an example of the invention.

15

Figure 5 is an exploded schematic diagram of a wrapper according to an example of the invention.

### Detailed Description

As used herein, the term “lacquer” refers to a coating, formed from polymers dissolved in volatile organic compounds, where the solvent is removed by evaporation, effecting curing of the polymers to produce a hard, durable finish.

20

The lacquer may be an acrylic lacquer. In some examples, the lacquer may be a styrene acrylic copolymer dispersion.

25

As used herein, the term “laminate” refers to a multi-layer structure in which the layers are fastened together to form a single body. The layers may be fastened with an adhesive, for example. In other examples, the layers may be fastened by static interaction. In other examples, the laminate structure might be formed by (partially) melting a first layer, contacting the first layer with a second layer and allowing the first layer to solidify. Any suitable mechanism for fastening the layers together including, but not limited to, the above examples, tying, sewing, screwing, nailing, bolting, hooking etc. may be employed to form the laminate structure.

30

In some cases, an adhesive may coat the surface of each layer. In other cases, an adhesive may be applied only to the periphery of the layers. In some cases, each layer in the laminate structure may be fastened to the adjacent layer(s). In some  
5 example laminate structures, the periphery of two layers may be fastened together with intermediate layers trapped in-between.

The peripheral layers may be referred to herein as the “innermost” and “outermost” layers. This refers to their location when the material is wrapped around  
10 an aerosol generating material.

In some examples, the wrapper comprises more than three layers. In some cases, the wrapper consists of three layers. In some cases, the wrapper may consist of a three layer laminate structure comprising the peripheral layers and the intermediate  
15 layer.

Figure 5 is a schematic illustration of a laminate wrapper according to the invention. The laminate structure (indicated by dotted lines) includes the peripheral layers 501,503 and the intermediate layer 502.  
20

In some cases, the non-combustible material comprises a metal foil. In some cases, it may consist essentially of or consist of a metal foil. Suitably, the metal foil may comprise, essentially consist of or consist of an aluminium foil. The metal foil is a non-combustible material that can nevertheless act to conduct heat to the aerosol  
25 generating material in use.

In some cases, the metal foil may be less than about 100  $\mu\text{m}$ , 50  $\mu\text{m}$ , 20  $\mu\text{m}$ , 10  $\mu\text{m}$  or 8  $\mu\text{m}$  thick. In some cases, it may be more than about 1  $\mu\text{m}$ , 3  $\mu\text{m}$  or 5  $\mu\text{m}$  thick.  
30

In some cases, the paper layer in the wrapper is a tobacco wrapping paper.

A consideration when preparing aerosol generating articles such as tobacco heating products is that they should not produce an acceptable smoking experience if combusted, so that the user is not minded to burn the aerosol generating article. This is because the formulation of the aerosol generating material is not configured for combustion (and the aerosol that results from combustion may be less suitable for inhalation than the aerosol that results from heating but not burning that aerosol generating material, or than the aerosol which results from combustion of traditional cigarettes).

The use of a non-combustible layer in the wrapper prevents the aerosol generating article from being burned and smoked as a conventional combustible cigarette.

Additionally, the inventors have found that the outer surface temperature of laminate wrappers described herein which have an intermediate layer comprising foil cool faster than comparative wrappers which comprise only paper. This eases handling for the user, and may be due to the higher thermal conductivity of the intermediate foil layer.

As used herein, the phrase “non-combustible” refers to a material that will not ignite or burn at temperatures normally associated with lighting (igniting) or burning of tobacco.

Further, the use of a metal foil layer results in a wrapper that has a low porosity, reducing side stream air flow to the aerosol generating material. This further reduces the propensity to burn through limiting the oxygen levels at the aerosol generating material.

Moreover, the inventors established that having peripheral surfaces with a coefficient of friction that is higher than a certain value is beneficial because this makes the wrapper easier to handle and process during the manufacturing process. It allows known machinery to be more readily employed. Specifically, this allows the garniture

belt of an aerosol generating article making machine to drive the laminate wrapper through the garniture during the aerosol generating article manufacturing process.

The lacquer may provide improved surface properties for the laminate wrapper. For example, the lacquer may have a coefficient of friction that is sufficiently high to improve handling during manufacture. (Surfaces that are too smooth may slip in manufacturing machinery.) Additionally, the lacquer aids in adhering the wrapper to itself when arranged around the aerosol generating material, since the lacquer retains adhesive on its surface and adheres more readily than the intermediate metal foil layer.

Additionally, the lacquer may provide resistance to corrosion of the metal foil layer. Metals such as aluminium may corrode, for example oxidise, in use or upon storage, and the presence of the lacquer may mitigate this corrosion.

In some cases, the paper in the innermost layer of the wrapper may have a basis weight of at least about  $10 \text{ g.m}^{-2}$ ,  $15 \text{ g.m}^{-2}$ ,  $20 \text{ g.m}^{-2}$  or  $25 \text{ g.m}^{-2}$  to about  $50 \text{ g.m}^{-2}$ ,  $45 \text{ g.m}^{-2}$ ,  $40 \text{ g.m}^{-2}$  or  $35 \text{ g.m}^{-2}$ . Paper having a density in this range has a low porosity, which further reduces the propensity to burn through limiting the oxygen levels at the aerosol generating material.

In some cases, the innermost layer may also comprise a flavourant, which is transferred to the aerosol generating material when wrapped around the aerosol generating material and heated. In some cases, the flavourant may comprise menthol.

In some cases, the paper in the innermost layer of the wrapper may be treated with one or more burn-retardant substances.

In some cases, the wrapper can be wound onto a bobbin core for use with standard cigarette makers that are fed from a single paper bobbin.

In some cases, one or more ventilation apertures may be formed in the wrapper. The ventilation apertures may provide airflow into the aerosol-generating article during use, the air forming part of the inhaled aerosol.

5           The laminate wrapper may be formed using any suitable lamination technique. In one example, the layers may be adhered together.

In some examples of the aerosol generating article described herein, at least part of the innermost layer is disposed in contact with the aerosol generating material.

10

In some cases, the aerosol generating material comprises tobacco. The tobacco may be any suitable solid tobacco, such as single grades or blends, cut rag or whole leaf, ground tobacco, tobacco fibre, cut tobacco, extruded tobacco, tobacco stem and/or reconstituted tobacco. The tobacco may be of any type including, but not limited to, Virginia and/or Burley and/or Oriental tobacco.

15

In some examples, the aerosol generating material may be a rod of aerosol generating material. As used herein, the term “rod” generally refers to an elongate body which may be any suitable shape for use in an aerosol generating assembly. In some cases, the rod is substantially cylindrical.

20

In some cases where the aerosol generating material is a rod of aerosol generating material, the wrapper circumscribes at least the end of the rod that is distant from the user's mouth in use (i.e. a distal-end rather than a mouth-end). This ensures that the non-combustible wrapper is disposed around the end of the rod which the user might try to ignite. In some cases, the laminate wrapper circumscribes the rod over at least 25% of the rod length. In some cases, the wrapper extends over at least 35%, 40%, 45% or 50% of the rod length. As more of the rod is circumscribed, burning of the rod is more difficult.

25

30

In some cases, the wrapper does not extend over the entire length of the rod of aerosol generating material, resulting in cost savings. In some cases, the laminate

wrapper extends over less than about 85%, 80%, 75%, 70%, 65% or 60% of the rod length.

Figure 1 illustrates an example aerosol generating article. The aerosol  
generating article 101 includes an aerosol generating material 103 which is wrapped by  
a laminate wrapper 102. In this example, this wrapper extends from the distal-end of  
the aerosol generating material over approximately 50% of the distance to the mouth-  
end of the aerosol generating material. In some examples, the wrapper 102 comprises  
three layers, wherein the outermost layer comprises a lacquer, the innermost layer  
comprises paper and the intermediate layer comprises a non-combustible material.

Optionally, the wrapper may also be arranged over the distal-end of the aerosol  
generating material, so that the distal-end is completely enclosed in the wrapper. Figure  
2 illustrates an example in which the wrapper 102 is wrapped around the circumference  
of the aerosol generating material 103. The distal-end of the aerosol generating article  
101 is not covered by the wrapper. Figure 3 illustrates an alternative example of an  
aerosol generating article 101 in which the wrapper 102 completely encloses the distal-  
end of the aerosol generating article.

Examples of the aerosol generating article may additionally comprise a filter  
and/or a cooling element. In some cases, the cooling element may be arranged between  
the aerosol generating material and the filter. In some cases, the filter may be arranged  
between the aerosol generating material and the cooling element.

The filter and/or cooling element may be joined to the aerosol generating  
material by a wrapping material that circumscribes these components. This may, in  
some cases, be the laminate wrapper discussed above.

For example, the mouth-end of the aerosol generating material may be provided  
adjacent to one or more of a cooling element and a filter. A cooling element, if present,  
allows vapour components to condense to form an aerosol and/or spaces the very hot

parts of the apparatus from the user. A filter, if present, may remove components from the fluid flow, affecting the chemical composition of the inhaled aerosol.

Figure 4 illustrates an example of an aerosol generating article 101 which includes, in addition to the features of figure 1, a cooling element 104, a filter 105 and a mouth-end tube 106. The cooling element 104 and filter 105, as illustrated, may be arranged between the mouth-end of the aerosol generating material 103 and the mouth-end tube 106, so that flow from the aerosol generating material 103 passes through the cooling element 104 and filter 105 (or vice versa if the filter is arranged before the cooling element in the flow) before reaching the user. Although the example in Figure 4 illustrates a cooling element 104, a filter 105 and a mouth-end tube 106, one or more of these elements may be omitted in other examples.

In some examples, the mouth-end tube, if present, 106 may be formed of for example paper, for example in the form of a spirally wound paper tube, cellulose acetate, cardboard, crimped paper, such as crimped heat resistant paper or crimped parchment paper, and/or polymeric materials, such as low density polyethylene (LDPE), or some other suitable material. The mouth-end tube 106 may be a hollow tube. Such a hollow tube may provide a filtering function to filter volatilised aerosol generating material. The mouth-end tube 106 may be elongate, in order to be spaced from the very hot part(s) of the main apparatus (not shown) that heats the aerosol generating material.

In some examples, the filter 105, if present, may be a filter plug, and may be made, for example, from cellulose acetate.

In some cases, the cooling element 104, if present, may comprise a monolithic rod having first and second ends and comprising plural through holes extending between the first and second ends. The through holes may extend substantially parallel to the central longitudinal axis of the rod. The through holes of the cooling element 104 may be arranged generally radially of the element when viewed in lateral cross-section. That is, in an example, the element has internal walls which define the through

holes and which have two main configurations, namely radial walls and central walls. The radial walls extend along radii of the cross-section of the element and the central walls are centred on the centre of the cross-section of the element. The central walls in one example are circular, though other regular or irregular cross-sectional shapes may be used. Likewise, the cross-section of the element in one example is circular, though other regular or irregular cross-sectional shapes may be used.

In an example, the majority of the through holes have a hexagonal or generally hexagonal cross-sectional shape. In this example, the element has what might be termed a “honeycomb” structure when viewed from one end.

In some cases, the cooling element 104 may comprise a hollow tube which spaces the filter 105, if present, from the very hot part(s) of the main apparatus that heats the aerosol generating material. The cooling element 104 may be formed of for example paper, for example in the form of a spirally wound paper tube, cellulose acetate, cardboard, crimped paper, such as crimped heat resistant paper or crimped parchment paper, and polymeric materials, such as low density polyethylene (LDPE), or some other suitable material.

The cooling element 104, if present, may be substantially incompressible. It may be formed of a ceramic material, or of a polymer, for example a thermoplastic polymer, which may be an extrudable plastics material. In an example, the porosity of the element is in the range 60% to 75%. The porosity in this sense may be a measure of the percentage of the lateral cross-sectional area of the element occupied by the through holes. In an example, the porosity of the element is around 69% to 70%.

Other examples of aerosol-cooling element are disclosed in PCT/GB2015/051253, the entirety of which is hereby expressly incorporated by reference, in particular in Figures 1 to 8 and the description from page 8, line 11 to page 18, line 16.

In further examples, the cooling element 104 may be formed from a sheet material that is folded, crimped or pleated to form through holes. The sheet material may be made, for example, from metal such as aluminium; polymeric plastics material such as polyethylene, polypropylene, polyethylene terephthalate, or polyvinyl chloride; or paper.

In some examples, the cooling element 104 and the filter 105 may be held together by a wrapper paper to form an assembly. The assembly may then be joined to the aerosol generating material by a further wrapper which circumscribes the assembly and at least the mouth end of the aerosol generating material to form the aerosol generating article 101. In other examples, the aerosol generating article 101 is formed by wrapping the cooling element 104, the filter 105 and the aerosol generating material 103 effectively in one operation, with no separate tipping paper being provided for the cooling element and/or filter components (if present).

In some cases, one or more ventilation apertures may be formed in the aerosol-generating article. The ventilation apertures may provide airflow into the article during use which forms part of the inhaled aerosol. It may be desirable to reduce airflow over the distal-end of the article to reduce the propensity to burn, and so the apertures may be formed nearer to the mouth-end of the article than to the distal-end. For example, the ventilation apertures may be formed in the cooling element and/or filter, if present. Moreover, the ventilation holes may be formed in a part of the article that is not wrapped in the non-combustible material. The inventors have established that cutting the non-combustible material to form ventilation apertures may not be straightforward.

In use, in some cases, the aerosol generating article may be arranged at least partially within a heating device to form an aerosol generating assembly which heats the article to generate an aerosol without burning. In some other cases, the article may be provided in an assembly with a fuel source, such as a combustible fuel source or chemical heat source, which heats but does not burn the aerosol generating material.

The above examples are to be understood as illustrative examples of the invention. It is to be understood that any feature described in relation to any one example may be used alone, or in combination with other features described, and may also be used in combination with one or more features of any other of the examples, or  
5 any combination of any other of the examples. Furthermore, equivalents and modifications not described above may also be employed without departing from the scope of the invention, which is defined in the accompanying claims.

CLAIMS

1. A wrapper for wrapping an aerosol generating material, wherein the wrapper is a laminate structure comprising at least three layers, and wherein;  
5 (a) one of the peripheral layers comprises a lacquer;  
(b) an intermediate layer comprises a non-combustible material; and  
(c) the other peripheral layer comprises paper.
2. A wrapper according to claim 1, wherein the non-combustible material  
10 comprises a metal foil.
3. A wrapper according to claim 2, wherein the metal foil comprises aluminium.
4. A wrapper according to any preceding claim, wherein the wrapper consists of  
15 three layers.
5. A wrapper according to any preceding claim, wherein the lacquer is an acrylic lacquer.
- 20 6. A wrapper according to any preceding claim, wherein the peripheral layer which comprises a lacquer has a dynamic coefficient of friction of from 0.4 to 1.0.
7. An aerosol generating article, the aerosol generating article comprising an aerosol generating material and a laminate wrapper arranged around the aerosol  
25 generating material, the laminate wrapper comprising at least three layers;  
wherein the outermost layer of the laminate wrapper comprises a lacquer, an intermediate layer comprises a non-combustible material, and the innermost layer comprises paper;  
and wherein at least part of the innermost layer is disposed in contact with the  
30 aerosol generating material.

8. An aerosol generating article according to claim 7, wherein the aerosol generating material comprises tobacco.

9. An aerosol generating article according to claim 7 or claim 8, wherein the aerosol generating material is a rod of aerosol generating material, and the wrapper circumscribes at least the end of the rod that is distant from the user's mouth in use.

10. An aerosol generating article according to claim 9, wherein the wrapper circumscribes at least the rod over at least 25% of the rod length.

10

11. An aerosol generating article according to any one of claims 7 to 10, further comprising a filter and/or a cooling element.

12. An aerosol generating article according to claim 11, wherein the aerosol generating article comprises a filter and a cooling element, and wherein the cooling element is arranged between the aerosol generating material and the filter.

15

13. An aerosol generating assembly comprising an aerosol generating article according to any one of claims 7 to 12 and a heater.

20

14. An aerosol generating assembly according to claim 13, wherein the assembly is a tobacco heating product.

15. An aerosol generating assembly according to claim 13 or claim 14, wherein the heater is a device into which the aerosol generating article is at least partially inserted in use.

25

16. A system comprising an aerosol generating device and an aerosol generating article according to any of claims 7 to 12.

30

17. A process for making an aerosol generating article comprising wrapping an aerosol generating material in a laminate wrapper, the laminate wrapper comprising at least three layers;

5 wherein the outermost layer of the laminate wrapper comprises a lacquer, an intermediate layer comprises a non-combustible material, and the innermost layer comprises paper;

and wherein at least part of the innermost layer is disposed in contact with the aerosol generating material.

10 18. A method of preventing a user lighting or igniting an aerosol generating material in aerosol generating article, the method comprising wrapping an aerosol generating material in a laminate wrapper, the laminate wrapper comprising at least three layers;

15 wherein the outermost layer of the laminate wrapper comprises a lacquer, an intermediate layer comprises a non-combustible material, and the innermost layer comprises paper;

and wherein at least part of the innermost layer is disposed in contact with the aerosol generating material.

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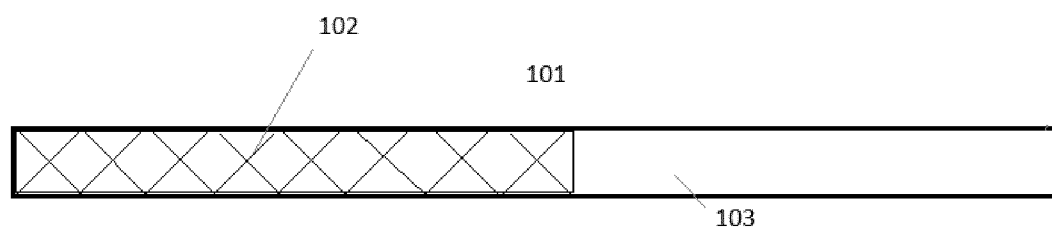


Figure 1

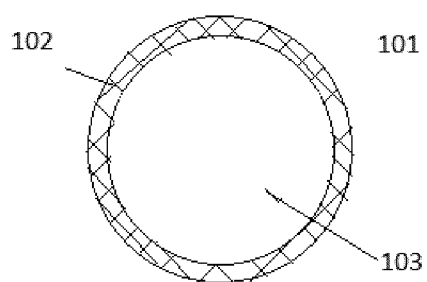


Figure 2

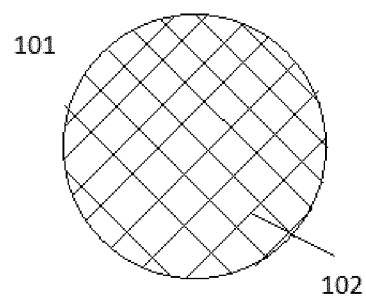


Figure 3

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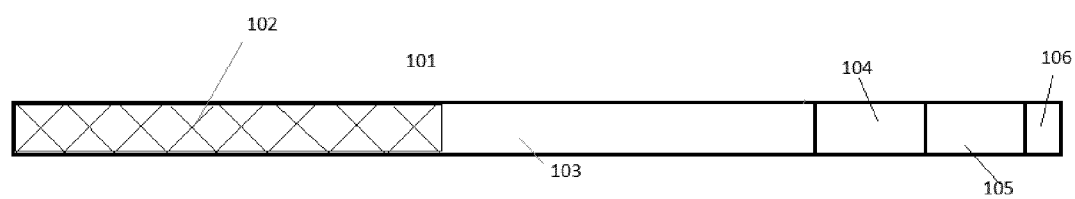


Figure 4

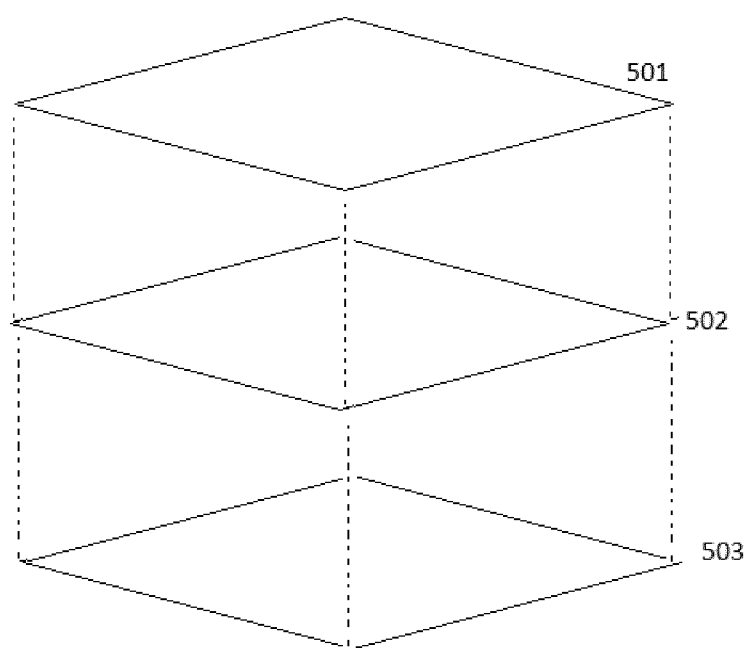


Figure 5

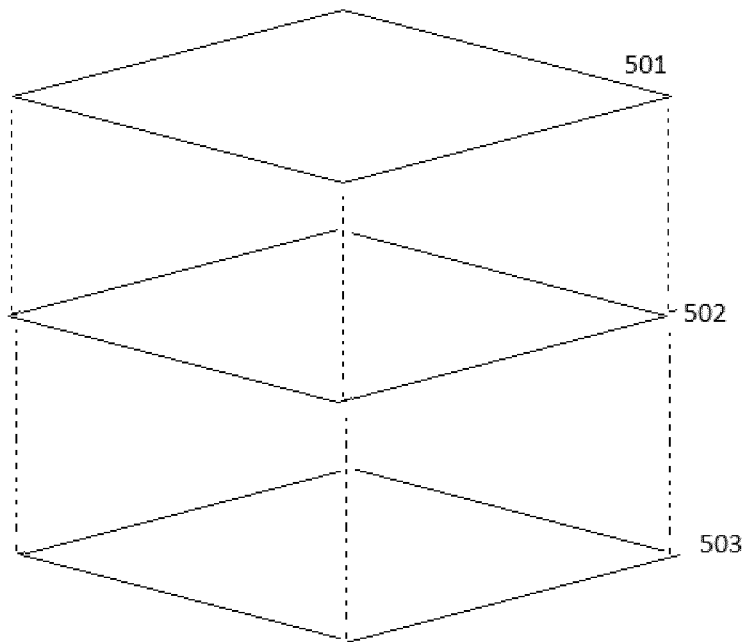


Figure 5