METHOD

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(54) Title: AN ADDITIVE RELEASE ASSEMBLY, A FILTER FOR A SMOKING ARTICLE, A SMOKING ARTICLE AND A METHOD OF MANUFACTURING

FIG. 2

(57) Abstract: An additive release assembly, a filter for a smoking article, a smoking article and a method of manufacturing. An additive release assembly (20) for a smoking article (10), comprising: a web (22) comprising a first sheet of material, and one or more discrete quantities of additive coupled to the first sheet material. The assembly is configured to permit selective release of the quantities of additive.
An additive release assembly, a filter for a smoking article, a smoking article and a method of manufacturing

Technical Field
5 Embodiments of the present invention relate to an additive release assembly, a filter for a smoking article including an additive release assembly, a smoking article including an additive release assembly, and a method of manufacturing an additive release assembly.

Background
10 It is known to provide within smoking articles and filters components that permit the consumer to release water or a flavourant such as menthol into the gaseous flow. One well known form of additive release component comprises a frangible capsule containing the additive. By applying pressure to the outside of the filter, the user can break the capsule therein and release the flavourant. Thus, a user wishing to add flavour to the inhaled gaseous flow can do so by simply squeezing the filter.

Individual breakable capsules having a flavourant therein and methods of manufacture thereof are known per se and are described in, for example, WO 2007/010407.

Summary
15 In some examples, an embodiment of the present invention provides, in a first aspect, an additive release assembly for a smoking article, comprising: a web comprising a first sheet of material, one or more discrete quantities of additive coupled to the first sheet of material, wherein the assembly is configured to permit selective release of the quantities of additive.

An embodiment of the invention further provides, an additive release assembly for a smoking article, comprising: a web comprising a first sheet of material and a second sheet of material, wherein the first and second sheets of material contain therebetween one or more additive release components containing additive, wherein the additive release component(s) are secured between the
first and second sheets of material, and wherein the first sheet of material is laminated to the second sheet of material.

In some examples, an embodiment of the invention further provides, an additive release assembly for a smoking article, comprising: a web comprising a first sheet of material and a second sheet of material, wherein the first sheet of material and second sheet of material form one or more compartments configured to retain the additive therein.

In some examples, an embodiment of the invention provides, in a second aspect, a filter for a smoking article comprising an additive release assembly, the additive release assembly comprising: a web comprising a first sheet material, one or more discrete quantities of additive attached to the first sheet material, wherein the assembly is configured to permit selective release of the quantities of additive.

An embodiment of the invention provides, in a further aspect, a smoking article comprising an additive release assembly, the additive release assembly comprising: a web comprising a first sheet material, one or more discrete quantities of additive attached to the first sheet material, wherein the assembly is configured to permit selective release of the quantities of additive.

An embodiment of the invention provides, in a third aspect, a method of manufacturing an additive release assembly for a smoking article, comprising: providing at least one quantity of additive, providing a first sheet of material, and coupling the at least one quantity of additive to the first sheet.

An embodiment of the invention provides, in a further aspect, a method of manufacturing an additive release assembly for a smoking article, comprising: receiving at least one quantity of additive, receiving a first sheet of material, and securing the at least one quantity of additive to the first sheet.

An embodiment of the invention provides, in a further aspect, a method of manufacturing an additive release assembly for a smoking article, comprising: receiving a first sheet of material, forming one or more pockets in the first sheet of material, providing an additive to at least one of the pocket(s), and receiving a second
sheet of material, affixing the first sheet of material to the second sheet of material to secure the additive within the pocket and form a web extending beyond the pocket.

**Brief Description of the Drawings**

Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 shows a side elevation view of a smoking article according to the present invention;

Figure 2 shows a cut-away perspective view of the smoking article according to the present invention;

Figure 3 shows a perspective view of an additive release assembly according to a first embodiment of the present invention;

Figure 4 shows a perspective view of a partially formed additive release assembly according to the first embodiment of the present invention;

Figure 5 shows an apparatus for forming a smoking article according to the first embodiment of the present invention;

Figure 6 shows a perspective view of a plurality of partially formed filters according to the first embodiment of the present invention;

Figure 7 shows a side elevation view of a plurality of partially formed filters according to the first embodiment of the present invention; and

Figure 8 shows a perspective view of an additive release assembly according to a second embodiment of the present invention; and

Figure 9 shows a perspective view of a further embodiment of an additive release assembly according to the present invention during manufacture, and an apparatus for manufacturing the additive release unit.
Figure 10 is a perspective view of a further embodiment of an additive release assembly.

5 Detailed description
As used herein, the term "smoking article" includes smokeable products such as cigarettes, cigars and cigarillos whether based on tobacco, tobacco derivatives, expanded tobacco, reconstituted tobacco or tobacco substitutes and also heat-not-burn products (i.e. products in which flavour is generated from a smoking material by the application of heat without causing combustion of the material).

Figures 1 and 2 show a smoking article according to an embodiment of the present invention. The smoking article 10 comprises a source of smokable material, which can be tobacco, in the form of a cylindrical tobacco rod 11. A filter 18 is coaxially attached to the tobacco rod 11. The filter 18 comprises filtration material 12 optionally surrounded by a porous sheet material, for example, a porous paper, e.g. plug wrap.

The filter 18 comprises one or more additive release components, and in some examples comprises a plurality of additive release components. The plurality of additive release components are located within the filtration material 12. The additive release components are frangible capsules, and embodiments of the invention will be described with references to capsules for simplicity. Any reference to a capsule should be taken as meaning an additive release component of any type. In other aspects, the additive release components has any form configured to release additive.

The additive release components 15 each contain a fluid, in the form of a liquid. Alternatively, the fluid is a powder which can substantially flow as a fluid. The additive release components can be ruptured or broken by inward pressure from a user, which releases the fluid. The fluid in the additive release components 15 can be a flavourant, for example a menthol solution, or can be water. Each additive release component 15 comprises a frangible outer wall, and an inner space filled with the fluid. The outer wall is made of gelatine. Alternatively, the outer wall is made of any shell material having appropriate physical and barrier properties.
The fluid can be released by the user of the smoking article into the adjacent filtration material by squeezing the outside of the filter to rupture the outer wall of the additive release component.

The filtration material 12 comprises a homogenous filtration material, for example, cellulose acetate tow as is known. The term "homogenous" is used to mean that the filtration material is substantially uniform throughout the filter, and in particular, is uniform in a radial direction through the filtration material. The filter 18 is covered by a covering layer 16. The covering layer is a sheet material wrapped around the filtration material, and forming an exterior of the filter 18. The covering layer 16 connects the filter 18 to the tobacco rod 11, and is formed of a paper material, e.g. tipping paper.

Optionally, the covering layer 16 is transparent over at least part of its area. The transparent area of the covering layer allows viewing of the additive release components 15. The covering layer 16 defines a transparent window 17 through which the additive release components 15 can be viewed. The window 17 comprises a transparent material attached to the covering layer 16. The filtration material 12 is configured such that filtration material is not located between the additive release components 15 and the window 17. The covering layer 16 around the window 17 is opaque, and in some examples, is patterned or coloured.

Figure 2 shows a perspective view of the smoking article 10, in which a part of the filter 18 has been cut away. The filter comprises an additive release component assembly 20, which comprises one or more additive release components 15 within a web 22. The additive release component assembly 20 comprises one or more additive release components, and in the example shown, a plurality of additive release components 15 connected by the web 22. The additive release component assembly 20 is also referred to more generally as an additive release assembly. The additive release components 15 are centrally located within the filter 18. The filter 18 comprises two to four additive release components 15, and for example, comprises four additive release components 15. The additive release component assembly 20 extends longitudinally within the filtration material 12, such that the web 22 extends parallel to a longitudinal axis.
of the filter 18. The additive release component assembly 20 is surrounded radially and longitudinally by filtration material 12, which is surrounded by a porous wrapper 28 and the covering layer 16.

The intact additive release components 15 in an initial state and containing fluid are a first colour, which is visible through the window 17. The fluid from the additive release components can be released and enter the filtration material. The ruptured additive release components are a second colour, different to the first colour of the un-ruptured additive release components. The transparent window 17 provides a visual indication to a user of the number and location of ruptured and un-ruptured additive release components.

Figure 3 shows the additive release component assembly 20 in isolation. The additive release components 15 are in an initial state, in which none of the additive release components 15 have been ruptured. The additive release components 15 are spherical. The additive release components assembly 20 as shown is configured for one filter for a smoking article. The releasable fluid is distributed between a plurality of additive release components 15, which allows each additive release component 15 to be of a smaller diameter than an equivalent single additive release component containing the same quantity of fluid. The additive release component assembly 20 can therefore be located in a smaller diameter filter than the equivalent single additive release component, or, the filter 12 can comprise an increased radial depth of filtration material around the additive release components 15 than the equivalent single additive release component. In addition, the number of additive release components 15 of the additive release component assembly 20 which are ruptured can be selected. A user can select the quantity of additive released by rupturing only a selected number of additive release components 15. The released additive can therefore be sequentially increased or selected.

Figure 4 shows an additive release component assembly 20 for one or more filters during manufacture. The web 22 comprises a first layer 24 and a second layer 26. The first layer 24 is an elongate laminar strip of sheet material which extends around a first side of the additive release components 15. The second layer 26 is an elongate laminar strip of sheet material which extends around a second side of the additive release components 15. One or both of the first and
second layers 24,26 are formed of a porous material, which allows the fluid released by rupturing the additive release components 15 to pass through the porous one or both of the first and second layers 24,26. The first and second layers 24,26 are formed of paper or cellulose acetate. The first and second layers 24,26 do not retain the fluid, and do not form part of the additive release components 15 which retain the fluid. The first and second layers 24,26 secure the additive release components together in an elongate chain.

The additive release components 15 comprise a frangible outer shell. The shell contains the additive contents of the additive release components 15, for example as a liquid. The shell retains the fluid until broken, typically by compression.

The first and second layers 24,26 are separate pieces of sheet material, which are unconnected prior to attachment to the additive release components 15. The first and second layers 24,26 are laminated together. The first sheet of material is affixed to a separate second sheet of material to couple the additive to the sheets of material forming the web. In this example, the sheets of material are connected by lamination. The lamination comprises a major surface of the first layer 24 being affixed to a major surface of the second layer 26, for example with an adhesive. Alternatively, the first and second layers are combined in any suitable manner, e.g. heat sealing.

The first and second layers 24,26 are affixed to each other around the whole periphery of the additive release components, such that the additive release components are secured in place within a pocket formed by the first and second layers 24,26. In particular, the first and second layers 24,26 are affixed together longitudinally on each side of the additive release components, and laterally between each additive release component 15. The connection of the first and second layers forms a plurality of compartments in each of which one of the plurality additive release components is located. The first and second layers 24,26 are optionally also be affixed to the additive release components 15, further securing the additive release components 15 in position. Alternatively, the first and second layers are formed of a non-porous material (e.g. a plastics or polymer material, e.g. cellulose acetate). The compartments contain the additive release component, and are broken open in addition to the breakage of the
additive release component to release the additive. For example, the material of
the layers and/or the seal between the layers is ruptured to release the additive.

The material of the first and second layers 24,26 is substantially inelastic. In
some examples, the material of the web is initially deformed to accommodate the
additive release components. For example, an impression or indent in the form a
hemisphere (or part of a hemisphere) is formed in the web. The indent is
configured to receive an additive release component. In some aspects, the
indents are formed prior to location of the additive release components in the
indents. In some examples, the indents are formed by vacuum forming a planar
sheet of material. Thus, the indents are accurately positioned, and the additive
release components are readily located in the indents such that the positions of
the additive release components are also accurately determined. Alternatively,
the material of the web is not be deformed around the additive release
components. The lamination of the first and second sheets of material can still
provide for improved manufacture of the assembly, e.g. by providing for accurate
location of the additive or additive release components.

In some aspects, one or both of the first and second layers 24,26 are transparent
or semi-transparent. A transparent first or second layers 24,26 faces the
transparent window. Alternatively, one or both of the first and second layers
24,26 are opaque.

The connecting web of any embodiment allows for improved handling of the
additive release components, and in particular, improves insertion of additive
release components into a filter. The connecting web allows easier insertion of a
plurality of additive release components into a single filter, and ensures that the
longitudinal spacing of the additive release components is constant. The
lamination of two separate layers together around the additive release
component provides an efficient method to create the additive release
component assembly. The web can be drawn from a spool to handle or insert the
additive, instead of handling individual additive release components or additive
encapsulated within separate compartments. The web can be cut into sections
prior to insertion in a single filter, and the web provides improved handling of
the additive in at least part of the manufacturing process.
Figure 5 shows an apparatus 30 for manufacturing an additive release component assembly 20 according to a first method of the present invention. The apparatus 30 comprises a first bobbin 34 for storing an elongate strip of the first layer 24, as previously described. The first layer 24 is drawn onto a rotating carousel 38 via a tensioning roller 39. The carousel 38 has an exterior surface comprising a plurality of receptacles 38a. The first layer 24 is located in the receptacles 38a.

The apparatus 30 further comprises a hopper 35 for storing a plurality of individual additive release components 15. The hopper 35 is configured to dispense additive release components 15 into each receptacle 38a of the carousel 38. Each additive release component 15 is located on the first layer 24 in the receptacle 38a.

The apparatus 30 further comprises a second bobbin 36 for storing an elongate strip of the second layer 26, as previously described. The second layer 26 is drawn onto the rotating carousel 38 via a tensioning roller 37. The second layer 26 extends over the receptacles 38a, and so overlies the additive release components 15 and first layer 24 in the receptacles 38a.

Each receptacle 38a is sequentially provided with the first layer 24, an additive release component 15 and the second layer 26 in that order. For example, the carousel 38 rotates (clockwise as shown) adjacent to the static first and second bobbins 34,36 and hopper 35 in order to receive the components of the additive release components assembly in the correct order. The first and second layers 24,26, and optionally the additive release components 15, are provided with adhesive by one or more adhesive applicators (not shown). The first and second layers 24,26, and optionally the additive release components 15, are adhered together on the carousel.

The formed additive release component assembly 20 is drawn from the carousel 38 as a plurality of additive release component assemblies 20 connected by the continuous first and second layers 24,26 forming the web 22. Each additive release component assembly 20 for a filter comprises a plurality of additive release components 15, e.g. four additive release components 15 as shown. The longitudinal spacing between a last additive release component 15 and a first
additive release component 15 in consecutive additive release component assemblies 20 is the same or larger than the longitudinal spacing between additive release components 15 in the same additive release component assembly 20. In particular, the web 22 has an extended length without an additive release component 15 between additive release component assemblies 20. This arrangement of additive release components 15 is provided by the hopper 35 dispensing the additive release components 15 for an additive release component assembly at a first interval, and in particular, into consecutive receptacles 38a. After dispensing the additive release components 14 for one additive release component assembly, the hopper 35 is configured to dispense the next additive release component after a second interval, which is greater than the first interval. For example, the second interval is twice the first interval, such that one receptacle 38a is left empty between additive release component assemblies.

The rotating carousel and receptacles provide an accurate spacing of the additive release components by the first interval. The carousel also provides an efficient way to combine the first and second layers and additive release component into a continuous web which connects the additive release components.

Figure 6 shows a cut-away view of a plurality of filter rods according to the present invention. The plurality of joined additive release assemblies 20 of any embodiment are located in an elongate rod of filtration material for forming a plurality of filters, during forming of the filtration material into a cylindrical rod.

The filtration material is surrounded by sheet material wrap 28, e.g. plugwrap. The elongate rod of filtration material is cut into filters between the additive release component assemblies by a cutting means, e.g. knife (not shown). The sheet material wrap 28 is wrapped with a covering layer as described above, before or after the rod is cut into individual filter.

Figure 7 shows a first method of forming a filter according to the present invention. The plurality of joined additive release component assemblies 20 are introduced into filtration material tow 12 in a garniture 50. The additive release component assemblies 20 are dispensed from a hopper 52 through a nozzle 54 into the centre of a moving stream of the filtration material tow. A wrapper 28 surrounds the tow, and is wrapped around the tow and the additive release
components 15 by the garniture. The garniture 50 comprises an endless garniture tape which drags the filtration material tow and the additive release component assemblies 20 through the garniture, shaping the wrapper 28 of plug wrap such that the tow and additive release component assemblies are
cylindrically wrapped. The additive release component assemblies are connected by the web 22, such that the additive release component assembly 20 moved with the tow draws further connected additive release component assemblies 20 from the hopper 52. One or more adhesive applicators (not shown) apply adhesive to the wrapper 28 adjacent a longitudinal edge to secure the wrapper 28 as a cylinder. Further details of the method of manufacturing are described in WO2010/03899, which is incorporated herein by reference.

Figure 8 shows a plurality of additive assemblies 40 according to a second aspect of the present invention. An assembly 40 comprises a plurality of discrete compartments containing quantities of additive 45. The first and second layers of sheet material directly contain the additive, without an additive release component having an outer shell. In effect, outer shells containing the additive 45 are integrally formed with a web connecting the compartments 45 together. The compartments are themselves configured to retain the additive, in particular by being formed of a material impermeable to the additive and sealed around the additive. The compartments are longitudinally spaced in the web, as described above. Each compartment 45 is formed by a recess. The recesses are in the form of a hemispherical shell (or part thereof) for containing additive. The additive is a fluid, for example, a flavourant or water.

The web comprises a first layer 44 of laminar material. The first layer 44 forms at least part of the connecting web, and defines recesses for containing the additive. The first layer 44 connects the compartments and integrally forms with the compartments 45, and in particular, is integrally formed with the hemispherical shells. The first layer 44 is in the form of an elongate strip of material which is non-porous to the contained additive. The web further comprises a second layer 46. The second layer 46 in the form of an elongate strip of material which is non-porous to the contained fluid. The second layer 46 provides a further part of the web and the outer shell containing the additive.
The first and second layers 44,46 are separate pieces of sheet material, which are unconnected prior to attachment to form the compartments (i.e. integrally connected additive release components). The first sheet of material is affixed to a separate second sheet of material to couple the additive to the sheets of material forming the web. In this example, the sheets of material are connected by lamination. The first and second layers 44,46 are laminated together. The lamination comprises a major surface of the first layer 44 being affixed to a major surface of the second layer 46, around the compartments, around the compartments, for example with an adhesive.

The first and second layers 44,46 are affixed to each other around the whole periphery of the compartments, such that the additive containing components have defined edges as a pocket formed by the first and second layers 44,46. In particular, the first and second layers 44,46 are affixed together longitudinally on each side of the compartments, and laterally between each compartment.

The first and second layers 44,46 of the connecting web themselves define the additive retaining shells, and contain the fluid or additive contents. In this embodiment, there is no separate additive release component shell secured within the web. The first and second layers 44,46 are preferably formed of cellulose acetate. The additive is free or loose within the one or more compartments, i.e. encapsulated only by the first and second layers 44,46 forming the compartments. The first and second layers are formed of any suitable non-porous material, e.g. plastics or polymer material, e.g. cellulose acetate or a paper treated to be non-porous. The first and second layers are laminated together around the compartment by any suitable means, e.g. adhesive, heat and/or pressure sealing. The first or second layers, or seal between them is arranged to be ruptured by an external pressure from a user.

The additive release assembly 40 is manufactured by providing the laminar first layer 44 with a plurality of recesses formed therein, for example in the form of hemispheres. Alternatively, the recesses can have any shape, for example, cuboid or any part of a sphere. The fluid contents are dispensed into each recess, which forms part of a compartment 45. The second layer 46 is applied to the first layer 44, over an open side of the recesses. The second layer 46 completes the compartment 45, and seals the fluid within the additive release component. The
second layer 46 is affixed to the first layer, preferably by lamination over their whole surfaces which are in contact. In some examples, the recesses are formed by vacuum forming a planar sheet of material. The second layer is substantially planar.

Figure 9 shows a further process and apparatus 50 for forming additive release compartments 55, which are similar to the additive release compartments 45 described with respect to Figure 8. The additive release compartments 55 are substantially rectangular in plan view. The compartments 55 contain additive and are connected by a web, both the compartments and web formed by two separate pieces of material. The additive release assembly including compartments 55 is the same as assembly 40, unless described as different. The process described is also applicable to the hemispherical additive compartments 45 described with respect to Figure 8.

Figure 9 shows a laminar first layer of sheet material 54, substantially as described above. The first layer 54 has recesses 52 formed by a forming unit 51. The forming unit 51 forms the recesses 52 by thermoforming. The recesses 52 are filled with additive 57. A laminar and planar second layer of sheet material 56 is located on top of the first layer 54, and covering the recesses 52. The second layer 56 is affixed to the first layer 54 to form a lamination. The second layer 56 is preferably affixed by sealing unit 53 forming a heat seal between the first and second layers. A continuous assembly with compartments 55 each containing a quantity of additive is drawn from the output of the apparatus. The continuous assembly is cut to form individual assemblies.

In a further embodiment (not shown), an additive release component assembly comprises a single sheet of material. One or more additive release components are attached to the single sheet of material. Preferably, the one or more additive release components are adhered to the sheet with an adhesive. The single sheet of a material is an elongate laminar strip of sheet material which extends on or around a first side only of any type of additive release component. The sheet material is formed of a porous material, which allows the fluid released by rupturing the additive release components to pass through the porous layer. Alternatively, the sheet material is impermeable to the additive. The sheet material is formed of paper or cellulose acetate. The sheet material does not
retain the fluid, and does not form part of the additive release components which retain the fluid.

The sheet material is substantially planar, wherein the additive release components are attached to the planar surface of the single sheet of material. Alternatively, the sheet material has one or more recesses formed in the sheet material. The additive release components are optionally affixed in the recesses. In particular, one additive release component is affixed (adhered) in each recess. The recesses are substantially hemispherical (or a part thereof), and the additive release components are substantially spherical.

In a further embodiment of the present invention shown in Figure 10 an additive release component assembly comprises a first sheet of material 64, a second sheet of material 66 and a third sheet of material 68. One or more first additive release components 15a are attached between the first and second sheets 64,66, and one or more second additive release components 15b are attached between the first and third sheets 64,68. The sheet material 64,66,68 is formed of a porous material, which allows the fluid released by rupturing the additive release components to pass through the porous layer. The sheet material does not retain the additive, and does not form part of the additive release components which retain the additive.

The first, second and third layers 64,66,68 are separate pieces of sheet material, which are unconnected prior to attachment to the additive release components. The first and second layers are laminated together, and the first and third layers are laminated together. The lamination comprises a major surface of the first layer being affixed to a major surface of the second layer, for example with an adhesive, and the lamination comprises a major surface of the first layer being affixed to a major surface of the third layer, for example with an adhesive.

The first and second layers 64,66 are affixed to each other around the whole periphery of the first additive release components 15a, such that the first additive release components are secured in place within a first pocket 67 formed by the first and second layers 64,66. In addition, the first and third layers 64,68 are affixed to each other around the whole periphery of the second additive release components 15b, such that the second additive release components 15b
are secured in place within a second pocket 69 formed by the first and third layers 64,68. In particular, the first and second layers are affixed together longitudinally on each side of the first pockets 67, and laterally between each of the first pockets 67. In addition, the first and third layers are affixed together longitudinally on each side of the second pockets 69, and laterally between each of the second pockets 69.

The connection of the first and second layers, and first and third layers, forms a plurality of compartments 67,69 in each of which one of the plurality additive release components is located. One or more of the first, second and third layers are optionally also affixed to the additive release components, further securing the additive release components in position. The material of the web is shaped, for example by deformation, to accommodate the additive release components.

The first additive release components between the first layer and second layer contains the same or different additive to the additive in the second additive release components between the first layer and third layer.

The first, second and third layers are described as connecting additive release components. Alternatively, the first, second and third layers directly contain the additive, analogously to the embodiment of Figures 8 and 9. For example, the first and second layers define compartments 67 therebetween which encapsulates the additive directly. In addition, the second and third layers define compartments 69 which encapsulates the additive directly. The first layer is planar, and is attached to both the second and third layers to close the recesses and contain the additive. The second and third layers define the recesses, which when attached to the planar first layer, forms the compartments. This arrangement is illustrated by Figure 10, with the additive release compartments replaced by additive. Breakage of the compartments directly provides for release of the additive.

In a further embodiment (not shown), an additive release component assembly comprises a web formed of a single sheet of material. The sheet of material is rolled to form a substantially cylindrical, or tubular, shape. The opposite longitudinal edges of the sheet material are connected with a longitudinally extending seal to maintain the tubular shape. In an example, the seal is a fin seal. The fin seal is formed by inner surfaces of the sheet material adjacent
opposite longitudinally extending sides being connected together. One or more additive release components are located within the tubular web. Optionally, the one or more additive release components are adhered to the sheet with an adhesive. The single sheet of a material is an elongate laminar strip of sheet material, prior to rolling into a tubular shape. The sheet material is formed of a porous material, which allows the fluid released by rupturing the additive release components to pass through the porous layer. Alternatively, the sheet material is impermeable to the additive. The sheet material is formed of paper or cellulose acetate.

The diameter of the filter 18 is within the range 4 to 10 mm. In some examples, the additive release component diameter is within the range 0.5 - 4.5 mm, or 2mm to 4mm. In some examples, the additive release components have a diameter of between 1.5 and 3mm, or, the additive release components have a diameter of between 2.2 and 2.6mm. For example, the additive release component diameter is approximately 2.5mm. Alternatively, the additive release component diameter is less than 3mm, less than 2mm, or less than 1mm, particularly in combination with some of the embodiments described below. The compartments containing additive can have the same dimensions as described above.

These ranges are not intended to be limiting and the skilled person would understand that larger or smaller filter diameters or additive release component could be employed.

In some aspects, a filter is formed so as to have more than one type of flavourant. For example, the additive release components are formed so that one or more additive release components in a filter contain a first flavourant, and one or more additive release components in the filter contain a different, second, flavourant.

By applying pressure to the outside of the part of the filter 18 which surrounds the additive release components, the user can break the one or more additive release components and/or compartments to release the additive therein.
The web has been described as formed of two pieces of laminar sheet material. Alternatively, the web is formed with a one or more lengths of yarn or ribbon. The additive release component can be co-extruded with the yarn or ribbon. The additive release component is therefore formed by a co-extrusion process with the yarn or ribbon extending therethrough, and so is attached to the yarn or ribbon. Alternatively, the additive release components are connected by a web in the form of a net.

The web of any embodiment can provide a defined orientation for the attached additive release components. In particular, the additive release components have a defined axis, which is orientated by the web. For example, the additive release components can be shaped to release additive in only a particular direction. The web reliably locates and secures the additive release components in the correct orientation within the filter.

The filter 12 has been described as having a covering layer with a transparent window 17. Alternatively, the covering layer 16 does not have a transparent window, and is opaque over the whole exterior surface.

The additive release components have been described as spherical. Alternatively, the additive release components can have any shape, for example, hemispherical or an elongate tube.

As used herein, the terms "flavour" and "flavourant" refer to materials which, where local regulations permit, is used to create a desired taste or aroma in a product.

In some examples, the additive release components are capsules having an outer shell, containing additive fluid (liquid or powder) in an interior cavity. The outer shell of each additive release component is frangible to release all of the additive on application of pressure.

In some examples, the filter comprise a reaction surface against which the additive release component can be urged, in order to facilitate release of additive. In some examples, the additive release components are located on a periphery of the filter. The radially adjacent filtration material provides a
reaction surface against which the additive release component can be urged. The filtration material is relatively hard (e.g. by containing an increased amount of plasticiser) to form the reaction surface, and has a hardness on the Filtrona scale of more than 90%. The additive release components can be located within the filtration material, or can be located in a cavity adjacent to the filtration material. The cavity can formed by an elongate inner rod of filtration material, which one or two annular outer sections of filtration material surround. A covering layer forming an exterior of the filter is attached to one or both of the outer sections of filtration material, and spaced from the inner rod to define a cavity. For example, the inner rod is harder than the annular outer sections, optionally by containing more plasticiser.

Alternatively, each additive release component can release its additive contents in a plurality of discrete doses, actuated by a plurality of separate applications of pressure. This type of additive release component comprises a resiliently or plastically deformable outer shell, for example configured to release additive through a slit formed in a pre-determined area. Alternatively, this type of additive release components comprises a porous absorbent substrate having an open cell structure (e.g. open cell foam), in which the additive is contained. The substrate is at least partially resiliently deformable. The substrate is surrounded by an outer shell to retain the additive, which is frangible, resiliently deformable, plastically deformable, or a thin coating. The substrate forms discrete additive release components, or is in the form of an annulus in the first filter section. Alternatively, this type of additive release component comprises a porous matrix containing the additive in discrete cavities and having a closed cell structure (e.g. closed cell foam), which is plastically deformable to release the additive.

The additive release components and compartments have been described as manually manipulated to release the additive. Alternatively, a movable part is configured such that movement of the movable part around an exterior of the smoking article releases additive from at least one of the additive release components. The movement is by sliding or rotation, by a ring or C-shaped clip, over an external surface of the filter. The filter provides a reaction surface, against which the additive release components are urged by the movable part. The additive release components is located in one or more grooves, extending circumferentially, longitudinally or helically. Alternatively, the movable part
comprises a covering layer defining two adjacent surfaces, wherein the additive release components are located between the adjacent surfaces such that relative movement of the adjacent surfaces of the covering layer releases additive from at least one of the additive release components.

Alternatively, the additive release components have been described as spherical. Alternatively, the additive release components are elongate, with a longitudinal axis extending parallel to a longitudinal axis of the filter. The elongate additive release component has a circular or elliptical cross-section, and contains more additive than an additive release component of the same diameter. The elongate additive release component has a maximum lateral extent of less than 3.5mm, or less than 3mm, or from 2mm to 3mm. Alternatively, or in addition, the elongate additive release component has a radial cross-sectional area which is less than 50% of the radial cross-sectional area of the smoking article, and optionally, less than 40% or less than 30%. Such an additive release component is optimised for use in a small diameter smoking article, e.g. having a diameter of 5mm to 6mm, or 6mm to 7mm.

The additive release components have been described as located in a web in the smoking article. Alternatively, a plurality of the additive release components are surrounded by an outer wall or outer encapsulation. The outer encapsulation is porous or configured to rupture or deform to allow release of additive on compression. The outer encapsulation is itself contained within a further encapsulation. In some examples, the additive is contained within a plurality of discrete cavities within an open cell substrate, or a closed cell substrate. The open cell substrate, and optionally the closed cell substrate, has an outer encapsulation. One or more additive release components are affixed to an exterior of a substantially larger additive release component. Alternatively, a plurality of additive release components, of the same or different sizes, are affixed together. Any of these embodiments can be considered as a plurality of components connected in a unitary structure.

The additive released from the additive release components has been described as being entrained by ventilating air and/or gaseous flow from the tobacco rod. Alternatively, flow containing additive is selectively released from the filter. The filter comprises a selecting means, e.g. in the form of a movable element, for
example rotatable, at a mouthpiece end of the filter. The selecting means, at least a part of which is movable in relation to the first and second flow paths, is configured to select a first flow path, a second flow path, or optionally, an adjustable proportion of the first and second flow paths. The first flow path corresponds to an annular, radially outer flow path, and the second flow path corresponds to a radially inner flow path within the first flow path. Alternatively, first and second half-cylindrical filter parts respectively define the first and second flow paths, the first and second filter parts arranged together to form a cylindrical filter part. The additive is initially encapsulated within one or more additive release components (i.e. capsules), prior to being selectively released.

As described above, the additive release component is located in a filter, within filtration material. Alternatively, the additive release component is located in a tobacco rod. Alternatively, the additive release component is located in a separate section of the smoking article, not surrounded by filtration material. For example, the additive release component is located in a separate section located between the tobacco rod and filter.

The additive in a smoking article is of one or more different types. In particular, an additive release component or separately contained additive each contains additive which is of same or different type to another additive release component or separately contained additive.

In some examples, the additive is an adsorbent, for example, carbon. The carbon can be in the form of activated charcoal. The additive improves filtration efficiency of particular smoke constituents when released. The carbon is optionally in the form of spherical beads enclosed in a capsule. Rupture of the outer wall exposes the carbon to the surrounding atmosphere, where the carbon modifies properties of smoke e.g. by adsorption.

The term "release" is intended to include exposure of the additive to the atmosphere, in addition to physical release and movement out of an encapsulation. The term "release" indicates that the additive is active, and can have an effect on the smoking article. Whilst encapsulated the additive is dormant, and does not have an effect.
Although the additive release components have been described as formed of gelatine, other additive release component types can be used in combination with a filter of the present invention.

In some examples, the additive release components are manufactured by a known co-extrusion process, for a additive release component size of 500µm to 10 mm. In the co-extrusion process, two fluids are extruded together so that a additive release component is created by surface tension.

The shell fluid can be a warm gelatin solution, and liquid contents, e.g. menthol, are respectively delivered under pressure from separate tanks into a two-fluid nozzle. The shell fluid and liquid contents flow from a nozzle where they form droplets in a carrier fluid, the droplets having an outer shell of shell fluid and an inner core of liquid contents. A cooling mechanism is provided to cool and solidify the shell fluid. Alternatively, the shell material is, for example, alginate, agar-agar, gum arabic, latices or waxes.

Alternatively, the additive release components are formed by any suitable process for encapsulating a liquid. For example, the additive release components are formed by interfacial polymerisation, which produces an additive release component size of 0.2µm to a few millimetres. The shell can be made of a polymer, for example, polyester, polyamide, polyurea, polyurethane, or a biodegradable polymer e.g. protein, polysaccharides or oligosaccharides.

Alternatively, the additive release components is formed by complex coacervation, which produces a particle size of 10µm to a few millimetres. The additive release component is made from gelatine and gum arabic.

Alternatively, the additive release components is formed by single extrusion, which produces a particle size of 200µm to a few millimetres. The additive release component shell is made from alginate, chitosan, carrageenan, cellulose derivatives, or waxes.

Alternatively, the additive release components is formed by melt extrusion, which produces a particle size of 300µm to a few millimetres. The additive
release component shell is made from e.g. gelatine, sugars, maltodextrins, corn syrup, food polymers or modified starches.

Alternatively, the additive release components is formed by melt injection, which produces a particle size of 200 µm to a few millimetres. The additive release component shell is made from carbohydrate materials, e.g. sucrose, glucose syrups and modified starches.

Alternatively, the additive release components is formed by a spray drying microencapsulation process, which produces a particle size of 10 µm to a few millimetres. The additive release component shell is made from e.g. polysaccharides (starch, alginate, agar, pectin, carrageenan, gums), proteins (gelatine, casein), fats and fatty acids, cellulose derivatives, lipids (waxes, shellac, carnuba or beeswax).

Materials for the additive release components or filter comply with and/or are subject to applicable regulatory requirements/approvals. Embodiments of the invention are configured to comply with applicable laws and/or regulations, such as, by way of non-limiting example, regulations relating to flavours, additives, emissions, constituents, and/or the like. For example, the invention is configured such that a smoking article implementing the invention is compliant with applicable regulations before and after release of an additive or additives.

Any of the features described in any embodiment can be used in combination with any other features of any other embodiment.

As used herein, the terms "flavour" and "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, 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 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.

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 superior containment of additive. The advantages and features of the disclosure are of a representative sample of embodiments only, and are not 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 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.
Claims

1. An additive release assembly for a smoking article, comprising:
   a web comprising a first sheet of material,
   one or more discrete quantities of additive coupled to the first sheet material,
   wherein the assembly is configured to permit selective release of the quantities of additive.

2. The assembly as claimed in claim 1 further comprising:
   a second sheet of material,
   wherein the first and second sheets of material contain therebetween the one or more discrete quantities of additive.

3. The assembly as claimed in claim 2 wherein the first sheet of material is laminated to the second sheet of material.

4. The assembly as claimed in claim 2 or 3 wherein the additive is contained within one or more additive release components,
   wherein the additive release component(s) are secured between the first and second sheets of material.

5. The assembly as claimed in any one of claims 1 to 3 wherein the first sheet of material and second sheet of material define one or more sealed compartments containing the additive.

6. The assembly as claimed in claim 5 wherein the first sheet of material defines one or more recesses defining the compartments, and the second sheet of material is substantially planar and covers the recesses.

7. The assembly as claimed in claim 5 or 6 wherein the additive is free or loose within the one or more compartments.
8. The assembly as claimed in claim 1 wherein the first sheet of material is in the form of a tube, wherein longitudinally extending edges of the first sheet are connected by a fin seal to form the tube.

9. The assembly as claimed in claim 2 further comprising a third layer of sheet material, wherein the first and third sheets of material contain therebetween one or more discrete quantities of additive.

10. The assembly as claimed in claim 9, wherein the additive between the first and third layers is contained within one or more additive release components, wherein the additive release component(s) are secured between the first and third sheets of material.

11. The assembly as claimed in claim 1 wherein the first sheet of material is the only sheet of material in the assembly, and wherein the additive is contained within one or more additive release components, and wherein the additive release components are affixed to the first sheet of material.

12. The assembly as claimed in claim 11 wherein the first sheet of material comprises recesses in which the additive release components are located, or, the first sheet of material is substantially planar.

13. A filter for a smoking article comprising:
filtration material, and
an additive release assembly as claimed in any one of the preceding claims.

14. The filter as claimed in claim 13, further comprising a covering layer forming an exterior surface of the filter, wherein the covering layer is transparent over at least a part of the filter such that the additive release component is visible.

15. A smoking article comprising:
the additive release assembly as claimed in any one claims 1 to 12.
16. A method of manufacturing an additive release assembly for a smoking article, comprising:
providing at least one quantity of additive,
providing a first sheet of material, and
coupling the at least one quantity of additive to the first sheet.

17. The method as claimed in claim 16 further comprising:
providing a second sheet of material,
wherein the first and second sheets of material contain therebetween the one or
more discrete quantities of additive, and
laminating the first sheet of material to the second sheet of material to
form a web around the additive.

18. The method as claimed in claim 16 or 17 further comprising applying a
first sheet of material to a rotatable carousel having a plurality of receptacles,
inserting an additive release component containing the additive into a
receptacle on which the first sheet of material has been applied;
applying the second sheet of material to the receptacle in which a said
additive release component is inserted.

19. The method as claimed in claim 17 further comprising:
forming one or more pockets in the first sheet of material
providing an additive to at least one of the pocket(s), and
affixing the first sheet of material to the second sheet of material to secure the
additive within the pocket and form a web extending beyond the pocket.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER


According to International Patent Classification (IPC) and/or both national classification and IPC

ADD.

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

A24D

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

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Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:

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- "O" document referring to an oral disclosure, use, exhibition or other means
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- "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
- "Z" document member of the same patent family

Date of the actual completion of the international search

26 July 2012

Date of mailing of the international search report

06/08/2012

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Authorized officer

Marzano Monterosso

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<td>WO 2010003899 A1</td>
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<tr>
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<td>EP 2416673 A1</td>
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<td>JP 2010528680 A</td>
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