

Smoking Article Filter

The present invention relates to a filter for a smoking article. In particular, the present invention relates to a smoking article filter through which smoke
5 passes prior to inhalation by a user.

Smoking article filters are, of course, well known. It is also relatively well known to provide smoking articles with filters which contain one or more user-activated components.

The purpose of a user-activated component is to allow a user to activate
10 it when desired to alter the smoke during the smoking process. For example, the component may be a frangible capsule which is crushed by a user to add flavour to smoke during use of the smoking article.

Whilst such smoking articles are becoming popular amongst users, there can be a problem in that it is difficult for the user to know whether or not they
15 have activated the component(s) sufficiently to provide the desired effect on the smoke. Although some indicator arrangements have been proposed, they have significant drawbacks in that they require chemical reactions or capillary action to activate the component, making such arrangements complex and costly to manufacture.

20 The present invention aims to address the problems associated with existing smoking articles having user activated components.

According to the present invention there is provided a filter for a smoking article, the filter comprising filter material and at least one liquid containing user-activated component for altering smoke passing through the filter, the filter
25 material being wrapped with at least one wrapper surrounding at least a portion of the filter material, a surface of the at least one wrapper being provided with an indicator material that is activated through wetting of said wrapper with liquid released by the user-activated component upon activation of the user-activated component and provides a visual indication of the activation in the wrapper
30 between 0.001 and 5 seconds, preferably less than 1 second, after the liquid is released by the user-activated component.

Advantageously, the filter according to the present invention solves the problems associated with the prior art by providing an indicator material such as a soluble solid dye provided in the wrapper material structure or on a surface

thereof and which is activated in direct contact with the liquid, thereby making the product relatively simple and inexpensive to manufacture (no modification of the basic filter structure is required). Furthermore, with this arrangement, the accuracy and speed of indication is also highly improved. Indeed, with the filter of the invention, indication of the activation of the user-activated component, for example a breakable capsule, is almost instantaneous, actually within 0.001s to 1s from the moment the liquid is released from the user-activated component in the porous filter material to the moment it reaches the wrapper.

By opposition with indicators known from the prior art such as WO-A-2012156704 or WO-A-2013068081, the indicator mechanism of the invention does not rely on any wicking effect nor any chemical reaction effect but simply on a colour change of a solid soluble dye through wetting. Indication is therefore much faster and direct upon activation of the user-activated component. The indicator arrangement of the filter of the invention is further much simpler in structure and consequently much easier and cost-effective to manufacture.

The indicator material may be a lipophilic (i.e. oil soluble) or hydrophilic (i.e. water soluble) solid dye. The term "dye" in this context to be understood generally, encompassing a dye, pigment, or other solid colourant, directly applied to the wrapper of the filter by projection or coating in a binder or evaporable solution for example. The solid character of the dye used in the present invention is particularly important to ensure the speed of indication upon wetting of the wrapper. As such, the activation of the indicator material occurs directly through wetting of the solid dye with liquid from the user-activated component upon rupture thereof, which makes indication almost instantaneous and advantageous over known indicators from the prior art. As such, the indicator component is part of an indicator arrangement of the filter.

The indicator material may be provided on an inner or outer surface of a substantially permeable wrapping material (i.e. a filter plug wrap). In the context of the present invention, the terms "permeable wrapping material" should be understood as referring to any material showing both liquid and air permeability.

The substantially permeable wrapping material may be formed, for example, out of a substantially impermeable wrapping material such as an impermeable coated plug wrap having at least one uncoated section surrounding

the section of the filter material containing the user-activated component. The substantially impermeable plug wrap can also be made locally permeable through mechanical piercing for example.

5 In a variant, the substantially permeable wrapping material may be an individual uncoated or porous plug wrap located between the filter material and a second impermeable plug wrap, said porous plug wrap surrounding the filter section or segment containing the user-activated component while the other section(s) or segment(s) are wrapped with the second impermeable plug wrap.

10 In a preferred embodiment of the invention at least one permeable plug wrap is used as a first wrapper in combination with at least a second wrapper which is a tipping paper for attaching the filter to a tobacco rod, the second wrapper is provided at least around a portion of the substantially permeable wrapping material and the indicator material can be provided on an inner surface of the second wrapper. The second wrapper may preferably comprise at least
15 one visualisation area for allowing visualisation of the activated indicator material.

The tipping paper may comprise a protective coating on an inner surface opposing the filter material to contend running of the indicator material to certain area(s) of the tipping paper (i.e. beyond visualisation area(s)) upon wetting of the
20 indicator material after activation of the user-activated component.

Preferably, the tipping paper may comprise at least one window, such as a cut-out or a transparent section, for example, allowing visualisation of the indicator material after activation of the user-activated component.

25 In a further embodiment of the invention, a single tipping paper can also be used as the at least one wrapper surrounding the filter material. In such case, the tipping paper can be a laminated tipping paper comprising a first inner layer being at least locally permeable and having the indicator material thereon at the permeable location(s) of the inner layer and at least a second outer layer being impermeable to prevent liquid and indicator material to run to the outside surface
30 of the tipping paper, and therefore the filter.

The liquid containing user-activated component may be a flavour releasing means and may be in the form of a frangible capsule or a capsule provided with a valve. In the latter case, the flow of the liquid is advantageously controlled by the operation of the valve.

5 According to the present invention there is also provided a smoking article comprising the filter as described above.

An example of the present invention will now be described with reference to the accompanying drawings, in which:

10 Figures 1 is a schematic side cross-sectional view of a smoking article employing a filter according to the present invention;

Figure 2 is a schematic end view of the smoking article of Figure 1, showing details of the indicator arrangement;

15 Figures 3A and 3B show alternative methods of providing the indicator material resulting in different structures of the capsule/indicator interface; and

Figure 4 shows an exemplary smoking article provided with a filter formed according to the present invention.

20 Referring to Figure 1 showing a first embodiment of a smoking article and filter according to the invention, a smoking article 1, for example a cigarette 1, comprises a tobacco rod 2 and a filter 3. In use, a smoking article 1 is lit at a free distal end 2a of the tobacco rod 2 and smoke is drawn from this distal free end 2a of the tobacco rod 2 through the filter 3 and onto a proximal end 3b of said filter 3 where it is inhaled by a user. The filter may comprise any known filter
25 material 3c, such as acetate tow.

Usually the tobacco rod 2 is surrounded by a wrapping 6, usually made of paper, which acts to retain the tobacco rod 2 in place and to direct the smoke towards the filter 3.

30 The cigarette 1 further comprises at least one wrapper surrounding the filter 3. More specifically as show in Figure 1, a first wrapper in the form of a plug wrap 7 made out of an at least locally air and liquid permeable wrapping material surrounds the filter material 3c and a second wrapper in the form of a tipping material 4, for example made out of impervious paper, surrounds the filter 3 and plug wrap 7 and extends over the wrapping 6 of the tobacco rod 2 to connect

them together. The tipping material 4 retains a proximal connecting end 2b of the tobacco rod 2 and a distal connecting end 3a of the filter 3 in abutment against each other to provide structural integrity to the smoking article 1 and allow proper guiding of the smoke from the distal end 2a to the proximal end 3b of the smoking article 1.

The filter 3 comprises a user-activated component 5 which may be a frangible or breakable capsule containing liquid which is released when the capsule is crushed by the user. For example, the user-activated component may be a fluid emitting device such as a capsule filled with a liquid solution such as a water- or oil-based solution. In alternative examples, the user-activated component 5 may take other forms, such as a capsule provided with a valve (i.e. a 'valve capsule') for controlling the fluid flow, or multiple capsules, provided all such forms allow for releasing liquid upon activation by the user.

The liquid solution contained in the user-activated component 5 may further comprise a smoke altering component or substance, for example a flavour altering substance which alters the flavour of the smoke when the user-activated component 5 is activated. The smoke altering component may be provided as an additive in the liquid contained in the user-activated component for example.

The activation of the user-activated component 5 by a user may take place for example by compression, in which case the capsule is broken to release the liquid, or by twisting to provide a similar effect. If activation is achieved via twisting then the filter 3 may be provided with two components that can be twisted with respect to one another, the twisting applying a force to the user-activated component 5 in order to activate it. In all cases, the activation of the user-activated component 5 results in the release of the liquid contained in the component 5.

The plug wrap 7 is preferably made out of a wrapping material that is substantially permeable at least around a transverse section of the filter material containing the user-activated component 5. The plug wrap 7 can for example be made out of a fully porous and permeable woven or non-woven material. Alternatively, it can also consist of an impermeable coated plug wrap that is locally uncoated so that at least a section of the plug wrap 7 is permeable or

simply rendered locally permeable through direct mechanical piercing to make it locally permeable to liquid released from the user-activated component 5.

The plug wrap 7 forms part of an indicator component which indicates to a user when the user-activated component 5 has been activated. In a first preferred embodiment and referring to Figure 2, an inner surface of the permeable plug wrap 7 may be provided with an indicator material 8 which dissolves in direct contact with the liquid contained in the user-activated component 5. The indicator material 8 may be a solid dye, pigment, or colourant being soluble in oil or water for example, i.e. which is either hydrophilic or lipophilic depending on the nature of the solution in the user-activated component 5. Typical oil-soluble dyes include, for example, 'solvent red 195', 'solvent violet 13' (CI number 60725), Sudan III (CAS number 85-86-9), paprika (E number E160c), or dyes available in oil-soluble forms, such as E100 Curcumin. Typical water-soluble dyes include, for example, E101 Riboflavin (vitamin B2), E164 Saffron, or E142 Green S. By using solid soluble dyes, pigments, or colourants, no 'wicking materials' or capillary effect nor any chemical reaction is necessary to activate the indicator component of the filter of the invention. Further, the use of dyes, and particularly solid dyes, improves the speed of indication of activation, with a colour appearing on a surface of the plug wrap 7 holding such dye within 0,001 and 1 second after the liquid is released in the filter material, i.e. almost instantaneously.

Examples of alternative embodiments of a filter according to the invention with various ways for providing the indicator material 8 in the filter are shown in Figures 3A and 3B.

Figure 3A shows a filter as previously discussed in reference to Figure 2 where the indicator material 8 is being provided on an inner surface of the plug wrap 7. As previously described, in such embodiment at least the section of the plug wrap 7 where the indicator material 8 is deposited is a permeable section, i.e. a section deprived of any impervious coating or perforated to render the plug wrap locally permeable. The tipping paper 4 may be a transparent tipping material or, as represented, a regular tipping paper 4 comprising a visualisation window 9 shaped (for example by a cut-out portion) into the tipping paper 4 above the section of the plug wrap holding the indicator material 8. Thereby, when the user-activated component 5 is broken, for instance a breakable

capsule containing water and/or a flavouring liquid, the liquid runs through the filter material 3c towards the indicator material 8, which is thereby dissolved and runs through the plug wrap 7 to appear on the plug wrap 7 within the visualization window 9 in the tipping paper 4.

5 Alternatively, the indicator material 8 may be provided on the outer surface of the plug wrap 7 or an inner surface of the tipping paper 4 (not shown). Preferably, the boundary of the indicator on the tipping paper 4 is controlled for example by using a coating on the tipping paper and leaving the indicator area, wherein the material 8 is visualised, uncoated.

10 Figure 3B shows another embodiment of a filter 3 according to the present invention. In this second embodiment the filter 3 comprises a permeable plug wrap 7 around the filter material 3c and a laminated tipping paper 10 comprising an inner absorbent and permeable layer 10b and an outer impermeable layer 10a. The indicator material 8 is being provided onto the
15 absorbent inner layer 10b. The outer layer 10a of the laminated tipping paper 10 may be transparent and/or may be provided with a shaped window 9. In this way, when the user-activated component 5 is broken, for instance a breakable capsule containing flavouring liquid, the liquid flows through the filter material 3c and through the plug wrap 7 to contact the indicator material 8 on the inner layer
20 10B of the laminated tipping paper 10. Upon dissolution, the indicator material 8 appears on the inner layer 10b of the laminated tipping paper 10 and in the visualization window 9 of the outer layer 10a of the tipping paper 10. In this alternative structure, the plug wrap 7 may be a partially or fully permeable plug wrap 7. It must be noted here that in such embodiment the plug wrap 7 is fully
25 optional and that the tipping paper 10 could be used as single wrapping material for the filter 3.

In the above described embodiments of the invention, the indicator material 8 can be provided to the plug wrap or tipping paper according to the method described in GB2261152A.

30 An exemplary method of producing a filter in accordance with the present invention comprises in a first step the formation of a standard continuous filter rod of acetate including crushable capsules including water or a flavouring liquid inserted with regular spacing within the filter rod. Said filter rod is being wrapped along its formation with a standard impermeable plug wrap, i.e. a coated plug

wrap (typically, with water-based coating applied at 3.0g/m^2) which was previously machine or laser pierced to make it locally permeable, and preferably with the same regular spacing as the spacing between consecutive capsules in the filter rod. Advantageously, the filter rod and plug wrap are adjusted such that areas of the plug wrap being permeable are wrapped in registry with the sections of the filter rod containing the crushable capsules. An indicator material such as a solid dye in powder form or the like may advantageously be provided on an inner or outer surface of the plug wrap in the permeable sections thereof before the plug wrap is wrapped around the filter rod. This first step can, for example, be carried out according to a method as described in GB2261152A, wherein the solid dye is the adhered additive.

Then, in a second step, the continuous filter rod is cut into individual filter plugs for the formation of smoking articles. In a third step, the individual filter plugs are attached to a tobacco rod by means of a transparent or shaped impermeable tipping material surrounding both the filter plug and an end of the tobacco rod as per normal smoking article manufacturing. If the tipping material is shaped, i.e. contains cut-out windows, the wrapping of the tipping paper is made such that the cut-out windows are wrapped in registry with the permeable sections of the plug wrap in the filter plugs.

A cigarette product 11 including a filter 3 according to the invention as described above with reference to Figure 3A or 3B is shown in Figure 4. Upon crushing of the user-activated component of the filter (e.g. a capsule) by the user, the dissolved indicator material (e.g. a soluble dye) is visible through the cut-out windows 9 in the tipping paper 4, 10. In this example, the cut-out windows 9 span the entire circumference of the filter in order to indicate activation of the capsule at more than one location. Such 'windows' in the tipping paper 4, 10 also enable shaping of the filter tipping paper to provide any interesting visually appearing symbol, logo or the like through activation of the indicator component. Alternatively, cut-out sections may be provided for example at only two locations coinciding with the crush points of the capsule to indicate to the user where to press the capsule in order to activate it. Alternatively or additionally to the cut-outs, the tipping paper may be provided with windows in the form of transparent sections which allow visualisation of the activated dye.

It will be appreciated that providing the substantially permeable wrapper of the filter according to the invention can be achieved following different well-known methods. For example, the permeable wrapping material may be formed as an uncoated section in a coated or partially coated commercially available plug wrap material. Perforations may alternatively be employed to create permeability in a fully coated commercially available plug wrap. Another alternative could also be to have a filter 3 made of individual segments wherein the segment(s) comprising a user-activated component (capsule) therein are individually wrapped with a porous or permeable plug wrap while the other segments are individually wrapped with an impervious plug wrap, all segments then being wrapped with a single layer of porous plug wrap and then tipping paper as in any known multi-segment filter.

With the configuration of the filter of the present invention it is possible to provide a filter 3 with a user-activated component 5 which alters a smoking experience yet still provides certainty to the user that activation has occurred on a simple and effective manner that is not dependent upon the component or material being used for altering that smoking experience.

CLAIMS

1. A filter (3) for a smoking article, the filter comprising filter material (3c) and at least one liquid containing user-activated component (5) for altering smoke passing through the filter, the filter material being wrapped with at least one wrapper (7, 10) surrounding at least a portion of the filter material (3c), a surface of the at least one wrapper being provided with an indicator material (8) that is activated through wetting with liquid released by the user-activated component (5) upon activation of the user-activated component (5) and provides a visual indication of said activation in said at least one wrapper between 0,001 and 5 seconds after said liquid is released by the user-activated component (5).
2. A filter (3) according to claim 1, wherein the visual indication of said activation is provided less than 1 second after said liquid is released by the user-activated component (5).
3. A filter (3) according to claim 1 or claim 2, wherein the indicator material (8) is provided on a surface of a substantially permeable wrapping material (7, 10b).
4. A filter (3) according to any one of the preceding claims, wherein a second wrapper (4) is provided for attaching the filter to a tobacco rod (2), wherein the second wrapper (4) comprises at least one visualisation area (9) for allowing visualisation of the activated indicator material (8).
5. A filter (3) according to claim 4, wherein the at least one visualisation area comprises a cut-out (9) in the second wrapper (4) or at least one transparent section (9) in the second wrapper (4).
6. A filter (3) according to any one of claims 4 or claim 5, wherein the second wrapper (4) comprises a protective coating for preventing the liquid to reach the second wrapper (4) upon activation of the indicator material (8) except in the visualisation area.

7. A filter according to any of claims 1 to 6, wherein the indicator material (8) is provided on an inner surface of the second wrapper (4).
8. A filter (3) according to any one of the preceding claims, wherein the liquid releasing user-activated component (5) is a flavour releasing means.
9. A filter (3) according to any one of the preceding claims, wherein the liquid releasing user-activated component (5) is in the form of a frangible capsule or a valve.
10. A filter (3) according to any one of the preceding claims, wherein the filter material is further surrounded by at least one substantially impermeable wrapping material, preferably a coated plug wrap.
11. A filter (3) according to claim 10, wherein the substantially permeable wrapping material is formed as an uncoated section in the coated plug wrap.
12. A filter (3) according to claim 10 or claim 11, wherein the substantially permeable wrapping material is an uncoated plug wrap located between the filter material and the impermeable wrapping material.
13. A filter (3) according to any one of the preceding claims, wherein the indicator material (8) is a lipophilic solid dye provided in the at least one wrapper.
14. A filter (3) according to any one of the claims 1 to 13, wherein the indicator material (8) is a hydrophilic solid dye provided in the at least one wrapper.
15. A smoking article (1, 11) comprising a filter (3) according to any one of claims 1 to 14.