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(54) **Smoking article**

(57) A smoking article comprises a distal end which, in use, contains a smoke producing substance. A proximal end has smoke drawn from it during smoking. At least one channel is provided which runs from the proximal end to at least part way towards the distal end. At least one vent hole is arranged such that an airflow path is defined through the vent hole, via the channel and to

the proximal end of the smoking article. A smoke supplement composition is housed along the airflow path, such that, when the smoking article is smoked, air is drawn along the airflow path and over the composition so that the composition becomes air born and is delivered to the smoker.

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Description

[0001] This invention relates to a smoking article.

[0002] Modern smoking articles aim to reduce the delivery of tar, carbon monoxide and other vapour phase components. Using cigarettes as an example, the quest for controlled delivery is typically achieved by altering blend choice, envelope ventilation, tip ventilation, filtration and filter adsorbents such as activated carbon. These methods, however, are known to compromise the delivery of other cigarette components, or 'smoke supplement compositions', for example flavour. This is detrimental to characteristics such as taste, in particular with regard to high ventilation, low tar type products.

[0003] Methods of combatting the above-described detriment to qualities such as taste are known, for example by introducing additional flavours into either the blend or the filter. Both of these options, however, can exhibit disadvantages such as the reduction of filter effectiveness due to the presence of flavour in (or the migration of flavour to) the filter or the filter adsorbents, the incomplete transfer of flavour to the smoker (for example due to combustion of the flavour, or due to extraction of the flavour by the filter), and the dilution of the flavour by other vapours produced by the smoking article. Since the introduction of additional flavour is an expensive process, maximum transfer of this flavour to the smoker is of utmost importance.

[0004] It is therefore necessary to formulate an improved method of introducing smoke supplement compositions such as flavour into smoking articles, such that the detriment to qualities such as taste which can occur in association with the controlled delivery of for example tar and carbon monoxide can be effectively overcome without the above-mentioned disadvantages.

[0005] The present invention provides a smoking article comprising a distal end which, in use, contains a smoke producing substance, a proximal end from which the smoke is drawn during smoking, and at least one channel which runs from the proximal end to at least part-way towards the distal end. At least one vent hole is arranged such that an airflow path is defined through the vent hole, via the channel, and to the proximal end of the smoking article. A smoke supplement composition is housed along this airflow path, such that, when the smoking article is smoked, air is drawn along the airflow path and over the composition so that the composition becomes airborne and is delivered to the smoker.

[0006] Such a smoking article exhibits what will now be termed as a "parallel delivery system", ie. a system wherein a smoke supplement composition such as flavour, nicotine, nicotine derivatives, pharmacologically active agents or smoke modifiers is delivered parallel to, rather than in series with, smoke from the smoke producing substance. Such a "parallel delivery system" improves delivery of the smoke supplement composition, and in the case of delivery of flavour, this improves the flavour of the smoking article while overcoming the prob-

lems associated with prior art flavour improvement methods.

[0007] In detail, the present invention does not give rise to pyrolysis or combustion of the smoke supplement composition since the composition receives at most only mild heating. Migration of the composition to other parts of the smoking article is reduced since the composition is confined to the airflow path, and delivery of the composition is not hindered by dilution with other vapours from the smoking article - in contrast delivery is most effective at high dilution levels, ie. when airflow is high.

[0008] Furthermore, the composition is not subject to significant filtration, there is a fixed amount of composition, and blocking the ventilation holes actually reduces delivery of the composition rather than increasing it.

[0009] Smoking articles according to the present invention include cigars, cigarettes, hookahs and pipes, and preferably the smoking article of the present invention is a cigarette. It is additionally envisaged that smoking articles which require the final stages of their manufacture to be performed by the smoker, for example ready formed hollow tubes containing a filter into which a smoker inserts tobacco, are also within the scope of the invention. Further 'roll your own' or 'make your own' smoking articles according to the invention are envisaged wherein such smoking articles typically use components commercially available for use in the making of smoking articles and/or commercially available accessories for use in conjunction with smoking articles.

[0010] Typical smoke producing substances comprise dried plant matter, for example tobacco.

[0011] Generally the smoke producing substance takes the form of an amorphous mass or a rod. The smoke producing substance is housed within the smoking article, typically within an area towards the distal end of the smoking article. This area generally extends along the direction of a longitudinal axis of the smoking article. When the smoke producing substance takes the form of a rod, the rod of smoke producing substance is optionally hollow.

[0012] The smoking article preferably comprises a filter and generally such a filter is situated at the smoking article's proximal end. Preferably the filter is within or covering the proximal end of any area containing the smoke producing substance such that, in use, smoke from the smoke producing substance is filtered prior to delivery to a smoker.

[0013] The at least one channel of the smoking article is typically substantially parallel to the direction of longitudinal extension of the area of the smoking article containing the smoke producing substance. The at least one channel is however distinct from any such area.

[0014] An airflow path along the at least one channel is defined from at least one vent hole, typically positioned on an outside face of the smoking article, through the channel to the proximal end of the smoking article.

[0015] In the case of the smoking article being a cigarette, at least one vent hole is typically positioned in the

tipping paper of the cigarette.

[0016] Generally the cross-section of the at least one channel is between 0.1 and 50% of the cross-section of the smoking article, preferably between 0.1 and 30% and more preferably between 5 and 20%. As the cross-section of the at least one channel is reduced, the air velocity through the channel increases, thus enhancing the entrainment of the smoke supplement composition into the airflow and hence to the smoker. Some formulations of a smoke supplement composition (eg those comprising glycerol) may require some heat to aid their transfer into the airstream, and this may be accomplished by providing the smoke producing substance as a hollow rod, and/or providing a filter having a high pressure drop core, such that the heated smoke stream passes in close proximity to the smoke supplement composition which is at the perimeter of the filter.

[0017] The entrainment of the smoke supplement composition into the airflow can also be improved by increasing channel length, for example by using channels that spiral around the smoking article. A further option is to increase convolution of the airflow path, and/or to introduce turbulence into the airflow path, for example by introducing kinks or baffles into the channels.

[0018] The at least one channel of the present invention is typically defined as a generally concave cavity within a body, wherein the body is comprised within the smoking article. In this case the at least one channel is generally formed by pressing a heated rod into the body. Alternatively the at least one channel is defined by a corrugated wrapping substance being placed around a body comprised within the smoking article.

[0019] The airflow path may additionally comprise a cavity which, in use, stores the smoke supplement composition. Alternatively or additionally, the smoke supplement composition is stored within the at least one channel. Typically the smoke supplement composition is placed into the cavity/channel by any known means either before, after or during manufacture, such as by injection, pasting, printing or depositing.

[0020] Typically the smoke supplement composition comprises nicotine or a nicotine derivative, and optionally it further comprises one or more substances selected from a flavourant, a pharmacologically active agent or a smoke modifier.

[0021] Pharmacologically active agents include for example antioxidants such as vitamin C or E, which act to reduce the impact of free radicals within the smoke. Smoke modifiers act to reduce the level of undesirable compounds in the smoke, preferably by acting on the smoke after its exit from the smoking article but before its absorption into the body of the smoker. The level of undesirable components can be reduced by chemical reaction of the undesirable component (eg radicals) with the smoke modifier (eg an antioxidant) to deactivate the undesirable component, or by reaction of the undesirable component (eg radicals) with another component to deactivate the undesirable component wherein this reaction

is catalysed by a smoke modifier (eg an iron catalyst). Alternatively, the undesirable component can be adsorbed into or amalgamated with a smoke modifier matrix (eg a matrix of fine carbon granules). Such absorption/amalgamation can reduce the availability of the undesirable component and/or alter the way the undesirable component is deposited within the airways of the smoker (eg if particles of undesirable component are made sufficiently large, these particles will be non-respirable).

[0022] Any of the one or more substances, and/or any nicotine or nicotine derivative, can be encapsulated or micro encapsulated, typically prior to being introduced into the smoke supplement composition. Suitable encapsulation or micro encapsulation materials include starch, gum acacia, glycerol, gelatine, albumin or cyclodextrin. Encapsulation or micro encapsulation can be used as a method to contain volatile compounds.

[0023] The smoke supplement composition can further comprise a substrate material such as a web or film, or such as solid particles for example cyclodextrin. Any of the above mentioned nicotine/nicotine derivatives and/or one or more substances (such as flavourant, pharmacologically active agents or smoke modifiers), all of which can optionally be encapsulated as described above, can be comprised within or on the substrate material. Optionally the substrate material becomes entrained in the ventilation air.

[0024] The vent holes and/or proximal ends of the grooves of the smoking article are optionally removably sealed such that during storage any volatile smoke supplement composition cannot migrate out of the channels and onto other parts of the smoking article, or onto any filter or packaging.

[0025] Suitable removable seals include a removable sleeve for the smoking article, for example a sleeve that slides over the proximal end of the article. Such a sleeve could be made from a polymer such as cellophane. Alternatively, a "tear tape" for the vent holes and/or the proximal ends of the channels can be incorporated, wherein this "tear tape" can be made from any suitable polymer such as cellophane.

[0026] In a similar manner, it is preferable that the channels comprise an impermeable barrier such that, in use, the smoke supplement composition does not migrate out of the channels in any way other than along the airflow path during smoking.

[0027] Examples of the present invention will now be described with reference to the accompanying drawings, in which:

Figure 1 shows the main design aspects of a conventional cigarette;

Figure 2 shows a conventional cigarette with a compound filter containing an adsorbent;

Figure 3 shows the main airflow paths of a conventional cigarette with a compound filter;

Figure 4 shows the main airflow paths within a cigarette with a parallel delivery system according to

the present invention;

Figure 5 shows a filter plug with channels arranged to enable parallel delivery according to the present invention;

Figure 6 shows a filter plug with alternative channels arranged to enable parallel delivery according to the present invention;

Figure 7 shows a cross-section of a filter plug with channels to enable parallel delivery according to the present invention;

Figure 8 shows a cigarette according to the present invention comprising a cavity in which to store smoke supplement composition;

Figure 9 shows a perspective view of the filter of Figure 8;

Figure 10 shows a cigarette according to the present invention comprising a hollow tobacco rod; and

Figure 11 shows a cross-section of a cigarette according to the present invention, wherein the cigarette uses corrugated outer plug wrap arranged to form channels.

[0028] Looking first at Figure 1, this shows the main design aspects of a conventional cigarette 10. The cigarette 10 has a proximal end 11, and at this proximal end 11 there is provided a cylindrical cellulose acetate filter 12. This filter is wrapped with a porous plug wrap 13, and is then wrapped with a tipping paper 14. A tipping paper 14 comprises vent holes 15 which form a ring around the cylindrical filter 12. Adjoining the filter 12 at its distal end is a tobacco rod 16. This tobacco rod 16 is wrapped with cigarette paper 17.

[0029] Looking now at Figure 2, this shows a conventional cigarette with a compound filter containing an adsorbent. The compound filter comprises a cellulose acetate segment 22 at the cigarette's proximal end 11 and an adsorbent containing segment 22' adjoining the distal end of the cellulose acetate segment 22. In all other respects the cigarette is as depicted in Figure 1.

[0030] Figure 3 shows the main air flow paths of a conventional cigarette as depicted in Figure 2. In detail, when the cigarette of Figure 2 is smoked, air is drawn through the tobacco rod 16 and through the adsorbent containing filter segment 22' and into the cellulose acetate filter segment 22. At this point extra air is drawn through the vent holes 15 and into the cellulose acetate filter segment 22. This air mixes with the air from the adsorbent containing filter segment 22' and all of the air is drawn out of the proximal end 11 of the cigarette by the smoker.

[0031] Figure 4 shows the main airflow paths within a cigarette with a parallel delivery system according to the present invention. In detail, air is drawn through the tobacco rod 16 and subsequently through the adsorbent containing filter segment 22' and into the cellulose acetate filter segment 22 as already described with regard to Figure 3. This air is further drawn out of the proximal end of the cigarette 11 by the smoker. In contrast to Figure 3, however, extra air entering via the vent holes 15 is

drawn along the channels 41 containing smoke supplement composition 42. This extra air does not mix with the air from the tobacco rod 16 but instead is confined to the channels 41 and is drawn out of the proximal end of the cigarette 11 by the smoker.

[0032] Figure 5 shows a filter plug with channels to enable parallel delivery according to the present invention. As can be seen, substantially straight, parallel channels 41 are formed in the cellulose acetate filter segment 22. The distal ends of the channels 41 align with vent holes 15 (not shown).

[0033] Figure 6 shows a filter plug with alternative channels to enable parallel delivery according to the present invention. In contrast to Figure 5, the channels 41 are arranged so as to extend substantially longitudinally whilst also exhibiting radial progression around the axis of the filter segment 22. This arrangement increases the length of the channels 41 and can therefore increase the capability of the cigarette to deliver smoke supplement composition.

[0034] Figure 7 shows a cross-section of a filter plug with channels arranged to enable parallel delivery according to the present invention. As can be seen, the channels 41 are formed from concave depressions within the filter 22.

[0035] Figure 8 shows a cigarette according to the present invention comprising a cavity 81 in which to store smoke supplement composition. In detail, air is drawn through the tobacco rod 16 and subsequently through the adsorbent containing filter segment 22' and into the cellulose acetate filter segment 22 as already described with regard to Figure 3. This air is further drawn out of the proximal end of the cigarette 11 by the smoker. In a similar manner to Figure 4, extra air is drawn in through the vent holes 15 and passes over smoke supplement composition 42 which is contained within a cavity 81. This air then passes along the channels 41 and is drawn out of the proximal end of the cigarette 11 by the smoker.

[0036] Figure 9 shows a perspective view of the filter of Figure 8. As can be seen, the cellulose acetate filter 22 comprises a cavity 81, in airflow connection with channels 41, which extend to the proximal end of the cigarette 11. The cavity 81 aligns with the vent holes 15 (not shown).

[0037] Figure 10 shows a cigarette according to the present invention comprising a hollow tobacco rod. In detail, air is drawn through the tobacco rod 16 and into the hollow core of the rod 101. This air then passes through the adsorbent containing filter segment 22' and into the filter segment 102. This filter segment 102 comprises a high pressure drop core 103, and the airflow from the adsorbent containing filter segment 22' passes between the high pressure drop core 103 and the channels 41, and is subsequently drawn out of the proximal end of the cigarette 11 by the smoker. As described with regard to Figure 4, the extra air entering via the vent holes 15 is drawn along the channels 41 containing the smoke supplement composition 42. This extra air does not mix

with the air from the tobacco rod 16 but instead is confined to the channels 41 and is drawn out of the proximal end of the cigarette 11 by the smoker.

[0038] Figure 11 shows a cross-section of a cigarette which uses corrugated outer plug wrap 112 arranged to form channels. In detail, the channels 111 are formed by placing corrugated outer plug wrap 112 around the outside of the cellulose filter 22. The corrugated outer plug wrap 112 is separated from the filter 22 by inner plug wrap 113, and the channels 111 formed by the corrugated outer plug wrap 112 are sealed by wrapping tipping paper 14 around the corrugated outer plug wrap 12. The grooves extend only part way down the filter and do not come into contact with the tobacco rod (not shown).

Claims

1. A smoking article comprising:

a distal end which, in use, contains a smoke producing substance;
 a proximal end from which this smoke is drawn during smoking;
 at least one channel which runs from the proximal end to at least part way towards the distal end;
 at least one vent hole arranged such that an airflow path is defined through the vent hole, via the channel, and to the proximal end of the smoking article;
 a smoke supplement composition, the composition being housed along the airflow path, such that, when the smoking article is smoked, air is drawn along the airflow path and over the composition so that composition becomes airborne and is delivered to the smoker.

2. A smoking article according to claim 1, wherein the smoke supplement composition comprises nicotine or a nicotine derivative.

3. A smoking article according to claim 1 or 2, wherein the smoke supplement composition includes at least one substance from the group of: flavourants, pharmacologically active agents, and smoke modifiers.

4. A smoking article according to claim 1, 2 or 3, wherein the at least one substance is encapsulated.

5. A smoking article according to claim 4, wherein the substance is encapsulated with cyclodextrin.

6. A smoking article according to any of claims 1 to 5, wherein the smoke supplement composition comprises a web or film.

7. A smoking article according to any preceding claim,

wherein the smoke supplement composition comprises solid particles.

8. A smoking article according to any preceding claim, wherein the composition is housed within cavities along the airflow path.

9. A smoking article according to any preceding claim, wherein, during storage, the vent holes and/or the proximal ends of the channels comprise a removable seal.

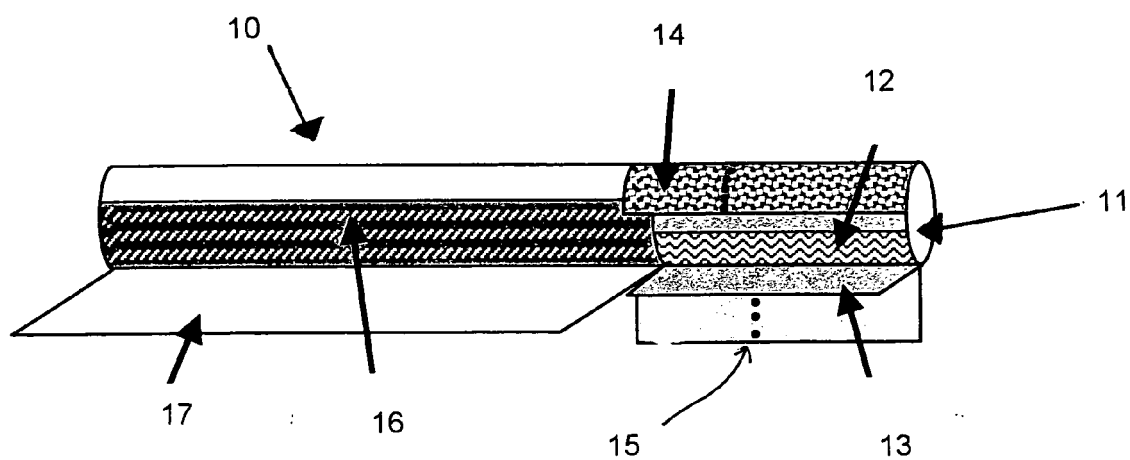
10. A smoking article according to any preceding claim, wherein the at least one channel comprises an impermeable barrier such that, both during storage and during smoking, the smoke supplement composition does not migrate out of the at least one channel in any way other than that specified in claim 1.

11. A smoking article according to any preceding claim, wherein the smoking article is a cigarette comprising a filter.

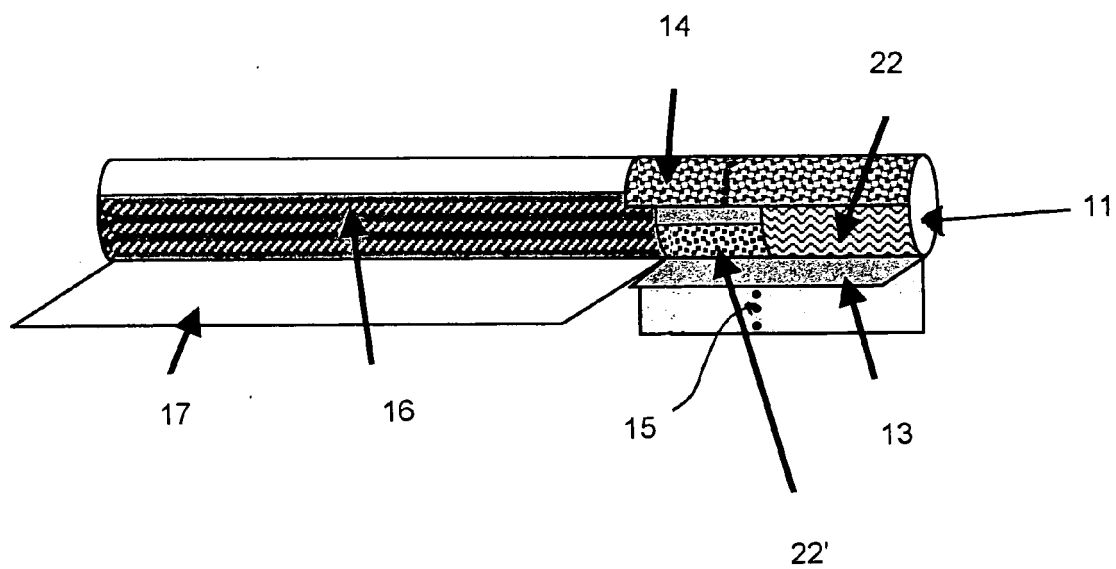
12. A smoking article according to claim 11, wherein the channels are defined within the filter.

13. A smoking article according to either of claims 11 or 12, wherein the vent holes are comprised within impermeable tipping paper.

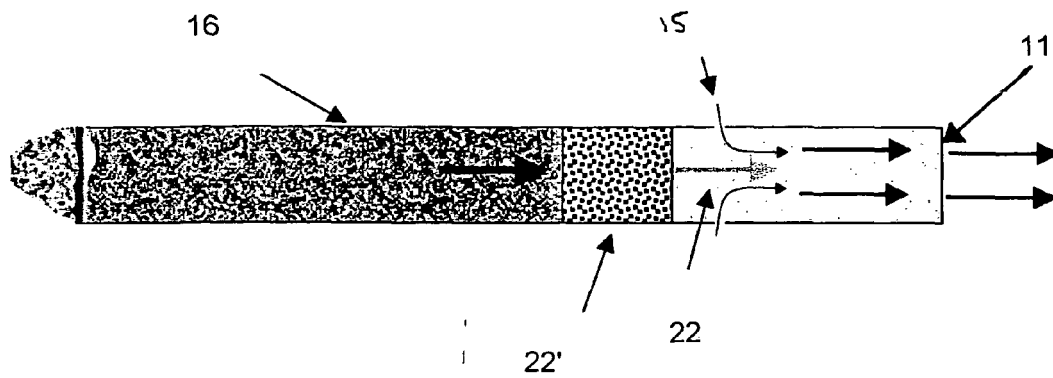
14. A smoking article according to any of claims 11 to 13, wherein the cigarette further comprises a tobacco rod with a hollow core.



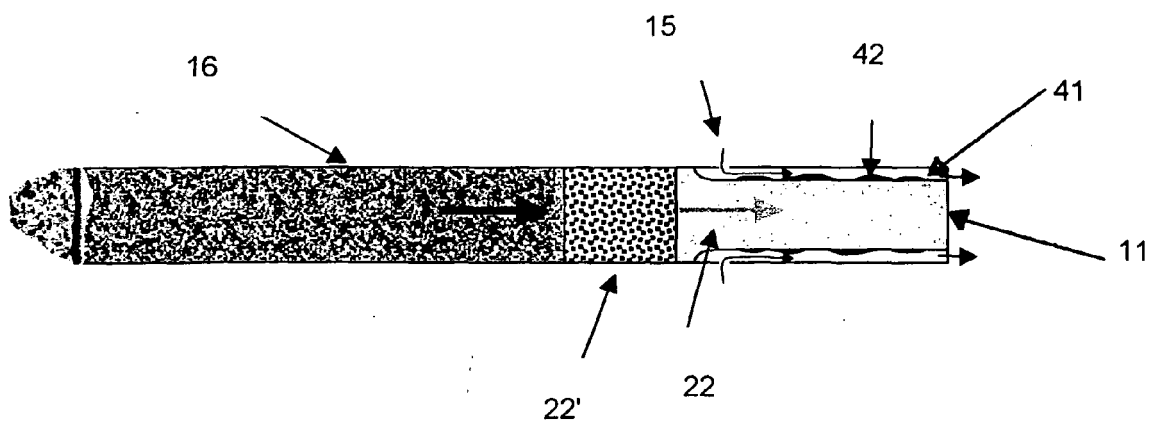
Fig(1)



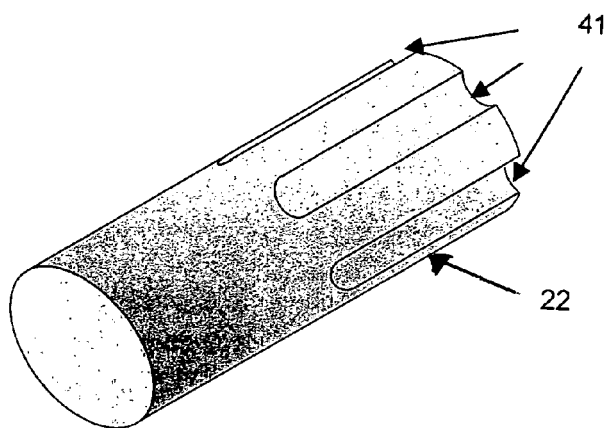
Fig(2)



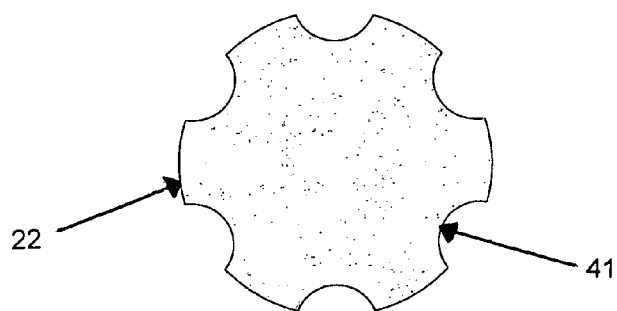
Fig(3)



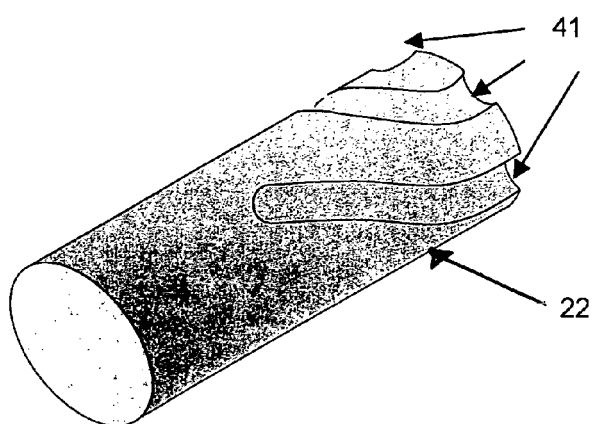
Fig(4)



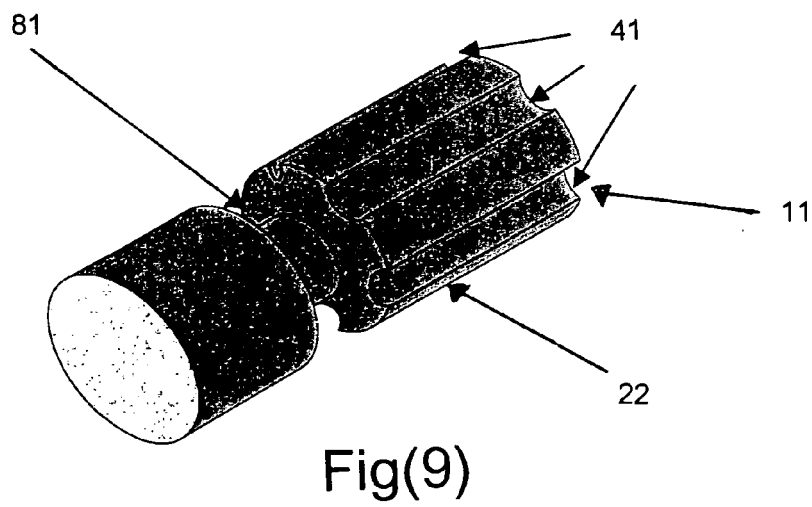
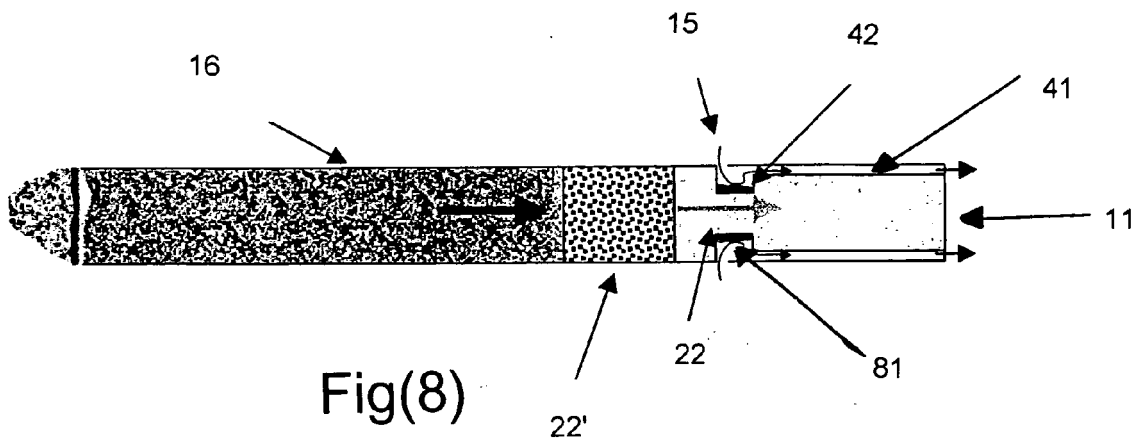
Fig(5)

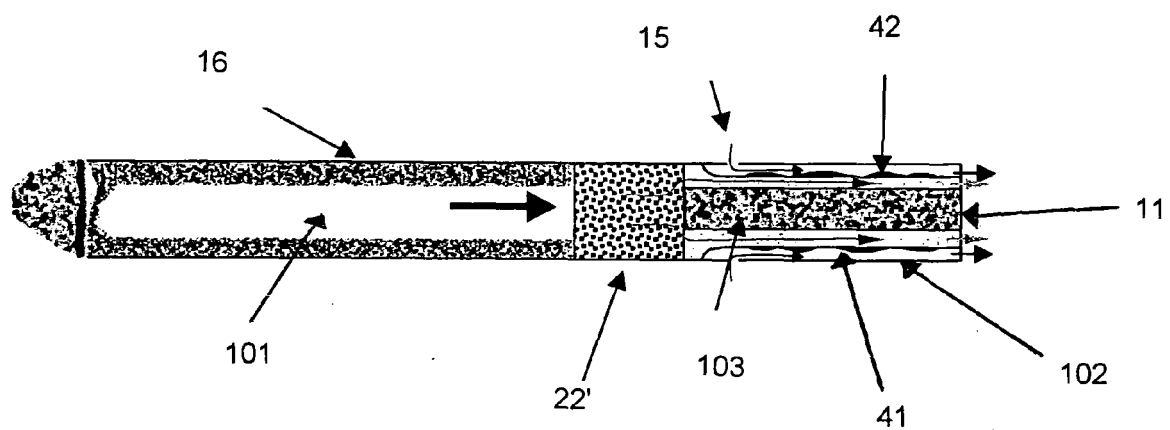


Fig(7)

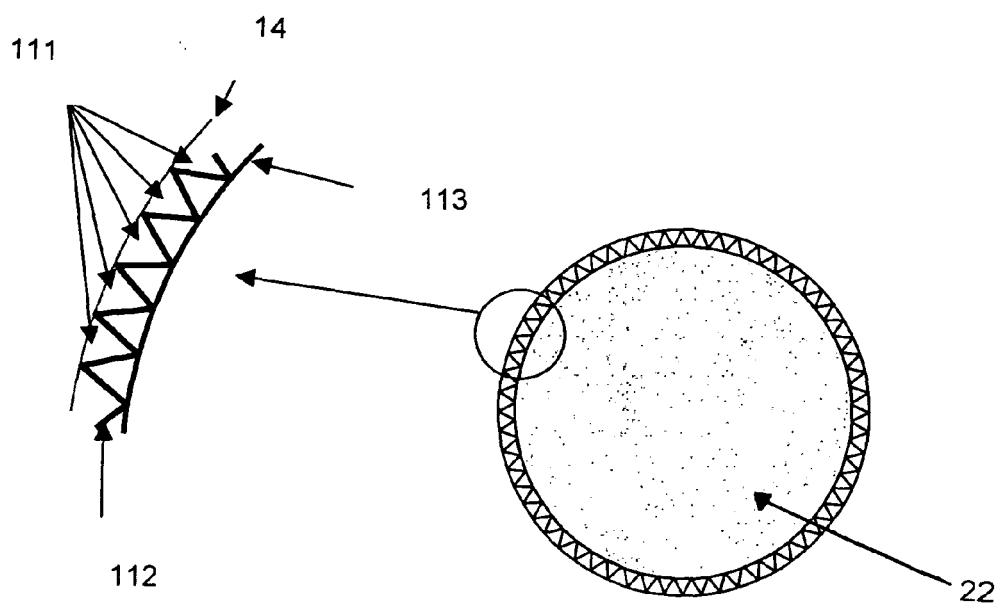


Fig(6)





Fig(10)



Fig(11)



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Place of search Munich		Date of completion of the search 18 May 2006	Examiner Pille, S
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