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(54) Filtering element to be embodied in the unsmokable section of the cigarette

(57) It is presented a new cigarette filtering element, to be embodied in the zone of the normal cellulose filter, that greatly limits and filters the absorption of carbonised elements by the smoker and by persons near to him.

The filter structure has the form of a labyrinth chamber that can have different forms, suitable for depositing the heavy carbonised products and tarry elements in the filter internal chamber.

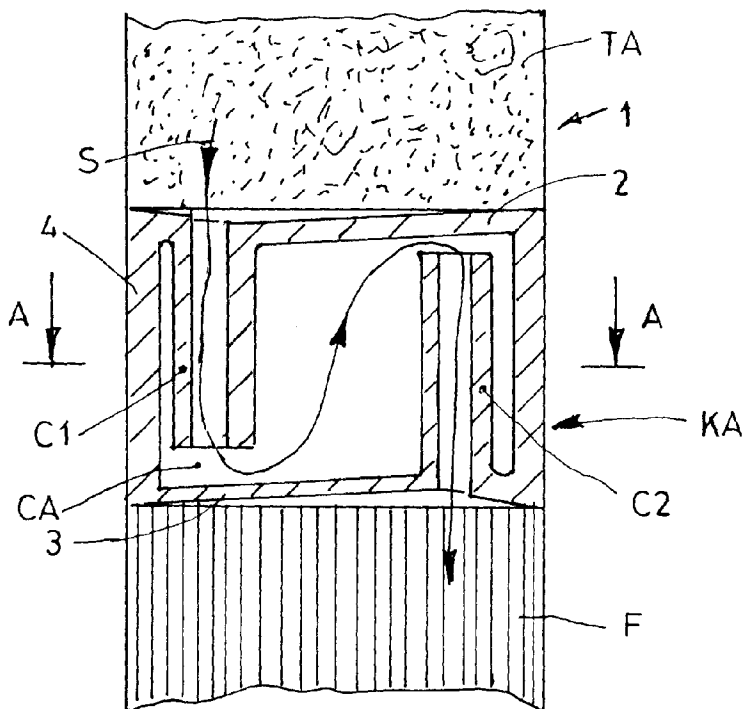


FIG. 1

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Description

[0001] The object of this model is to get the aim that was searched since a long time and wished by many persons of having a filter that approaches to a perfect filter that allows to smoke a cigarette without breathing the greatest part of carbonised elements generated by combustion of tobacco and paper that form the cigarette.

[0002] The consolidated certitude of a direct correlation of the pulmonary tumour with the tobacco smoke and the quantity of tar contained in this smoke as the major cause of this disease has caused the applicant of this utility patent application to conceive a device that can be able to greatly limit the absorption of tarry elements, and that further is a device that has dimensions and price suitable to be included in the normal filter of the cigarette, eliminating in this manner the reluctance to use a cigarette-holder, that sometimes appears to be unpleasant by the major part of smokers.

[0003] The elimination of the major part of cancerous substances from the inspired smoke, in particular at high temperature, has a double effect on the health: in first place the evident effect of reducing the smoker's risk of pulmonary tumour to one tenth of the normal risk or also to lower value, and in second place it has a great influence on the "passive smoke" as the whole tarry part is not absorbed by smoker's lungs and a great part thereof is emitted in the ambient in cooled form and made heavier by a high humidity percentage, therefore it is different from the uninspired smoke due to temperature and condensed humidity lack and it is transported by natural and physical causes into a zone inaccessible to breathing of no smoking people.

[0004] In normal cases this invention can be contained in a part of usual filter made of cellulose fibres, occupying a volume equal to one third of this normal filter and does not influence the aspect and tactile feeling of the cigarette and it seems to have a freeing effect on the smoker's psychology with the collateral effects that can be easily imagined.

[0005] The invention principle is substantially to create a labyrinth chamber of various embodiments, that allows to increase the permanence time of the smoke within the labyrinth chamber and then to deposit a greater quantity of carbonised materials, higher than the quantity deposited during the crossing of an usual cellulose filter. Further the smoke humidity is reduced as the smoke exits out of proposed filter with a temperature lower than the usual temperature owing to the longer smoke path within the filter. Further the labyrinth layout allows to get a further filter having very reduced dimensions that has a limited cost, as it can be obtained by injection molding of plastic material or cellulose-based material having low cost. The labyrinth chamber collecting the smoke is here termed as hyperbaric chamber, as it is believed that it is caused an increase of partial smoke pressure within this chamber owing to greater

resistance to the smoke passage during its outlet from the cigarette. We believe that this filter holds at least 80% of the total tar contained in the smoke of cigarette and it reduces the nicotine to low levels so that it is not harmful to health.

[0006] The running principle of the proposed filter is to generate some chambers with smoke path in serpentine or zigzag form, that reduces the smoke temperature and then its carbon deposits.

[0007] For a better comprehension of this invention and for showing how it can be put in practice, it shall be made reference, as an example, to the annexed drawings, in which:

- 15 - The Figures 1 and 1A show a first embodiment with labyrinth filter in the form of two little opposite pipes and included in a sole body;
- The Figure 2 is a second embodiment with a central element for deviating the smoke held in filter;
- 20 - The Figure 3 is an embodiment similar to the one shown in Figure 2, but with a greater number of smoke deviation elements and smoke holding chambers.

25 [0008] At first we can observe the Figure 1, that is a section of a cigarette 1 with the part TA holding tobacco and the traditional filter F with the new cartridge KA made of cellulose material or incombustible plastic material that can be porous and with rough surfaces for a better collection of carbonised materials. This cartridge KA is limited superiorly by a superior circular wall 2 and by an equal lower wall 3 and by a cylindrical wall 4 that surrounds the whole internal chamber CA. The walls 2 and 4 are crossed by two pipes C1 and C2 projecting towards the inside of chamber CA and having a length higher than the half of the thickness of cartridge KA. The walls 2 and 3 are not necessarily plate, but can be slightly conical with vertex towards the inside of the chamber CA. The path of smoke S through the pipe C1, the chamber CA and the pipe C2 is shaped in the serpentine or zigzag form. In this manner the smoke is cooled and causes a certain internal pressure increase within the chamber CA, condensing a great part of its burnt carbon content. Probably the major part of carbon formed in the combustion will be deposited on the raw internal walls of cartridge KA and then the smoke crosses the normal cigarette cellulose filter. As it can be seen in Figure 1A (section A-A1 of Figure 1), the pipes C1 and C2 are diametrically opposed for maximising the smoke path within the filter KA, reducing in this manner the heavy carbon content to the minimum possible value.

30 [0009] The Figure 2 shows a section of another filter KA formed by the superior and lower walls 2, 3, and by the cylindrical wall 4 and by a central element 5 having a truncated conical form. The superior wall 2 has a central hole 7, while the lower wall 3 has two opposed holes 8, 9, diametrically opposed and near to the filter periphery. The central body 5 is arranged on the cigarette axis,

but has a cavity 6 suitable to deviate the smoke along the path included from the two holes 8, 9 and the hole 7, so that it is increased the smoke path in a certain extent within the filter, this path having a conical spiral form, therefore it is guaranteed a longer permanence time within the internal chamber CA, that allows a better absorption of tar. In this case the proposed filter can be molded in three parts, a part forming the housing sing 3, 4, another part made by the truncated cone 5 and the third part forming the superior cover 2. The initial pas-
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 sage holes 8,9 let pass a certain smoke quantity, that in the following is braked by the presence of a sole outlet hole 7, therefore it is caused a limited pressure increase in the filter inside. Even if it is necessary to use adhesives, it will be clear to the skilled technicians that this element can be made easily by automatic machines and then its fabrication is economical.

[0010] The Figure 3 shows a third filter type with two plate walls 2,3 and cylindrical wall 4. The internal volume of filter KA cylinder holds a certain number of elements 10, substantially having a cylindrical form, supplied with protuberances 11 of various forms, but substantially in the form of ship bow, that form superiorly a plate cavity 12, therefore it is caused a high deviation of the smoke flow within the chamber KA and then the outlet from the central hole 13. A certain number of these elements 10 are overlapped, then it is generated a long serpentine path, that allows a greater carbon deposit within the internal chamber. The efficiency of this solution will be more efficacious, although its cost is greater than the preceding solutions. Although this invention was described with reference to its particular embodiments, many variants and modifications and other uses shall be evident to the skilled technicians. It is clear that all its variants and also all other possible solutions based on this principle are included in this invention and we request its priority by means of this document.

Claims

1. A new cigarette filtering element, to be embodied in the zone of the normal cellulose filter, that greatly limits and filters the absorption of carbonised elements by the smoker and by persons near to him, characterised in that said filter has a labyrinth chamber that can assume different forms suitable for depositing the heavy carbonised products and tarry elements in the filter internal chamber, having a smoke path substantially in zigzag form.
2. Filtering element as claimed in preceding claim, characterised in that it is held in a part of usual cellulose filter, using a volume equal to about a third of this usual filter and not changing the external cigarette aspect.
3. Filtering element as claimed in preceding claims, characterised in that it is generated a labyrinth chamber of various forms, substantially with zigzag path, that allows to increase the permanence time of smoke within the labyrinth chamber and then to deposit a greater quantity of carbonised elements, higher than the quantity deposited during the crossing of an usual cellulose filter and further the smoke humidity is reduced as the smoke exits from the filter at a temperature lower than the usual temperature - that is high - owing to longer smoke run time within the filter.
4. Filtering element as claimed in preceding claims, characterised in that it can be manufactured by injection molding of plastic material or made of cellulose-based material.
5. Filtering element as claimed in preceding claims, characterised in that it is made up of a cartridge (KA) of cellulose material or incombustible plastic material that can be porous and with rough surfaces for a better collection of carbonised materials, this cartridge (KA) being limited superiorly by a superior circular wall (2) and by an equal lower wall (3) and by a cylindrical wall (4) that surrounds the whole internal chamber (CA), the walls (2, 4) being crossed by two pipes (C1, C2) projecting towards the inside of the chamber (CA) and having a length higher than the half of the thickness of cartridge (KA), the walls (2, 3) being not plane, but being slightly conical with vertex towards the inside of the chamber (CA), the smoke path (S) through the pipe (C1), the chamber (CA) and the pipe (C2) being shaped in the serpentine or zigzag form, therefore the smoke being cooled and causing a certain internal pressure increase within the chamber (CA), condensing a great part of its burnt carbon content.
6. Filtering element as claimed in claim 5 and in preceding claims, characterised in that it has two inlet and outlet smoke pipes (C1, C2), that are diametrically opposed for maximising the smoke path within the smoke (KA), reducing in this manner the carbon content present in the smoke to the minimum possible value.
7. Filtering element as claimed in claims 1-4, characterised in that it is a filter (KA) formed by the superior and lower walls (2, 3) and by the cylindrical wall (4) and by a central element (5) having a truncated conical form, the superior wall having a central hole (7), while the lower wall (3) having two holes (8, 9) diametrically opposed and near to the filter periphery, the central body (5) being arranged on the cigarette axis, but having a cavity (6) suitable to deviate the smoke along the path included from the two holes (8, 9) and the hole (7), so that it is increased the smoke path within the filter, this path having a con-

ical spiral form, therefore it is guaranteed a long permanence time within the internal chamber (CA).

8. Filtering element as claimed in claim 7, characterised in that it can be molded in three parts, a part forming the housing (3, 4), another part made by the truncated cone (5) and the third part forming the superior cover (2), the initial passage holes (8, 9) allowing the passase of a certain smoke quantity, that in the following is braked by the presence of a sole outlet hole (7), therefore it is caused a limited pressure increase in the filter inside. 5 10
9. Filtering element as claimed in claims 7-8, characterised in that it can be assembled gluing the parts indicated in claim 8, and can be assembled easily by automatic machines and then its fabrication is economical. 15
10. Filtering element as claimed in claims 1-4, characterised in that it is a filter with two plate walls (2, 3) and a cylindrical wall (4), and the internal volume of filter cylinder holds a certain number of elements (10), substantially having a cylindrical form, supplied with protuberances (11) of various forms, but substantially in the form of ship bow, that form superiorly a plate cavity (12), therefore it is caused a high deviation of the smoke flow within the chamber (KA) and then the outlet from the central hole (13), a certain number of these elements (10) being overlapped, then it is generated a long serpentine path, that allows a high carbon deposit within the internal chamber (KA). 20 25 30
11. A filtering element to be embodied in the unsmokable section of the cigarette, substantially as described, claimed and shown in figures. 35

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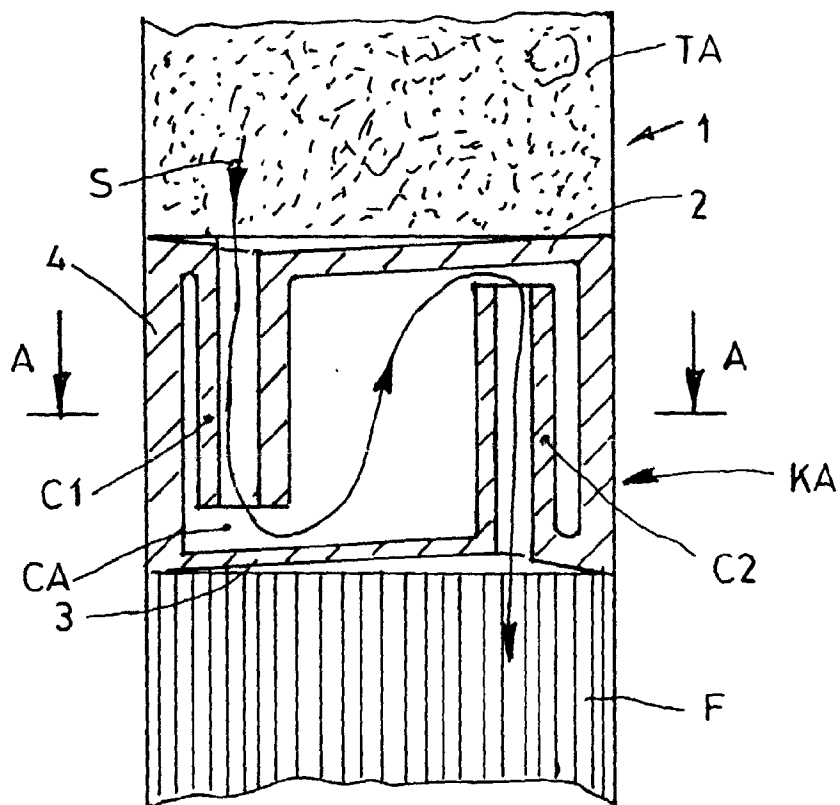


FIG. 1

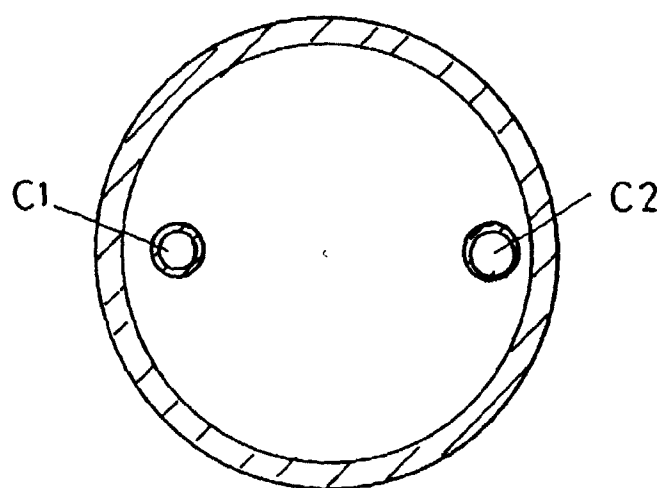


FIG. 1A

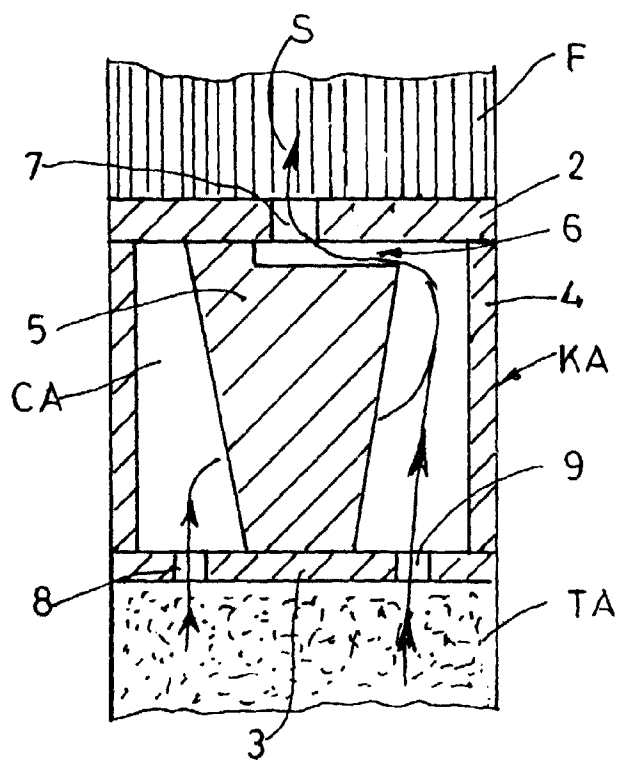


FIG. 2

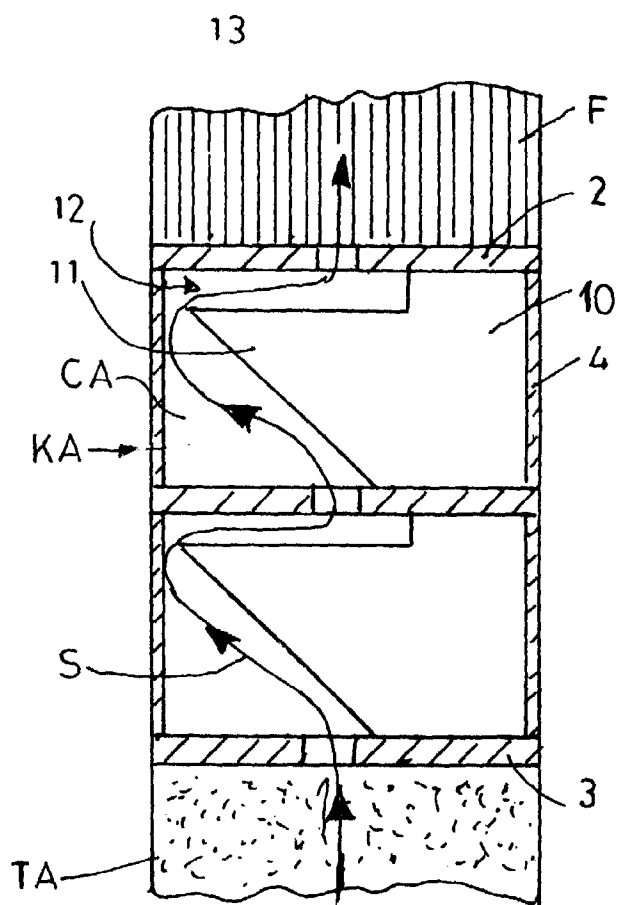


FIG. 3



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EUROPEAN SEARCH REPORT

Application Number
EP 99 10 0744

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The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 22 April 1999	Examiner Pille, S
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03 82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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