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(54) **Cigarette filter**

(57) The present invention relates to a cigarette filter which allows a more efficient retention of harmful substances. The filter consists of a filtration zone (1) with a case containing particulate activated carbon for the initial filtration, whereas subsequently two spiral channels and two respective chambers contribute to the retention of as many substances as possible. The outer spiral ring

(4) as well as the inner spiral channel (8) have a continuously reducing step, so that a endless-screw configuration is created, while at the same time their inner surfaces consist of a sticky material for retaining smoke particles. Finally, before discharge, the smoke is passed through a filtration element (12). The filter may be employed independently in cartridges for use in pipes or hand-rolled cigarettes.

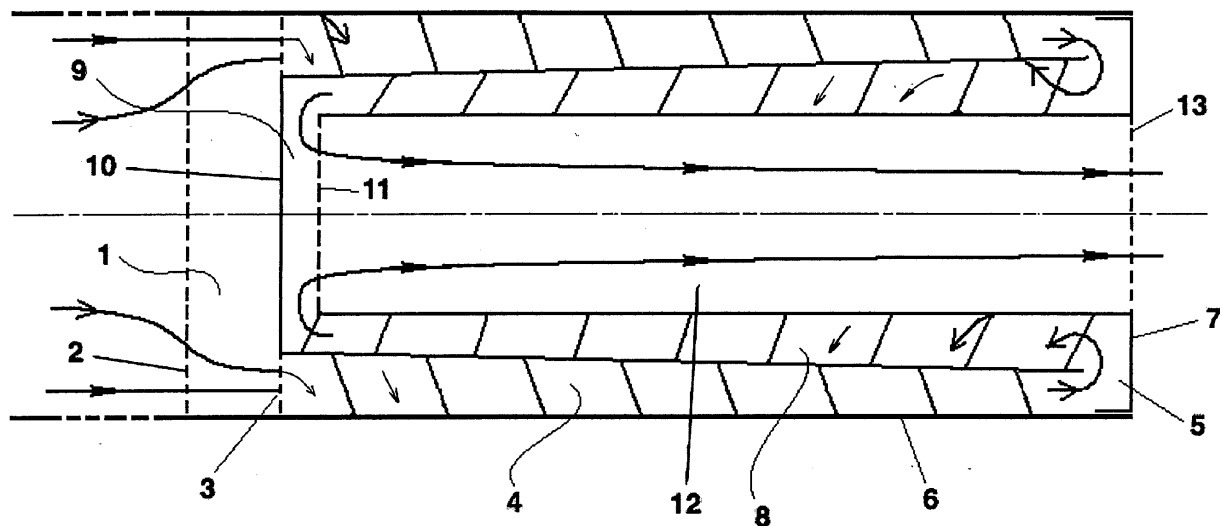


Fig. 1

Description

[0001] The present invention relates to a cigarette filter which fully retains all the harmful substances of a cigarette without deteriorating the taste thereof.

[0002] The currently available cigarette filters are simple filtration elements, which are interposed between the main body of a cigarette and the smoker's mouth in order to retain tar and other harmful products from the combustion of the tobacco of the cigarette. This is achieved in a somehow inconvenient manner or under a delay in the passage of these products, which depends on the various blends in the cigarettes and cigarillos, without however an effective or integrated retention control. By the device proposed herein, and by exploiting laws of physics, a more effective control and a more effective protection of the smokers are achieved.

[0003] The present invention relates to a filter which consists of four regions, which aim at arresting the transport of the harmful substances of a cigarette, without affecting the taste thereof. It preserves the same elastic sense of the simple filters, thus it does not affect the acceptance by the user. Also, it exploits the laws of physics, and due to the centrifugal phenomena that take place in the filter it retains all the harmful substances.

[0004] All the above and further features, as well as advantages of the present invention will be apparent by the following detailed description. The invention is fully understood with reference to the accompanying figures, which depict an exemplary embodiment thereof.

Figure 1 shows a filter of the present invention with all its parts, while in parallel the course of smoke in the filter is shown.

Figure 2a shows in longitudinal section the filter as fully assembled, while figure 2b shows the filter before assembling, in order to show the construction and composition of the invention.

[0005] Referring now to these figures, an exemplary embodiment of the invention is described.

[0006] The filter presented herein consists of four regions/zones and is made of a material suitable not only to filter effectively but also to give an elastic sense on the smoker's lips. The first filtration zone (1), figure 1, consists of a case containing particulate activated carbon or fragrant, taste improving substances and is responsible for the first stage of filtration of the harmful substances, while in parallel it prevents any accidental removal of tobacco pieces, which would otherwise clog the spiral channels through which the combustion products pass. The cigarette smoke passes from the inlet front (2) of the filtration zone (1) to the outlet front (3) and therefrom into the external spiral ring (4) which has a step that is large at the beginning and incrementally reduces. This provides a configuration resembling an endless screw that guides the smoke to the chamber (5), figure 2a, which is formed by the spiral ring (4) itself, a paper wrap (6) and

the cylindrical configuration of the terminal introduction part (7). The spirals in the interior of the filter create cyclonic and centrifugal effects, which accelerate the passage of the smoke and guide it to the inner spiral channel (8), which again has a continuously reducing step, and ends to a chamber (9) for the retention of the harmful substances. As it is apparent, this is formed by the inner surface (10) of the outer spiral ring (4) and of the end (11), figure 2b, of the final filtration element (12). The smoke reaches the outlet (13) of the final filtration element (12) after having been treated to the maximum possible degree, so that the major portion of the harmful substances is retained. The provision of the two chambers (5), (9) and the change in the direction of the motion of the combustion gases contribute, due to inertia, to the accumulation and retention of the entrained smoke residues. The paper wrap (6) at the beginning of the filter has less density, however subsequently its density and strength increase, so that it is impervious and contributes to the wrapping and the intended strength. It is apparent that the large distance that the products and substances of the smoke must cover in the filter, compared to that of the conventional filters, contribute to the more effective filtration, without reducing the smoke discharge speed.

[0007] In an alternative embodiment of the invention, both the outer spiral ring (4) and the inner spiral channel (8) have a layer of sticky material. When the warm smoke passes over their surface, their almost dry state is converted to a sticky one and thus the harmful substances as well as the other combustion residues are better retained.

[0008] Another alternative embodiment of the invention relates to the use of the said filter in plastic, for example independent, cartridges so that it is used in hookahs, pipes or hand-rolled cigarettes. The said filters may be disposable or may be used several times depending on their manufacture.

[0009] It should be noted that the description of the invention was made with reference to an exemplary, non-limiting embodiment. Any change or modification regarding the shape, size, dimensions, manufacture/assembly materials and components employed, application fields, as long as not constituting a new inventive step and not contributing to the known state of the art, are considered encompassed in the scope of the present invention.

Claims

1. Cigarette filter **characterized in that** it consists of a filtration zone (1), a case containing particulate activated carbon, followed by an outer spiral ring (4) having a continuously reducing step, then a chamber (5) and an inner spiral channel (8), which, via a harmful-substance retention chamber (9), ends to the final filtration element (12).

2. Cigarette filter according to claim 1, **characterized**

in that the zone (1) consists of fragrant substances for improving the taste in the user's mouth.

3. Cigarette filter according to claim 1, **characterized in that** both the outer spiral ring (4) and the inner spiral channel (8) comprise a layer of sticky material which contributes to a more effective retention of the harmful substances of the smoke. 5
4. Cigarette filter according to claim 1, **characterized in that** it can be used in disposable or multiple-use cartridges to be mounted in pipes, hookahs and hand-rolled cigarettes. 10

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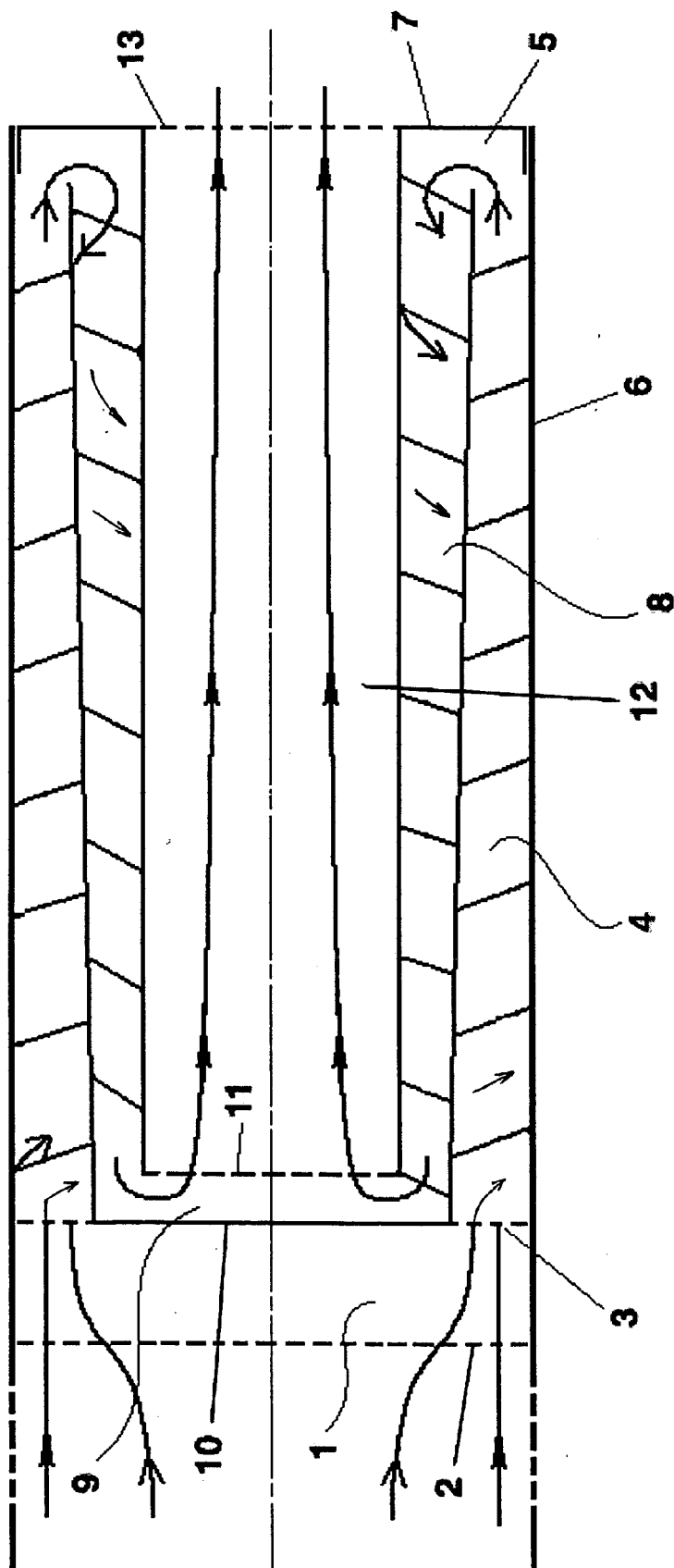


Fig. 1

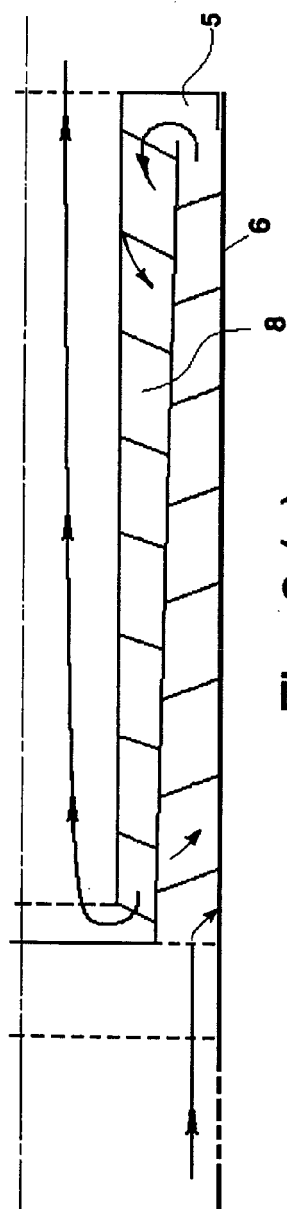


Fig. 2 (a)

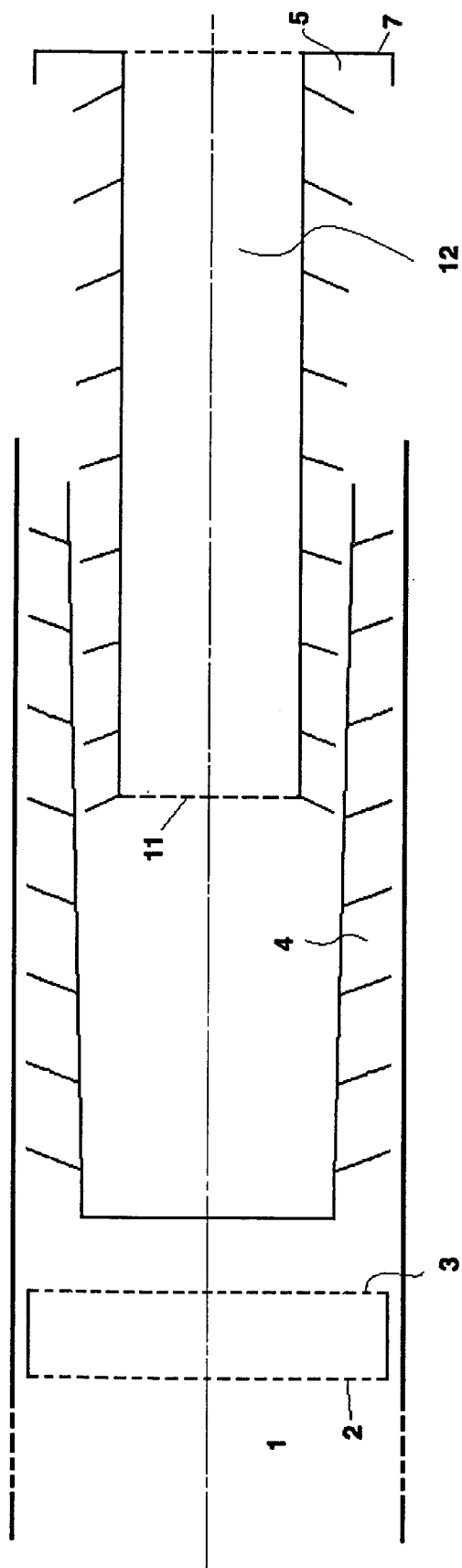


Fig. 2 (b)



EUROPEAN SEARCH REPORT

Application Number
EP 12 38 6012

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 3 525 345 A (HARRIS WALTER) 25 August 1970 (1970-08-25) * column 2, line 27 - column 3, line 33; figures *	1-4	INV. A24D3/04
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			TECHNICAL FIELDS SEARCHED (IPC)
			A24D
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 7 September 2012	Examiner Marzano Monterosso
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			

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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 12 38 6012

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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