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3,389,705

CIGARETTE SMOKE FILTER DEVICE

Filed April 29, 1966

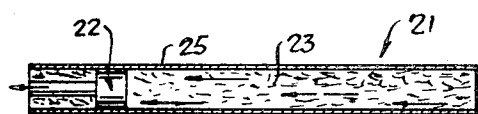


FIG. 1

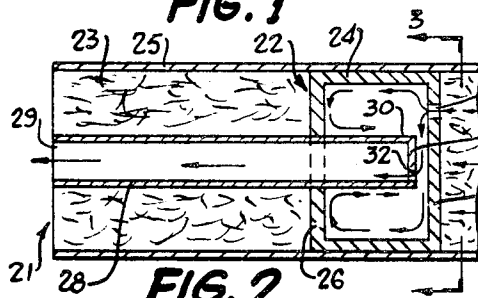


FIG. 2

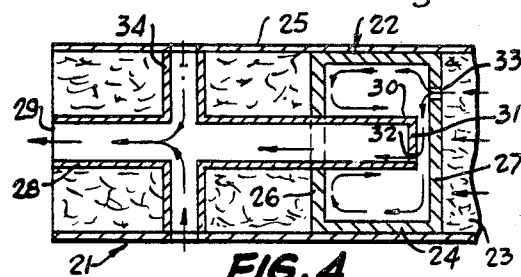


FIG. 4

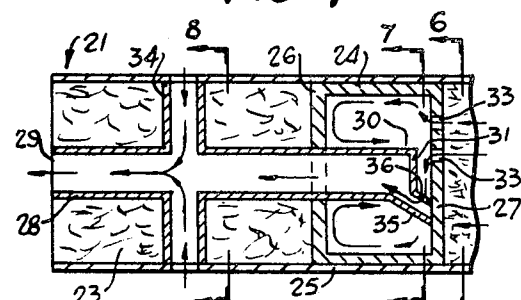


FIG. 5

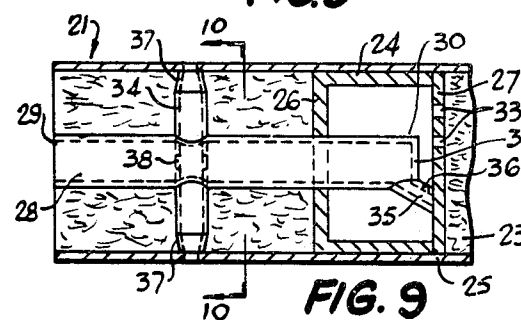


FIG. 9

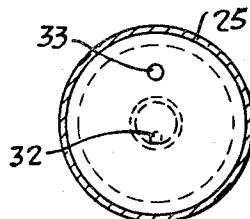


FIG. 3

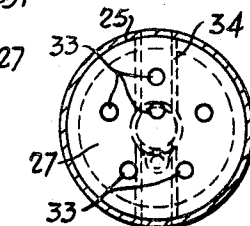


FIG. 6

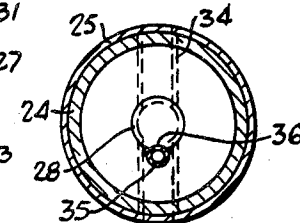


FIG. 7

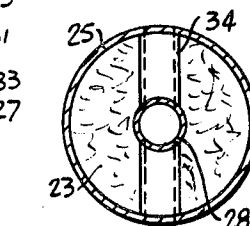


FIG. 8

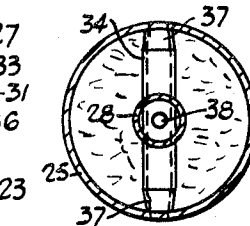


FIG. 10

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CIGARETTE SMOKE FILTER DEVICE

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5 Claims. (Cl. 131—10.5)

ABSTRACT OF THE DISCLOSURE

A cigarette filter having a cylindrical condensing chamber positioned within the cigarette paper casing in sealing engagement therewith and an axially positioned smoke tube of relative small diameter with one end open and extending to the rearward end of the cigarette and the other end extending into the condensing chamber close to its forward end. There are misaligned perforations in the forward end walls of the chamber and the tube through which the smoke flows.

This invention relates generally to a cigarette filter device and, more particularly, to an improved filter device which is positioned in a cigarette to entrap harmful substances, such as tars and nicotine, to enable the smoker to inhale substantially uncontaminated smoke which still retains the tobacco aroma and taste characteristics of unfiltered cigarettes.

In the following specification the end of a cigarette which is ignited will be referred to as the forward end, and the end of a cigarette which is placed between the lips of the smoker will be referred to as the rearward end.

In its basic form a filter device, according to this invention, includes a cylindrical condensing chamber positioned within a cigarette relatively close to the rearward end thereof. The outside diameter of the condensing chamber is dimensioned to sealingly engage the bore of the cigarette paper casing and the length of the condensing chamber is short relative to the length of the cigarette.

A smoke tube, of small diameter relative to the diameter of the cigarette, is positioned axially within the cigarette. One end of the smoke tube is open and finishes substantially flush with the rearward end of the cigarette. The other end of the smoke tube penetrates the rearwardly facing end wall of the condensing chamber and extends inwardly to a point close to the forwardly facing end wall of the condensing chamber and is substantially closed with an end closing disc.

The forwardly facing end wall of the condensing chamber contains at least one perforation therethrough to permit the passage of smoke into the condensing chamber and a small hole is positioned in the end closing disc of the smoke tube to permit the passage of smoke therethrough.

The basic operation of the filter device is as follows:

Contaminated smoke flowing through the cigarette enters the condensing chamber through the perforated forwardly facing end wall and contaminating substances, such as tars and nicotine, are condensed out of the smoke and deposited onto the inner walls of the condensing chamber, leaving the smoke substantially uncontaminated. The substantially uncontaminated smoke will then enter the smoke tube through the small hole in the end closing disc, flow through the smoke tube and be inhaled by the smoker.

A small portion of the contaminated smoke may flow directly through the condensing chamber and into the smoke tube without the benefit of any filtering action. This portion of contaminated smoke will be very small compared with the total volume of uncontaminated smoke inhaled by the smoker.

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Misalignment of the holes in the end closing disc and the forwardly facing end wall of the condensing chamber will ensure that no contaminated smoke will flow directly through the condensing chamber and into the smoke tube without first having to change the direction of flow. Thus, the contaminated smoke entering the condensing chamber will have to change direction and flow between the end closing disc and the forwardly facing end wall of the condensing chamber before entering the smoke tube. Thus, more contaminating substances will be condensed out of the smoke, further increasing the ratio of the uncontaminated smoke to contaminated smoke which is inhaled by the smoker.

An alternative execution of this invention provides an air tube which is positioned transversely through the cigarette and passes through, and interconnects with, the smoke tube. Thus, according to the size of the air tube, cool fresh air will be drawn into the smoke tube and mixed with the substantially uncontaminated smoke flowing therethrough, providing cooler diluted smoke to be inhaled by the smoker together with improved draught control.

The preferred execution of this invention provides a smoke tube extension which is in the form of a tube extending angularly outwards from the small hole in the end closing disc of the smoke tube and contacting the forwardly facing end wall of the condensing chamber. A small hole is positioned in the smoke tube extension to permit passage of smoke into the smoke tube. Thus, smoke entering the condensing chamber will be provided with a longer distance to travel, and hence a longer condensing path, before entering the smoke tube, and the small hole in the smoke tube extension will remain substantially clean and free from contaminating substances, thus, permitting free flow of smoke therethrough.

Thus, a filter device as embodied in any one of the aforementioned executions will effectively remove contaminating substances from the smoke inhaled by the smoker, but will not provide any impediment to the flow of smoke through the cigarette which will in any way effect the tobacco taste and aroma.

It is, therefore, the main object of this invention to provide an improved cigarette filter device which is positioned in a cigarette to effectively remove contaminating substances from the smoke inhaled by a smoker, whilst retaining the tobacco aroma and taste usually associated with unfiltered cigarettes.

Another object is to provide an improved cigarette filter device which effectively removes contaminating substances from, and adds cool fresh air to, the smoke inhaled by a smoker.

A further object is to provide a cigarette filter device which improves the draught of the cigarette.

These and other objects and advantages of this invention will be further apparent by reference to the following detailed specification and figures, in which:

FIG. 1 is a longitudinal section through a cigarette embodying a filter device according to the basic form of this invention.

FIG. 2 is an enlarged sectional view of the rearward end of the cigarette and filter device shown in FIG. 1.

FIG. 3 is a section on 3—3 in FIG. 2.

FIG. 4 is an enlarged sectional view, similar to FIG. 2, but embodying a filter device which includes an air tube.

FIG. 5 is an enlarged sectional view, similar to FIG. 4, but embodying a filter device according to the preferred execution of this invention.

FIG. 6 is a section on 6—6 in FIG. 5.

FIG. 7 is a section on 7—7 in FIG. 5.

FIG. 8 is a section on 8—8 in FIG. 5.

FIG. 9 is a sectional view, similar to FIG. 5, but show-

ing the preferred execution adapted to facilitate one form of manufacture.

FIG. 10 is a section on 10—10 in FIG. 9.

Reference will now be made to the figures, wherein like numerals represent like parts throughout the several views.

FIG. 1 is a longitudinal sectional view through a cigarette 21 in which filter device 22 is positioned at the rearward end of cigarette 21.

FIGS. 2 and 3 show enlarged sectional views of filter device 22 which is positioned in the cigarette tobacco filter 23 and comprises a condensing chamber 24 having an outside diameter which sealingly engages the inside diameter of the easily combustible cigarette wrapper 25, a rearwardly facing end wall 26 and a forwardly facing end wall 27.

Smoke tube 28, positioned axially within cigarette 21, is open at the rearwardly facing end 29 and finishes flush with the end of the cigarette. The other end 30, of smoke tube 28, penetrates end wall 26 and extends inwardly to a point close to end wall 27, the end 30 being substantially closed by end closing disc 31.

A small diameter hole 32 is positioned in disc 31 close to the periphery of smoke tube 28 and hole 33 is positioned through end wall 27. It will be understood that although only one hole 33 is shown through end wall 27, a plurality of holes could be positioned therethrough, the number and diameter of the holes depending upon the draught requirements of the cigarette.

In the operation of this filter device, suction by the smoker on the rearward end of the cigarette will result in contaminated smoke travelling through tobacco filter 23, entering hole 33 in end wall 27, and filling condensing chamber 24. Contact between the contaminated smoke and the inner walls of contaminating chamber 24 will cause contaminating substances, such as tars and nicotine, to be condensed out of the smoke and be deposited on the inner walls. Continuing suction by the smoker will result in continuous flow of smoke around condensing chamber 24 and through smoke tube 28. Thus condensing paths will be established in condensing chamber 24, as shown by the arrows, with the contaminated smoke entering hole 33 and substantially depositing its contaminating substances on the inner walls of condensing chamber 24 as it flows around the condensing paths, then entering hole 32 and flowing through smoke tube 28 in the form of substantially uncontaminated smoke.

Holes 31 and 32 are axially misaligned to minimize the amount of contaminated smoke which will pass directly through condensing chamber 24 and into smoke tube 28.

FIG. 4 is an enlarged sectional view, similar to FIG. 2, but including air tube 34, which permits air to be drawn into smoke tube 28 and mixed with the substantially uncontaminated smoke flowing therethrough to provide cooler diluted smoke and improved draught control.

FIGS. 5 to 8 show details of the preferred execution of this invention in which end wall 27 contains a plurality of holes 33 and includes an extension tube 35 extending angularly outwards from end 30 of smoke tube 28 and sealingly contacting end wall 27. A small diameter hole 36 is positioned in extension tube 35 to permit the flow of smoke therethrough and into smoke tube 28. Thus this preferred execution provides a longer path for the smoke, which does not circulate around condensing chamber 24, to travel. The positioning of hole 36 in extension tube 35 also minimizes the possibility of an accumulation of contaminating substances restricting the flow of smoke from condensing chamber 24 into smoke tube 28.

FIGS. 9 and 10 show the preferred execution adapted to facilitate one form of manufacture. In this form air tube 34 comprises a separate tube of smaller diameter than the diameter of smoke tube 28, and includes tapered ends 37 to permit convenient insertion into smoke tube 28. Holes 38, through air tube 34, provide communication between air tube 34 and smoke tube 28.

It will be understood that this form of manufacture is for illustration purposes only and that many other forms of manufacture could equally well be used according to the materials used for construction of the filter and to the manufacturing facilities available.

The component parts of filter 22 can be manufactured from metals, such as copper or stainless steel, or from various non-combustible plastic materials which, when subjected to heat, will not produce any harmful effects to the smoker.

The preferred execution of this invention shows filter device 22 entirely surrounded by tobacco filter 23, and open end 29 finishing flush with the rearward end of cigarette 21. However, in a further execution of this invention, open end 29 is moved forwardly to provide a small quantity of tobacco filler 23 between open end 29 and the end of cigarette 21. Thus the smoker will, in this execution, get the distinctive feel of tobacco on his tongue.

In another execution, tobacco filler 23 extends only from the forward end of cigarette 21 to end wall 27 of condensing chamber 24.

A filter device according to this invention can also be combined in a cigarette embodying a conventional composition type filter. When so combined, filter device 22 can be positioned either forwardly of the composition type filter, or combined integrally therewith.

It will be understood that the executions described merely illustrate basic forms of this invention, and that many other variations and modifications to these executions can be made without departing from the scope of this invention.

From the foregoing it is thus seen that an improved filter device, according to this invention, accomplishes all of the objectives and advantages as set forth herein.

What I claim is:

1. In a cigarette including an easily combustible cylindrical wrapper and a tobacco filler substantially filling said wrapper, a smoke filter device comprising a cylindrical condensing chamber having a forwardly facing end wall and a rearwardly facing end wall and being of short length relative to the length of said cigarette, said condensing chamber positioned within said cigarette near the rearward end of said cigarette which is placed between the lips of a smoker, a hollow smoke tube positioned axially within said cigarette, one end of said smoke tube being open and finishing adjacent the rearward end of said cigarette and the other end penetrating the rearwardly facing end wall of said condensing chamber and extending therein to a point close to the forwardly facing end wall of said condensing chamber, hole means through said forwardly facing end wall to permit flow of smoke through said cigarette into said condensing chamber, and hole means through said other end of said hollow smoke tube to permit flow of smoke therethrough from said condensing chamber, said other end of said smoke tube being substantially closed by an end closing disc and including a small diameter hole positioned through said end closing disc adjacent the periphery of said smoke tube.

2. A cigarette as set forth in claim 1 including an extension tube of small diameter relative to the diameter of said smoke tube, said extension tube enclosing said hole through said end closing disc and extending outwards to contact said forwardly facing end wall of said condensing chamber, and including hole means through said extension tube to permit flow of smoke from said condensing chamber into said smoke tube.

3. In a cigarette including an easily combustible cylindrical wrapper and a tobacco filler substantially filling said wrapper, a smoke filter device comprising a cylindrical condensing chamber having a forwardly facing end wall and a rearwardly facing end wall and being of short length relative to the length of said cigarette, the outer cylindrical surface of said condensing chamber adapted

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to sealingly engage the inner surface of said wrapper, said condensing chamber positioned within said cigarette near the rearward end of said cigarette which is placed between the lips of a smoker, a hollow smoke tube positioned axially within said cigarette, one end of said smoke tube being open and finishing adjacent the rearward end of said cigarette and the other end penetrating the rearwardly facing end wall of said condensing chamber and extending therein to a point close to the forwardly facing end wall of said condensing chamber, a plurality of holes through said forwardly facing end wall to permit flow of smoke through said cigarette into said condensing chamber, said other end of said smoke tube having hole means therein, an extension tube of small diameter relative to the diameter of said smoke tube, said extension tube adapted to enclose said hole means in said other end and to extend angularly outwards to contact said forwardly facing end wall of said condensing chamber, and hole means through said extension tube to permit smoke to flow from said condensing chamber and through said smoke tube.

4. A cigarette as set forth in claim 3 including an air

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tube positioned transversely through said cigarette between said condensing chamber and said rearward end, said air tube connecting with said smoke tube to permit air to be drawn into said smoke tube and to mix with the smoke flowing therethrough.

5. A cigarette as set forth in claim 3 including an air tube positioned transversely through said cigarette and through said smoke tube, said air tube having hole means therethrough communicating with said smoke tube to permit air to be drawn into said smoke tube and to mix with the smoke flowing therethrough.

References Cited

UNITED STATES PATENTS

15	1,940,075	12/1933	Caldwell	-----	131—198
	2,705,013	3/1955	Brother	-----	131—261 X
	2,958,328	11/1960	Bartolomeo	-----	131—9

FOREIGN PATENTS

20	577,635	6/1958	Italy.
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