Sept. 26, 1967 G. A. GILL, JR 3,343,547

CIGARETTE FILTER

Filed Sept. 22, 1964

FIG 1

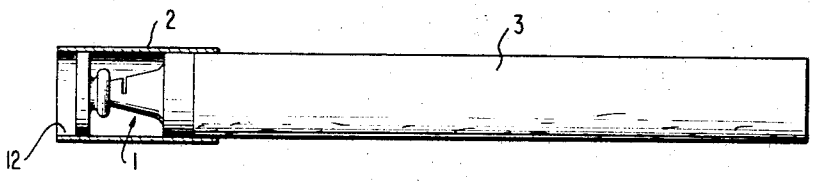


FIG 2

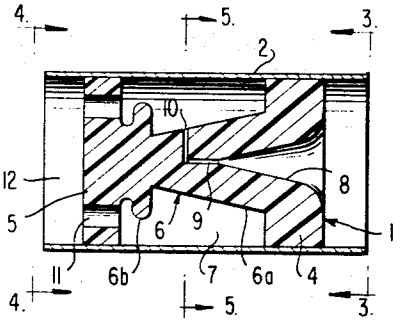
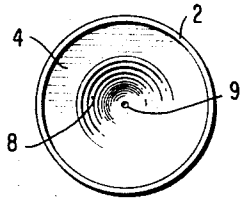


FIG 3



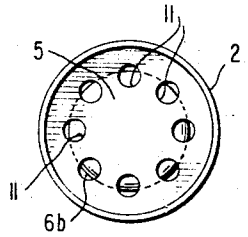


FIG 4

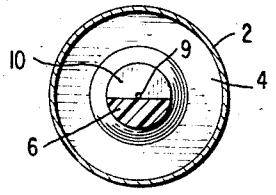


FIG 5

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CIGARETTE FILTER

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This invention relates to a cigarette filter, and more particularly to a mechanical-type cigarette filter.

Heretofore, many types of cigarette filters have been proposed for lowering the temperature of the cigarette smoke and extracting nicotine and tar products therefrom prior to entry of the smoke into the user's mouth. While these filters have been satisfactory for their intended purposes, they have been open to certain objections such as not cooling the smoke sufficiently or not removing a sufficient amount of the nicotine and tar products from the smoke, and in some instances, the absorbent or particulate type of filter caused a change in the taste of the cigarette smoke, much to the dissatisfaction of the user. Mechanical-type filters have been characterized by a plurality of precision-made interconnected parts which are expensive to manufacture and which have a tendency to lose their close tolerances after continued use, with a resultant loss of their effectiveness as filters.

After considerable research and experimentation the cigarette filter of the present invention has been devised to overcome the disadvantages experienced in heretofore employed filters. The cigarette filter of the present invention is of one-piece construction and includes a conical portion for cooling the smoke and a baffle arrangement for changing the direction of flow of the smoke to thereby extract nicotine and tar products therefrom prior to entry of the smoke into the user's mouth.

An object of the invention is to provide an improved cigarette filter for lowering the temperature of the cigarette smoke and extracting nicotine and tar products therefrom prior to entry of the smoke into the user's mouth.

Another object of the invention is to provide an improved cigarette filter of one-piece construction including a conical portion and a baffle portion whereby the temperature of the cigarette smoke is lowered and the nicotine and tar products are extracted therefrom prior to entry of the smoke into the user's mouth.

Still another object of the invention is to provide an improved cigarette filter characterized by its simplicity in design and inexpensiveness to manufacture such that the filter can be considered a throw-away item after the smoking of the cigarette has been completed.

Other objects reside in the combinations of elements, arrangements of parts, and features of construction, all as will be more fully pointed out hereinafter and disclosed in the accompanying drawings wherein there are shown preferred embodiments of this inventive concept.

In the drawings:

FIGURE 1 is a side elevational view of the filter of the present invention secured to one end of a cigarette, with the cylindrical member in section;

FIGURE 2 is an enlarged longitudinal sectional view of the filter of the present invention;

FIGURE 3 is a view taken along line 3—3 of FIGURE 2;

FIGURE 4 is a view taken along line 4—4 of FIGURE 2; and

FIGURE 5 is a view taken along line 5—5 of FIGURE 2.

Referring to the drawings and more particularly to FIGURE 1 thereof, the filter of the present invention, designated generally by reference numeral **1**, is adapted to be mounted within a cylindrical member **2** secured to the end of a cigarette **3**. The cylindrical member or "tip"

is made from cork, plastic or other suitable material, and together with its associated filter **1**, is adapted to be permanently secured to the end of the cigarette and packaged therewith, as is customary in conventional filter-type cigarettes, or as a filtered tip can be secured by the user individually to each cigarette preparatory to smoking thereof.

As will be seen in FIGURE 2, the filter of the present invention comprises, a pair of axially spaced cylindrical members **4** and **5** secured to the inner wall of tip member **2** and interconnected by a medial portion including a conical portion **6***a* and an annular flange **6***b*, the flange being integrally connected to the convergent end of portion **6***a* and cylindrical member **5**. Tip member **2**, cylindrical members **4** and **5**, and medial portion **6** form a trap chamber **7** adapted to receive nicotine and tar products extracted from the smoke, to be described more fully hereinafter. Cylindrical member **4** is provided with an axially extending conical bore **8**, the apex of the conical bore communicating with one end of an axially extending orifice **9** formed in the medial portion **6**. The opposite end of the orifice communicates with a radially extending slot **10** formed in the medial portion, the slot communicating with trap chamber **7**. A plurality of axially extending apertures **11** are formed in cylindrical member **5** and establish communication between trap chamber **7** and a recess **12** formed between cylindrical member **5** and the end of tip member **2**, the apertures being equally spaced on their line of centers which is concentric with the circumference of the cylindrical member. As will be seen in FIGURE 4, the peripheral edge of annular flange **6***b* extends outwardly beyond the longitudinal axes of apertures **11** to thereby restrict the flow of fluids therethrough.

In the operation of the filter of the present invention, when smoke is drawn through the cigarette, a partial vacuum is created in chamber **7** causing smoke from the cigarette to be drawn through conical bore **8** and orifice **9** at a high velocity. Since the diameter of the orifice is of the order of .030" in diameter, the flow of smoke through the orifice is restricted thus causing a volume of smoke to remain in the conical bore which imparts a cyclonic motion thereto thereby forming a vortex, whereby the temperature of the smoke is lowered. This relatively cool smoke in the vortex becomes mixed with the hotter smoke subsequently drawn through bore **8** to thereby reduce the temperature of the smoke flowing through the orifice **9** and slot **10**. The compressed smoke flowing through slot **10**, expands as it enters chamber **7** thereby causing nicotine and tar products to be precipitated from the smoke and deposited within the chamber. The relatively cool and clean smoke then passes through apertures **11** and into the user's mouth. The construction and arrangement of annular flange **6***b* and apertures **11** is such that, not only are the nicotine and tar products maintained within trap chamber **7**, but also high velocity smoke is prevented from burning the tongue of the user.

The filter of the present invention can be molded or machined from plastic or other suitable material, and while for purposes of illustration, the filter has been disclosed for use in cigarette tips, it will be readily understood to those skilled in the art that the filter can be readily adapted for use in the stem of a pipe, cigarette holder and the like.

As many embodiments may be made of this inventive concept and as many modifications may be made in the embodiments hereinbefore shown and described, it is to be understood that all matter herein is to be interpreted merely as illustrative and not in a limiting sense.

I claim:

1. A filter of the character described comprising, a pair of axially spaced cylindrical members, a medial por-

tion interconnecting said cylindrical members, an axially extending conical bore formed in one of said cylindrical members and extending into said medial portion, an axially extending orifice formed in said medial portion, one end of said orifice communicating with the apex of said conical bore, a transversely extending slot formed in the medial portion and communicating with the opposite end of said orifice, said slot being spaced a substantial distance from the first of said cylindrical members, and a plurality of axially extending apertures formed in the other of said cylindrical members.

2. The filter according to claim 1 wherein, the apertures are equally spaced on their line of centers which is concentric with the circumference of the second mentioned cylindrical member, and an annular flange secured to the medial portion in proximity to said second-mentioned cylindrical member, the outer periphery of said flange extending beyond the longitudinal axes of said apertures.

3. A cigarette filter of the character described comprising, a cylindrical tip member, one end of said tip member being adapted to be secured to the end of a cigarette, a pair of axially spaced cylindrical members secured to the inner wall of said tip member and being concentric therewith, a medial portion of reduced diameter interconnecting said cylindrical members, a trap chamber defined by said tip member, cylindrical members and medial portion, an axially extending conical bore formed in one of said cylindrical members and extending into said medial portion, an axially extending orifice formed in said medial portion, one end of said orifice communicating with the apex of said conical bore, a transversely extending slot formed in the medial portion

and establishing communication between the opposite end of said orifice and said trap chamber, said slot being spaced a substantial distance from the first of said cylindrical members, and a plurality of axially extending apertures formed in the other of said cylindrical members, whereby smoke being drawn from the cigarette is caused to flow in a vortical whirl within the conical bore to thereby lower the temperature of the smoke flowing through the orifice, while the expansion of the smoke into the trap chamber precipitates nicotine and tar products therefrom.

4. A cigarette filter according to claim 3 wherein the apertures are equally spaced on their line of centers which is concentric with the circumference of the second-mentioned cylindrical member, and an annular flange secured to the medial portion in proximity to said second-mentioned cylindrical member, the outer periphery of said flange extending beyond the longitudinal axes of said apertures, whereby the nicotine and tar products are maintained within the trap chamber and high velocity smoke is prevented from burning the tongue of the user.

References Cited

UNITED STATES PATENTS

1,458,479	6/1923	Gibbons et al.	131—211
2,104,777	1/1938	Silverthorne	131—211
2,686,524	8/1954	Kershaw et al.	131—211
2,954,772	10/1960	Lebert	131—10.5
2,954,778	10/1960	Lebert.	

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