

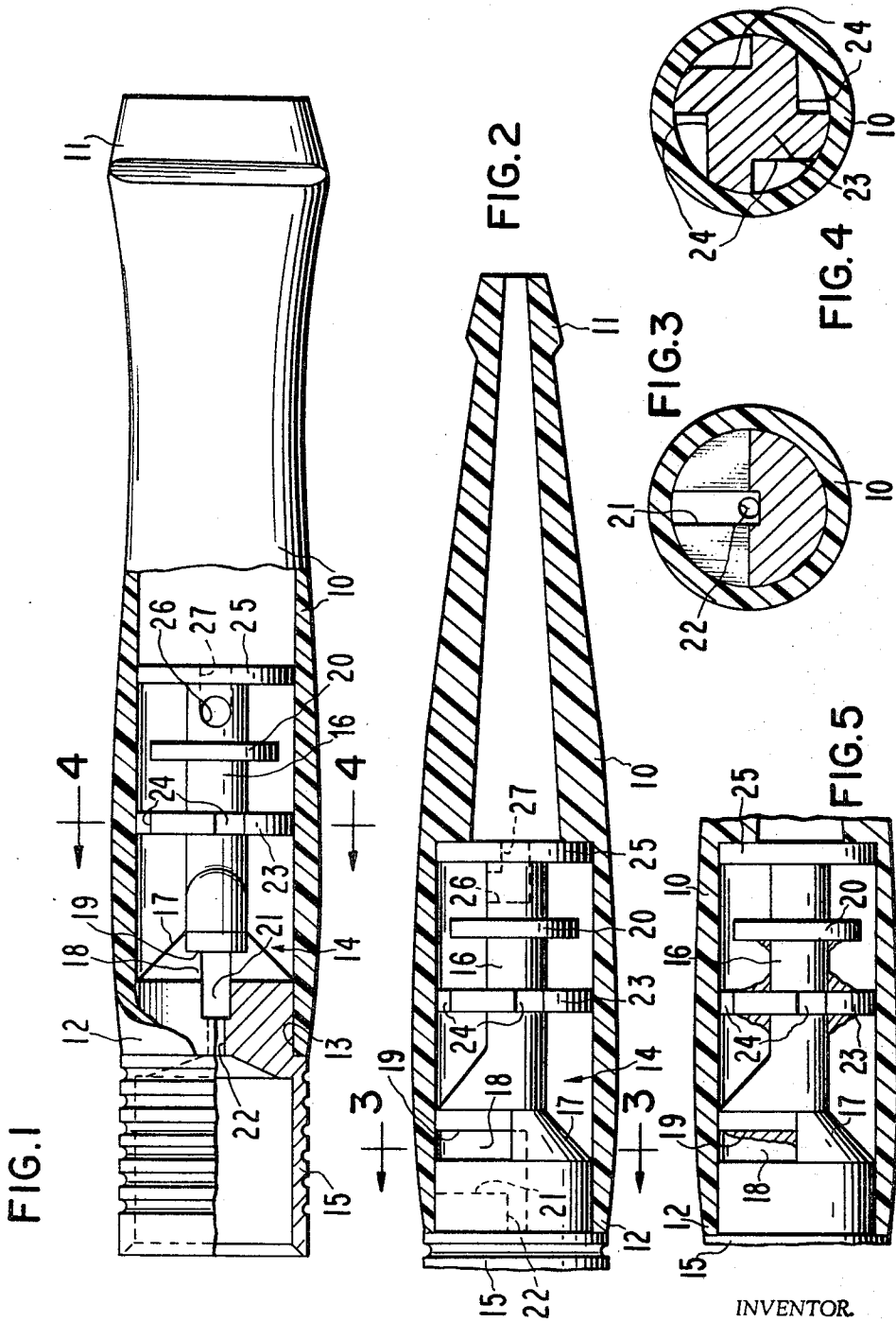
March 25, 1969

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3,434,480

DISPOSABLE FILTER FOR TOBACCO-SMOKING DEVICE

Filed April 29, 1966



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3,434,480

DISPOSABLE FILTER FOR TOBACCO-SMOKING DEVICE

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 Filed Apr. 29, 1966, Ser. No. 546,376
 Int. Cl. A24f 13/02; A24d 1/06

U.S. Cl. 131-187

4 Claims

ABSTRACT OF THE DISCLOSURE

A disposable filter is disclosed wherein an insert for a hollow mouthpiece is provided with a shoulder sealably engaging the open end of the mouthpiece with a cup-shaped portion for receiving a cigarette on one side of the shoulder portion and a stem of lesser diameter than the shoulder portion on the other side thereof. A transverse slot is provided centrally of the insert defining a barrier to smoke passing from the cup-shaped portion through an orifice to a longitudinal slot adjacent the transverse slot. At least one annular shoulder barrier is provided on the stem downstream from the first barrier and provided with a plurality of slots in the peripheral portion.

This invention relates to a tar-removing filter for a smoking device and more particularly to a disposable filter for collecting heavy tars from cigarettes and the like.

U.S. Patent No. 2,954,772 to Herbert A. Lebert, assigned to the assignee of the subject application, discloses a filter structure for a tobacco smoking device wherein when smoke is accelerated to high velocity such as above 100 feet per second and directed against a barrier spaced a short distance from the output end of the accelerating orifice, heavy tars are deposited upon the barrier substantially solely by impingement as distinguished from by expansion and condensation. A filter constructed within the range of preferred dimensions set forth in the referenced patent efficiently collects tars, but due to the close spacing of elements of the structure, the tars rapidly fill up the smoke passageways of the filter and necessitate frequent cleaning.

The object of the present invention is to provide a filtering structure which will collect a substantial portion of the tars from a number of smokable articles such as a pack of cigarettes without filling up the smoke passageways to such an extent as to block the passageways.

Broadly stated, the present invention to be described in greater detail below is directed to a tobacco-smoking device made up of an insert and a hollow housing having a cylindrical opening at one end thereof for sealably receiving an annular shoulder portion of the insert and formed at the other end in the shape of a mouthpiece. The insert is provided with a cup-shaped portion on one side of the annular shoulder portion for holding a tobacco product and on the other side of the annular shoulder portion with a stem of lesser diameter than the shoulder portion. A transverse slot is provided on the insert to define a barrier on the side thereof remote from the cup portion and a smoke-accelerating orifice providing communication between the cup portion and the slot for accelerating smoke from the tobacco article for impingement on the barrier and collection on the barrier and subsequent surfaces along the flow path. At least one annular shoulder barrier is located on the stem spaced longitudinally downstream from the first barrier in sliding contact with the inside surface of the housing and provided with a plurality of slots in the peripheral portion thereof for passing smoke from the first barrier to the mouthpiece.

It has been discovered that a filter device constructed in the manner described above collects tars from a number of smokable articles on the front and sides of the first barrier as well as on the up and downstream sides of the second barrier. With this construction the collection surface for the tars is effectively distributed over a larger area and in locations that do not create obstruction of the flow passageways whereby the tars can be collected from a number of smokable articles in one filter and the filter made of an inexpensive material such that the filter can be discarded after a given number of articles have been smoked.

In accordance with another aspect of the present invention, a longitudinally extending slot is provided in the filtering insert aligned with the first barrier and extending from the first slot toward the cup portion for effectively opening up the smoke passageway ahead of the first barrier. With this construction a considerable amount of tars can be collected on the first barrier without clogging the flow of smoke passing thereby and at the same time more tars are permitted to flow past the first barrier for collection on the second barrier whereby the device can be utilized for collecting the tars from a large number of smokable articles.

In accordance with still another aspect of the present invention, the first barrier is dimensioned at least as narrow as the diameter of the stem of said insert thereby permitting passage of a certain amount of tars thereby for collection at the second barrier. This construction in combination with the construction of the last aforesaid aspect of the present invention permits the utilization of a given filtering device for a large number of smokable articles and manufacture of the device of an inexpensive material whereby a disposable filtering device can be provided.

Other objects and advantages of the invention will be apparent from reading the following specification in conjunction with the accompanying drawings, in which:

FIG. 1 is a top enlarged view partially broken away of a tobacco smoking device constructed in accordance with the present invention;

FIG. 2 is a side elevational view of a portion of the structure shown in FIG. 1 with the mouthpiece broken away to show an insert therein;

FIG. 3 is a cross-sectional view of a portion of the structure shown in FIG. 2 taken substantially along line 3-3 in the direction of the arrow;

FIG. 4 is a cross-sectional view of a portion of the structure shown in FIG. 1 taken along line 4-4 in the direction of the arrow; and

FIG. 5 is a partial view similar to FIG. 2 but showing the collection of tars on the device after utilization of the device with the smoking of a number of smokable articles.

While the present invention is equally applicable for utilization with other tobacco smoking articles, it is primarily adapted for and will be described with reference to cigarettes.

Referring now to the drawings, there is illustrated a cigarette holder filter constructed in accordance with the present invention and including a hollow housing 10 such as of polystyrene formed at one end in the shape of a mouthpiece 11 and open at the other end 12 for slidably and sealably receiving a cylindrical shoulder portion 13 of an insert or filter core 14 such as of polystyrene. The insert 14 is provided on one side of the shoulder portion 13 or on the forward end with a cup-shaped portion 15 adapted to receive and hold an end of a cigarette (not shown). On the other side of the shoulder portion 13 the insert 14 is provided with a stem 16 of lesser diameter than the shoulder portion 13 and connected to the shoulder portion 13 by an intermediate tapered portion 17.

A first slot 18 is cut in the tapered portion 17 from the cylindrical surface at the shoulder portion 13 transverse to the longitudinal axis of the insert for defining a barrier 19 on the side of the slot remote from the cup portion 15 to serve as an impingement barrier in the manner set forth in greater detail below. In the embodiment illustrated, the bottom of the slot 18 lies substantially on the longitudinal axis of the insert so that the azimuthal angular extent of the tapered portion 17 below the slot 18 is 180°. The barrier 19 has a width approximately no greater than the diameter of the stem 16 and a height extending to the internal surface of the housing 10 for dividing the smoke stream after impingement thereon. The members 17, 18 and 19 present a longitudinally extending flat surface having a portion which extends downstream of the upstream face of the barrier 19 as shown in FIGURES 1, 2 and 5, providing a plane which lies on opposite sides of the longitudinal axis of the insert 14 as shown in FIGURE 3.

A second radial slot 21 extends longitudinally of the insert 14 in line with the barrier 19 from the first slot 18 toward but short of the cup portion 15 and extends radially from the internal wall of the housing 10 to a location tangential with a smoke-accelerating orifice or venturi 22 providing communication between the cup portion 15 and slot 21 for accelerating smoke for direction against the first barrier 19.

Spaced downstream from the barrier 19 on the opposite side thereof from the orifice 22 is annular shoulder barrier 23 extending radially outwardly from the stem 16 to the inner surface of the housing 10. The peripheral portion of this annular shoulder portion 23 is provided with four slots 24 for passing smoke between the shoulder barrier 23 and the housing 10 from the first barrier 19 toward the mouthpiece 11. Downstream of the shoulder barrier 23 an annular shoulder 20 is provided on the stem 18 extending radially outwardly toward but short of the housing 10 while at the downstream end of the stem 16 an annular shoulder 25 is located which extends radially outwardly to the housing 10 to force flow of smoke directed through the housing 10 into a transverse bore 26 communicating via an axial bore 27 with the mouthpiece 11.

The device constructed in accordance with the present invention collects the tars from the smoke of a number of cigarettes such as a full pack and distributes the tars over many surface areas as illustrated in FIG. 5 in such a manner that the flow of smoke through the device to the smoker is not substantially impeded. At the same time a satisfactory filtering device is provided for both light and heavy draw smokers.

A number of orifice sizes were tested in devices similar to the device described above and it was found that an orifice diameter of .029 in. produced the best results. This orifice diameter in combination with the first and second slots both of width 0.050 in. and a first barrier 19, 0.125 in. wide produced the desired tar collection while permitting use of a single filter on at least one pack of cigarettes. This orifice diameter is believed to produce acceleration of the smoke from cigarettes to the requisite 100 ft. per second for collection of tars by impingement in accordance with the above-referenced patent while permitting the collection of tars over a number of surfaces including those of the barriers 19 and 23 without choking the smoke-flowing passageways of the insert. With this size orifice it was found possible to produce the desired filtering effect with desirable smoke drawing characteristics when the radial width of each of the slots 24 was typically 0.040 in. cut in a shoulder barrier 23 of diameter 0.270 in.

While for the purpose of illustration, the tar-removing device embodying the invention has been shown and de-

scribed in connection with a cigarette, it should be understood that the invention is applicable with other tobacco products as well. In addition it should be understood that particular embodiment of the invention has been shown and described as means of illustration only and that details of structure and procedure may be varied widely by those skilled in the art without departing from the spirit of the invention.

What is claimed is:

1. A tobacco smoking device comprising a smoke treating member and a hollow housing having a cylindrical opening at one end to receive said smoke treating member and formed at the other end in the shape of a mouthpiece; said smoke treating member including axially adjacent cylindrical portions at the upstream end thereof providing a socket for holding the unlit end of a cigarette or the like and an annular shoulder for closing the upstream of the casing, a stem of lesser diameter than said cylindrical portions at the downstream end of said smoke treating member slidable within said housing, means providing a relatively small duct extending partially and axially through the cylindrical portion within the housing and communicating with means providing a single radial slot at the downstream end of said duct with the width of said radial slot being such as to provide a cross section larger than that of said duct, a barrier wall axially spaced from the downstream end of said slot such that smoke issuing from said duct and said slot will impinge on said wall and divide to fill the space between said stem and housing.

2. The smoking device in accordance with claim 9 wherein the internal wall of said housing provides a closure for the radial outward portion of said radial slot and the radial inward wall of said radial slot being substantially tangential to said duct.

3. The tobacco smoking device in accordance with claim 9 including at least one annular shoulder barrier wall on said stem spaced downstream longitudinally of said stem from said barrier wall and having an outside diameter substantially the same as the inside diameter of said housing, said annular barrier provided with a plurality of slots in the peripheral portion through which smoke can be passed downstream to the mouthpiece while collecting tars.

4. The tobacco smoking device of claim 1 wherein said barrier wall is at least as narrow as the diameter of said stem and is aligned with the open end of said slot.

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U.S. Cl. X.R.