# United States Patent [19]

**Doumas**

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[54] **ADJUSTABLE TOBACCO SMOKE FILTER DEVICE**


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[21] Appl. No.: **160,833**

[52] **U.S. Cl.**..... **131/10.3**, 131/207, 131/215 B, 131/261 B

[51] **Int. Cl.**..... **A24d 01/04**, A24f 07/04

[58] **Field of Search**..... 131/10.3, 10 R, 261 B, 131/10.5, 207, 200, 215 A, 215 B



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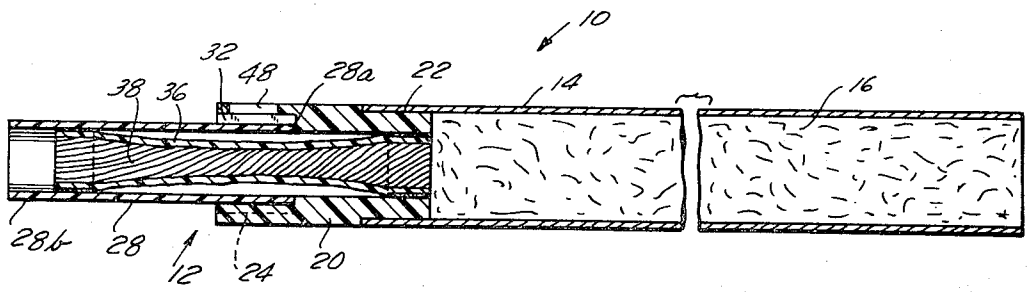
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[57] **ABSTRACT**

An adjustable tobacco smoke filter device for attachment to cigarettes, cigars and the like has a filter body with an internal passage and a mouthpiece with a similar internal passage. The mouthpiece has one end disposed adjacent the filter body with the internal passages in aligned relationship. Advantageously the mouthpiece is mounted for manual rotation relative to the filter body. A filter wrapper of resilient material is provided with a compressible tobacco smoke filter material disposed therein. The resilient filter wrapper is open at opposite ends and provides a smoke passage for tobacco smoke through the filter material. The filter wrapper is disposed in the internal passages of the filter body and the mouthpiece with one end fixed to the filter body and with its opposite end fixed to the mouthpiece. Upon manual rotation of the mouthpiece the filter wrapper is twisted to restrict the smoke passage therethrough.


**5 Claims, 13 Drawing Figures**



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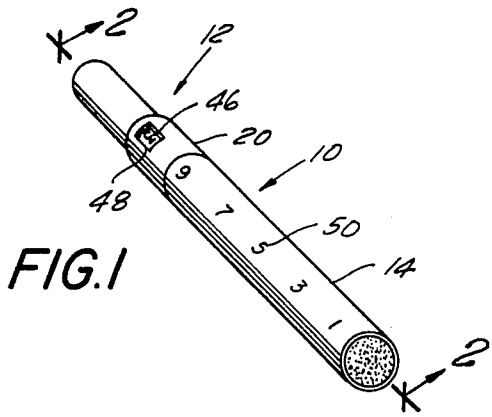



FIG.1

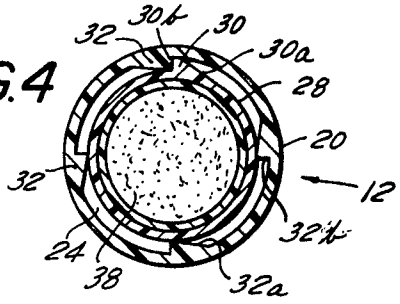



FIG.4

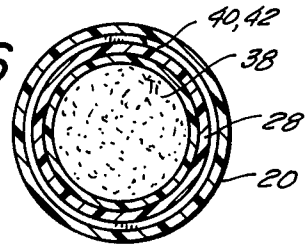



FIG.6

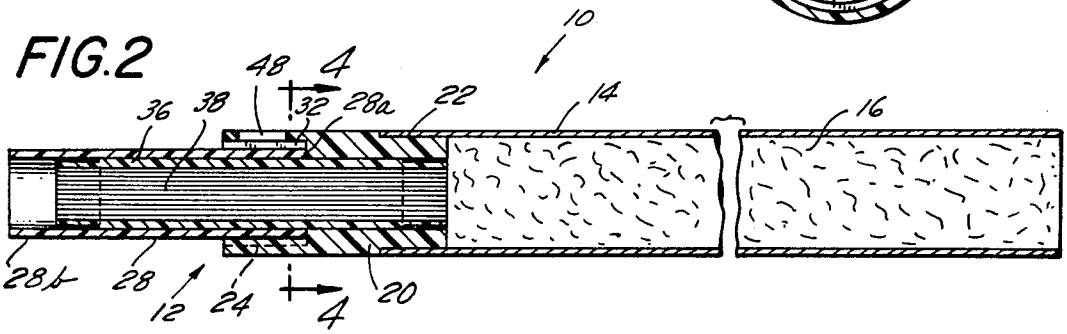



FIG.2

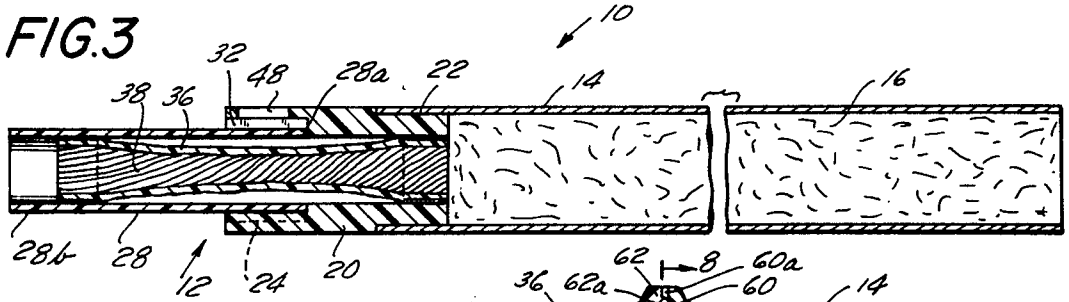



FIG.3

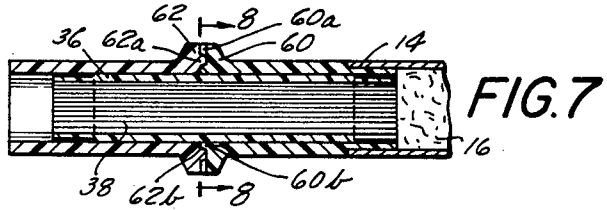



FIG.7

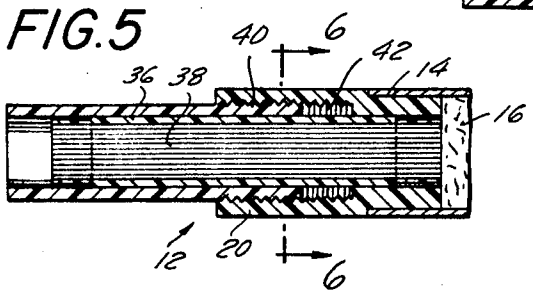



FIG.5

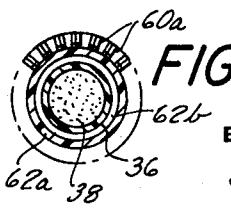



FIG.8

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FIG. 11

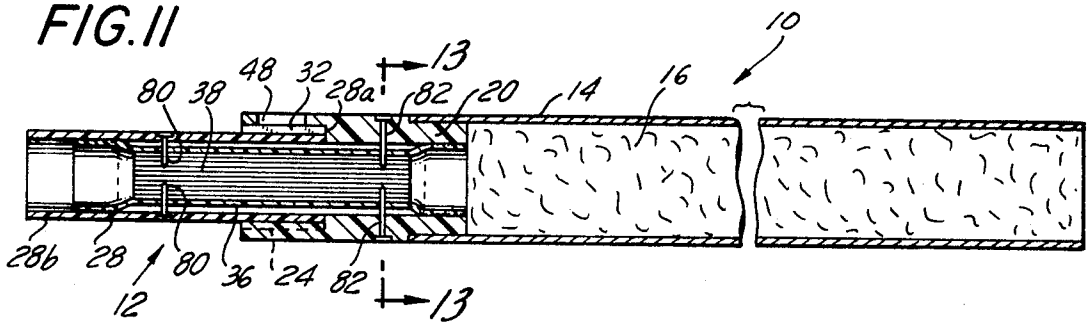



FIG. 12

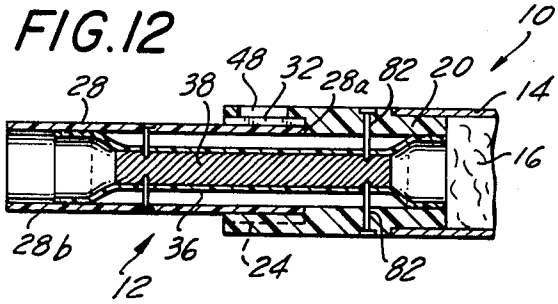



FIG. 9

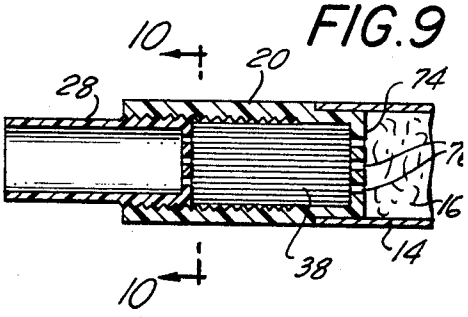



FIG. 10

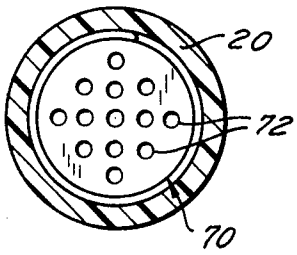
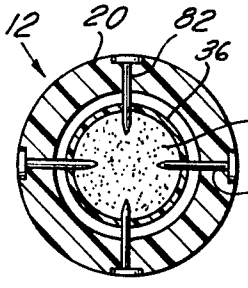



FIG. 13




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# ADJUSTABLE TOBACCO SMOKE FILTER DEVICE

This invention relates to tobacco smoke filter devices for use on cigarettes, cigars and the like and more particularly to an adjustable tobacco smoke filter device.

It is well known that the inhalation of tobacco smoke may be injurious to a smoker's health, and that filter devices are used to reduce the harmful effects of tobacco smoke. For health reasons and for matters of personal taste a smoker may desire to adjustably restrict the passage of tobacco smoke through a filter device in order to limit the amount of smoke inhaled in accordance with his personal requirements.

It is an object of this invention to provide a relatively simple, inexpensive, yet highly effective tobacco smoke filter device whereby a smoker may readily manually adjust the capacity of the tobacco smoke filter in accordance with his personal requirements.

It is another object of this invention to provide such a tobacco filter device that may be readily adapted for use with conventional forms of cigarettes and cigars.

It has now been found that the foregoing objects and other advantages can be readily attained in an adjustable tobacco smoke filter device for attachment to cigarettes, cigars and the like wherein the device includes a filter body having an internal passage and a mouthpiece having a similar internal passage. The mouthpiece has one end disposed adjacent the filter body with the internal passages in aligned relationship. Means are provided for mounting the mouthpiece for manual rotation relative to the filter body. A filter wrapper of resilient material having a compressible tobacco smoke filter material disposed therein is advantageously provided. The filter wrapper is open at opposite ends and provides a smoke passage for tobacco smoke through the filter material. The filter wrapper is disposed in the internal passages of the mouthpiece and filter body with one end fixed by an adhesive to the filter body and with its opposite end fixed by an adhesive to the mouthpiece. Accordingly, upon manual rotation of the mouthpiece the filter wrapper is twisted to restrict the smoke passage.

In one embodiment the mouthpiece may be rotatably mounted with one end partially disposed in the internal passage of the filter body for rotation therein. The mouthpiece is provided with an external stop releasably engagable with adjacent cooperating internal teeth on said mouthpiece for adjustably restricting the rotation of said mouthpiece relative to said filter body.

In another embodiment of this invention, the mouthpiece also has one end partially disposed in the internal passage of the filter body for rotation therein. However, in this embodiment the mouthpiece has a threaded external surface engaged with a complementary internal threaded surface on the filter body for adjustably restricting a manual rotation of the mouthpiece relative to the filter body.

In an additional embodiment of this invention the filter body has an annular flange aligned with an adjacent opposing annular flange on the mouthpiece. The annular flanges having opposed engagable mating teeth for adjustably restricting the manual rotation of the mouthpiece relative to the filter body.

Various other objects and advantages of this invention will be apparent from the following detailed description, the claims and the drawings appended hereto wherein:



FIG. 1 is a perspective view of a cigarette having a tobacco smoke filtering device embodying the advantageous construction of this invention.

FIG. 2 is an enlarged longitudinal cross sectional view taken along lines 2—2 of FIG. 1 illustrating one embodiment of the tobacco smoke filter device of this invention.

FIG. 3 is a cross sectional view similar to FIG. 2 illustrating the filter device after the filter piece has been turned to restrict the filter smoke passage.

FIG. 4 is a transverse cross sectional view of the embodiment illustrated in FIG. 2 and taken along lines 4—4.

FIG. 5 is a partial cross sectional view similar to FIG. 2 illustrating another embodiment of the filter device of this invention.

FIG. 6 is a transverse cross sectional view taken along lines 6—6 of FIG. 5.

FIG. 7 is a partial cross sectional view illustrating another embodiment of the filter device of this invention.

FIG. 8 is a transverse cross sectional view taken along lines 8—8 of FIG. 7.

FIG. 9 is a cross sectional view of another embodiment of this invention wherein instead of being twisted the filter material is compressed by pressure applied by the mouthpiece.

FIG. 10 is a cross sectional view taken along lines 10—10 of FIG. 9.

FIG. 11 is a cross sectional view illustrating an embodiment of this invention similar to the embodiment shown in FIGS. 2, 3 and 4 except that additional gripping means are provided to insure the twisting of the filter material when the mouthpiece is rotated.

FIG. 12 is a view similar to FIG. 11 illustrating the position of the parts after the tubular mouthpiece has been rotated and the filter material twisted.

FIG. 13 is a cross sectional view taken along lines 13—13 of FIG. 11.

Referring now in detail to the drawings, there is illustrated in FIG. 1 a cigarette, generally designated by the reference numeral 10, having an adjustable tobacco smoke filter device 12 advantageously constructed in accordance with this invention mounted thereon. One particular embodiment of the filter device 12 is illustrated in FIGS. 2, 3 and 4 for advantageously adjustably restricting the flow of smoke from the burning tobacco of the cigarette through the filter smoke passage to the mouth of the user.

As illustrated in FIG. 2, the cigarette 10 has a conventional wrapper 14 of paper or other suitable materials for enclosing the usual supply of tobacco 16 therein. The adjustable filter device 12 has a tubular filter body 20 attached to the wrapper 14 by a conventional adhesive. The wrapper 14 overlaps a portion of the filter body 20 and is disposed within a recess 22 formed in the filter body 20 in order to provide a smooth continuous surface at the connection of the wrapper 14 to the filter body 20.

The interior of the tubular filter body 20 is provided with an internal chamber 24 which extends therethrough and is open at both ends. Advantageously there is rotatably mounted on the filter body 20 a tubular mouthpiece 28 which has a one end 28*a* extending into the chamber 24 and supported by the filter body 20. An exterior portion 28*b* of the mouthpiece 28 extends outwardly from the filter body 20 and acts as a mouthpiece for the cigarette 10. The end 28*a* of the

mouthpiece 28 which extends into the chamber 24 has a longitudinally outwardly extending stop 30 formed thereon for cooperating with three inwardly extending teeth 32 formed on the interior surface of the tubular filter body 20 at the end portion adjacent the mouthpiece 28.

As may be seen clearly from FIG. 4 as the mouthpiece 28 is rotated in a clockwise direction the stop 30 will be periodically positioned for engagement with one of the teeth 32 which will prevent a return movement in a counterclockwise direction. The filter body 20 and the mouthpiece 28 are sufficiently resilient so the stop 30 can slide by the teeth 32 during counterclockwise rotation of the mouthpiece 28 by the user. In order to enhance this sliding action, the stop 30 is formed with an inclined surface 30a which cooperates with a similarly inclined surface 32a formed on the teeth 32 so that rotation in a counterclockwise direction, as viewed in FIG. 4, is not inhibited. However, rotation in a clockwise direction is prevented because of the engagement of the mating flat face 30*b* of the stop 30 with one of the flat faces 32*b* of the teeth 32. The resilient material of the filter body 20 and the mouthpiece 28 may be synthetic plastic or paper, in order to allow the stop 30 to pass by the teeth 32 when a rotating force is applied to the tubular mouthpiece 28.

The filter device 12 of the invention has the highly desirable provision of a resilient filter wrapper 36 of suitable material such as synthetic plastic or other conventional resilient sheet material. The interior of the filter wrapper 36 provides a passage for tobacco smoke through conventional tobacco smoke filter material 38 contained therein. The filter material 38 is compressable when the wrapper 36 is twisted in the manner illustrated in FIG. 3 thereby restricting the size of the passage for the tobacco smoke. The restriction of the smoke passage is adjustable by rotation of the mouthpiece 28. To accomplish this the wrapper 36 is advantageously connected at one end to the interior chamber 24 of the filter body 20 adjacent the tobacco 16 and at its other end to the mouthpiece 28 adjacent the exterior end 28b. The resilient wrapper 36 also biases the filter body 20 toward the mouthpiece 28. However, the wrapper is free to be twisted between its ends. In the position illustrated in FIG. 2, the untwisted wrapper 36 allows unrestricted passage of tobacco smoke through the filter medium 38. When the mouthpiece 28 is rotated, the filter wrapper 36 which is connected to the mouthpiece 28 on one end is twisted because of its stationary connection to the filter body 20 at its other end. A shoulder formed in the interior passage of the filter body 20 prevents the mouthpiece 28 from moving longitudinally within the filter body 20. The twisting of the filter wrapper 36 reduces the diameter of the smoke passage and compresses the filter material 38. This compression increases the resistance to the flow of smoke through the filter material 38 so that the smoker obtains less smoke for each puff on the cigarette 10.

Another embodyment of this invention is illustrated in FIGS. 5 and 6 which has same structure as illustrated and described for FIGS. 2, 3 and 4 except that instead of the stop 30 on the mouthpiece 28 and the teeth 32 on the filter body 20, complimentary threaded surfaces 40 and 42 are provided on the interior surface of the filter body 20 and on the exterior mating surface of the tubular mouthpiece 28 respectively. Accordingly, the mouthpiece in the embodyment illustrated in FIGS. 5 and 6 may be rotated in a clockwise direction so that the filter tube 36 will be twisted in the manner illustrated in FIG. 4 in order to adjustably restrict the filter smoke passage in the same manner as described above.

Another embodyment of the filter device 12 of this invention is illustrated in FIG. 78, and operates in a manner similar to the embodyments described above. Here the filter body 20 has an annular flange 60 aligned with a similar annular flange 62 on the mouthpiece 28. Mating teeth 60*a* on the filter body mesh with opposed teeth 62*a* on the mouthpiece 28 to releasably hold these parts in a fixed position. The mouthpiece 28 and the filter body 20 are biased into engagement by the resilient filter wrapper 36. Upon rotation of the mouthpiece 28, the filter wrapper 36 is sufficiently resilient to allow the teeth 62*a* to slide over the teeth 60*a* of the filter body whereby the filter wrapper 36 is twisted and the smoke passage therethrough is restricted. In order to hold the filter body 20 and the mouthpiece 28 in alignment during rotation of the mouthpiece 28 an annular shoulder 60*b* on the filter body 20 is configured to fit into a complementary annular groove 62*b* on the mouthpiece 28.

In order to indicate to the user the position of the tubular mouthpiece 28 relative to the filter body 20 to give an indication of the amount of the restriction of the smoke passage through the filter wrapper 36 suitable indicia 46 may be imprinted upon the mouthpiece 28 and viewed through an aligned aperture 48 in the filter body 20. The indicia may be in the form of numbers 1–9 to indicate to the user the relative amount the smoke passage has been restricted. In addition, indicia 50 may be applied to the cigarette wrapper 14 in order to indicate suggested amounts of restriction to the smoker as the cigarette is consummed.

Another embodiment of this invention is illustrated in FIGS. 9 and 10 wherein the filter body 20 is engaged with a tubular mouthpiece 28 with mating threaded surfaces 40 and 42 in the same manner as the embodiment illustrated in FIG. 5. However, the embodiment in FIG. 10 differs in that the inner end of the tubular mouthpiece 28 has a perforated wall 70 which abuts against the filter material 38. The perforated wall 70 has a plurality of apertures 72 formed therein to allow smoke to pass therethrough but to firmly abut against the filter material 38. A similar cooperating perforated wall 74 is formed on the inner end of the filter body 20 and has apertures 76 formed therein to allow smoke to pass from the burning tobacco through the filter material 38 and out through the aperture 72 and the perforated wall 70 of the mouthpiece 28. When the user desires to reduce the amount of smoke received from the cigarette 10 he can rotate the tubular mouthpiece 28 so that the threaded surfaces 40 and 42 cause the mouthpiece 28 and perforated wall 70, to advance and compress the filter material 38 in cooperation with the wall 74 whereby the amount of smoke passing through the filter material is reduced in accordance with the personal requirements of the user.

In the embodiments illustrated in FIGS. 1–8 the wrapper 36 is secured to the filter material 38 by an adhesive in order to insure a twisting of the filter material when the mouthpiece 28 is rotated. An additional gripping means is illustrated in the embodiment of FIGS. 11, 12 and 13 to insure a twisting of the filter material 38.

The embodiment illustrated in FIGS. 11, 12 and 13 is similar to the embodiment illustrated in FIGS. 2, 3 and 4 except that the filter material 38 does not extend the full length of the filter wrapper 36 which is attached by an adhesive at opposite ends to the filter body 20 and the tubular mouthpiece 28 in the same manner as described above. In this embodiment a plurality of gripping members in the form of pins 80 or the like are advantageously provided to extend through the tubular mouthpiece 28, through the wrapper 36, into the body of the filter material 38. Similarly the other end the filter material 38 is gripped by pins 82 which extend through the filter body 20, through the wrapper 26, and into the filter material 38 adjacent its inner end. The purpose of the pins 80 and 82 is to insure that turning of the tubular mouthpiece 28 relative to the filter body 20 causes the filter material to twist from the position illustrated in FIG. 11 to the position illustrated in FIG. 12 thereby compressing the filter material and reducing the size of the passage to inhibit the flow of tobacco smoke therethrough. As illustrated in FIG. 12, even though the diameter of the filter material is reduced by twisting the pins 80 and 82 remain in engagement with the filter material 38.

It will be understood that the foregoing description with the details of exemplary structure is not to be construed in any way to limit the invention, but that modifications may be made thereto without departing from the scope of the invention as set forth in the following claims.

Having thus described the invention, what is claimed is:

1. A tobacco smoke filter device for attachment to cigarettes, cigars and the like including filter body having an internal passage, a mouthpiece having an internal passage, said mouthpiece having one end disposed adjacent said filter body with said internal passages in aligned relationship, means for mounting said mouthpiece for manual rotation relative to said filter body, a filter wrapper of resilient material having a compressible tobacco smoke filter material disposed therein, said resilient filter wrapper being open at opposite ends and providing a smoke passage for tobacco smoke through said filter material, said filter wrapper being disposed in said internal passages with one end fixed to said filter body and with its opposite end fixed to said mouthpiece whereby upon manual rotation of said mouthpiece said filter wrapper is twisted to restrict said smoke passage and means for retaining said filter wrapper in a twisted position upon manual rotation of said mouthpiece.

2. The tobacco smoke filter device of claim 1 wherein said mouthpiece has one end partially disposed in said internal passage of said filter body for rotation therein and wherein said mouthpiece has a stop releasably engagable with adjacent cooperating teeth on said mouthpiece for adjustably restricting the rotation of said mouthpiece relative to said filter body.

3. The tobacco smoke filter device of claim 1 wherein said mouthpiece has one end partially disposed in said internal passage of said filter body for rotation therein and wherein said mouthpiece has a threaded surface engaged with a complementary threaded surface on said filter body for adjustably restricting the manual rotation of said mouthpiece relative to said filter body.

4. The tobacco smoke filter device of claim 1 wherein said filter body has an annular flange aligned with one adjacent opposing annular flange on said mouthpiece and wherein said annular flanges have opposed engagable mating teeth for adjustably restricting the manual rotation of said mouthpiece relative to said filter body.

5. The tobacco smoke filter device of claim 1 wherein a plurality of gripping members extend from the filter body and from the tubular mouthpiece into the filter material to grip the filter material at opposite ends to cause twisting thereof when the tubular mouthpiece is rotated relative to the filter body.

* * * * *