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(54) **FILTER CIGARETTE WITH VARIABLE VENTILATION**

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(57) **ABSTRACT**

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A filter cigarette with variable ventilation includes a rod of smokable material, a mouthpiece including an element rotatable relative to the rest of filter cigarette about the longitudinal axis thereof to vary the ventilation of the filter cigarette, and a ventilation indicator including a scale extending circumferentially about the periphery of the filter cigarette and a cursor. The scale is symmetric about the longitudinal axis of the filter cigarette and the cursor and the scale are rotatable relative to one another about the longitudinal axis of the filter cigarette. One of the cursor and the scale rotate with the rotatable element of the mouthpiece, the level of ventilation being indicated by the longitudinal distance between the cursor and a longitudinally aligned point on the scale.

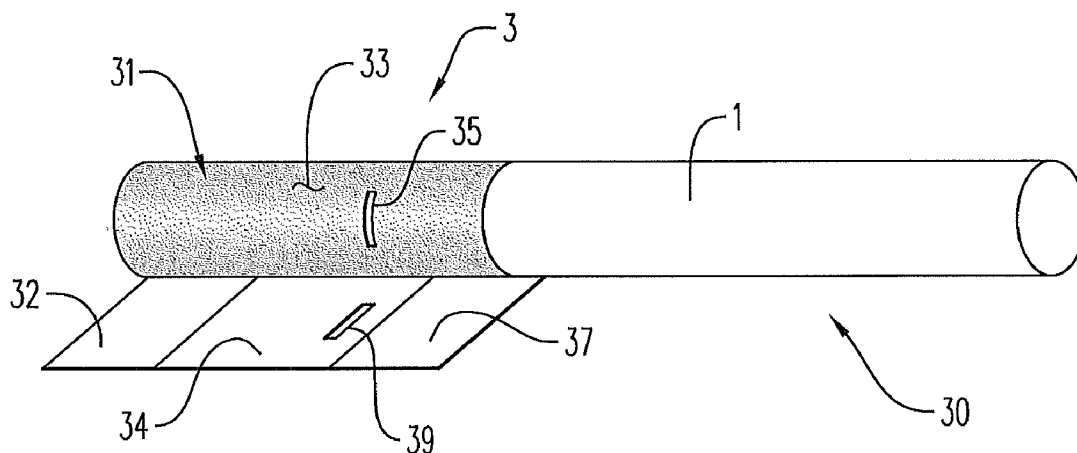
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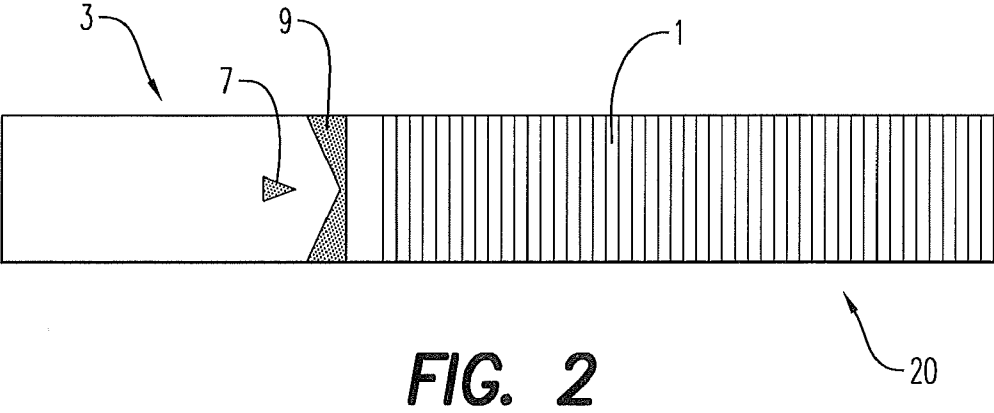
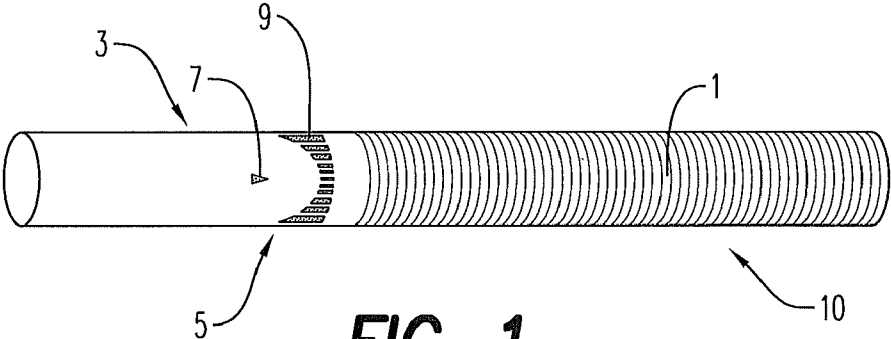
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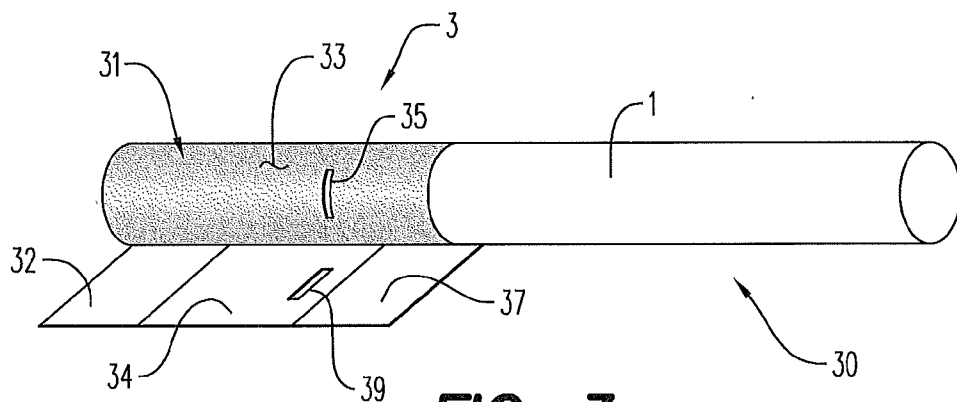
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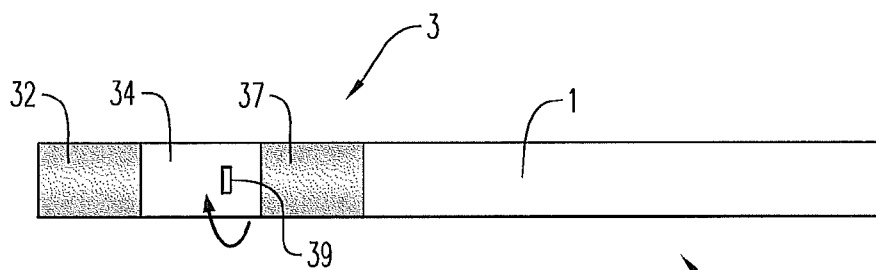
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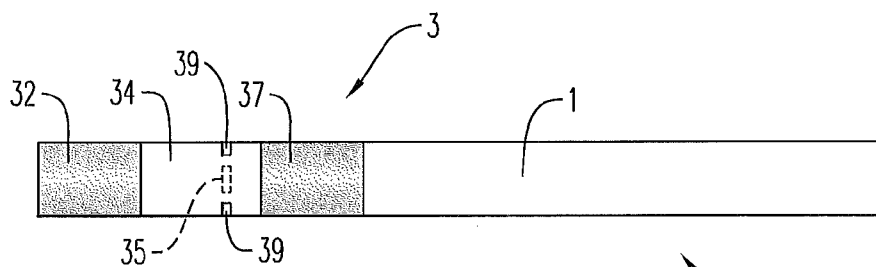




**FIG. 3**



**FIG. 4**



**FIG. 5**

## FILTER CIGARETTE WITH VARIABLE VENTILATION

### CROSS REFERENCE TO RELATED APPLICATION

**[0001]** This application corresponds to, and claims priority under 35 U.S.C. §119 and 37 C.F.R. §1.55 to European Application No. 10250600.3, filed Mar. 26, 2010, the entire content of which is hereby incorporated by reference.

### WORKING ENVIRONMENT

**[0002]** Filter cigarettes may include a cylindrical rod of tobacco cut filler surrounded by a paper wrapper and a cylindrical filter axially aligned in an abutting end-to-end relationship with the wrapped tobacco rod. The wrapped tobacco rod and the filter may be joined by a band of tipping paper that circumscribes the entire length of the filter and an adjacent portion of the wrapped tobacco rod. The tipping paper may be provided with one or more circumferential rows of perforations at a location along the filter in order to ventilate mainstream tobacco smoke produced during combustion of the wrapped tobacco rod with ambient air. Filter cigarettes may also include mechanisms for varying the level of ventilation obtained during smoking, which enable a consumer to vary the ratio of ambient air to mainstream smoke delivered to their mouth.

**[0003]** For example, U.S. Pat. No. 4,570,649 discloses a variable dilution filter cigarette including a substantially cylindrical tobacco rod, a substantially cylindrical filter plug, a plug wrap circumscribing the filter plug, and a tipping paper circumscribing the plug wrap and a portion of the tobacco rod. At least one of the plug wrap and the tipping paper is air impermeable. The plug wrap is divided into a mouth-end band, a central band and a rod-end band having a first opening therein. The mouth-end and rod-end bands are fixed to the filter, while the central band is rotatable about the longitudinal axis of the filter plug. The tipping paper is divided into a first band and a second band. The first band of the tipping paper extends from the mouth end of the filter plug to a position overlying the rod-end band of the plug wrap and is attached only to the central band of the plug wrap for rotation therewith about the longitudinal axis of the filter plug. The first band of the tipping paper has a second opening therein overlying the rod-end band of the plug wrap such that rotation of the first band rotates the second opening into varying degrees of registry with the first opening in the rod-end band thereby varying the level of dilution obtained during smoking. The second band of the tipping paper extends from the first band to a position on the tobacco rod and joins the tobacco rod to the filter plug.

**[0004]** U.S. Pat. No. 3,519,000 discloses a vented cigarette holder with an air-to-smoke ratio control valve including a valve body and a valve stem attached to a valve head. The valve body is rotatable relative to the valve stem to alter the degree in which smoke from a cigarette in the holder and ambient air are mixed in a mixing chamber formed in the valve head. An index marker on the outer surface of the valve stem serves as a reference mark for use with graduation marks formed on the surface of the valve body to indicate the magnitude of the air-to-smoke ratio experienced at different relative rotational positions of the valve stem and valve body. The graduation marks are not symmetrical about the longitudinal axis of the cigarette holder. Clockwise rotation of the valve

head relative to the valve body results in closure of a smoke inlet and opening of an air inlet, and so increases the air-to-smoke ratio, while counterclockwise rotation of the valve head relative to the valve body results in opening of the smoke inlet and closing of the air inlet, and so decreases the air-to-smoke ratio. At the extremities of valve head rotation, the respective one of the inlet openings is completely closed and the other is completely open.

**[0005]** Filter cigarettes can also include other mechanisms for varying the level of ventilation obtained during smoking.

**[0006]** For example, FR-A5-2 273 443 discloses a cigarette with variable filtration including a first filter plug adjacent the cigarette and a buccal filter plug separated from the first filter plug by a cavity with a flexible tubular wall. The buccal filter plug is rotatable relative to the first filter plug about the longitudinal axis of the filter to progressively reduce the section of the cavity, which forms a helical corridor, and thereby increase the level of filtration; rotation of the buccal filter plug relative to the first filter plug does not vary the level of ventilation of the cigarette. To allow a user to directly select a preferred level of filtration, a graduated scale is provided on the exterior of the first filter plug and a cursor is provided on the exterior of the buccal filter plug.

**[0007]** It would be desirable to provide a filter cigarette with variable ventilation having means to enable a consumer to more simply and easily select a desired level of ventilation.

### SUMMARY OF SELECT EMBODIMENTS

**[0008]** In a preferred embodiment, a filter cigarette with variable ventilation includes a rod of smokable material, a mouthpiece attached to the rod of smokable material, and a ventilation indicator including a scale extending circumferentially about the periphery of the filter cigarette and a cursor. Preferably, the mouthpiece includes an element rotatable relative to the rest of filter cigarette about the longitudinal axis thereof to vary the ventilation of the filter cigarette. Also preferably, the scale is symmetric about the longitudinal axis of the filter cigarette and the cursor and the scale are rotatable relative to one another about the longitudinal axis of the filter cigarette. In the preferred embodiment, one of the cursor and the scale rotate with the rotatable element and the level of ventilation is indicated by the longitudinal distance between the cursor and a longitudinally aligned point on the scale.

**[0009]** Preferably, the scale includes a line at an acute angle to the longitudinal axis of the filter cigarette. Moreover, the line is a continuous line. Also preferably, the scale includes a plurality of circumferentially spaced apart markers. In the preferred embodiment, the markers are longitudinally offset relative to one another. Moreover, the markers are of different length in the longitudinal direction of the filter cigarette. Preferably, the markers are longitudinally extending lines of bars.

**[0010]** Also in the preferred embodiment, the ventilation indicator includes a tactile cursor and a tactile scale.

**[0011]** Preferably, the mouthpiece includes a filter including a filter plug circumscribed by a filter wrapper. Also preferably, the filter wrapper includes a mouth-end band, a central band and a rod-end band. In the preferred embodiment, the rod-end band and the mouth-end band are affixed to the filter and the central band is rotatable about the longitudinal axis of the filter cigarette.

**[0012]** Preferably, the filter cigarette also includes a band of tipping paper circumscribing the filter and an adjacent portion of the rod. Moreover, the band of tipping paper includes a first

band extending from the mouth end of the filter to a position overlying the rod-end band of the filter wrapper and a second band extending from the first band to a position overlying the rod. Also preferably, the first band is affixed only to the central band for rotation therewith. Moreover, one of the cursor and the scale of the ventilation indicator is provided on the outer surface of the first band of tipping paper and the other of the cursor and the scale of the ventilation indicator is provided on the second band of tipping paper.

**[0013]** In the preferred embodiment, at least one of the filter wrapper and the tipping paper is substantially air-impermeable. Preferably, the rod-end band of the filter wrapper has at least one opening therein. Moreover, the first band of tipping paper has at least one opening therein positioned such that rotation of the first band of tipping paper about the longitudinal axis of the filter cigarette rotates the at least one opening in the first band of tipping paper into varying degrees of registry with the at least one opening in the rod-end band of the filter wrapper thereby varying the level of ventilation obtained during smoking.

**[0014]** Also in the preferred embodiment, the filter cigarette further includes a rod end band of tipping paper attaching the rod to the filter, a mouth end band of tipping paper, and a sleeve disposed between the rod end and mouth end bands of tipping paper. Preferably, the sleeve overlies a portion of the filter wrapper and is rotatable relative thereto about the longitudinal axis of the filter cigarette. Also preferably, one of the cursor and the scale of the ventilation indicator is provided on the outer surface of the sleeve and the other of the cursor and the scale of the ventilation indicator is provided on the rod end band of tipping paper or the mouth end band of tipping paper.

**[0015]** Preferably, at least one of the sleeve and the filter wrapper is substantially air-impermeable and the sleeve includes at least one opening therein. Also preferably, the portion of the filter wrapper underlying the sleeve includes at least one opening therein, such that rotation of the sleeve about the longitudinal axis of the filter cigarette rotates the at least one opening in the sleeve into varying degrees of registry with the at least one opening in the filter wrapper thereby varying the level of ventilation obtained during smoking.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0016]** The invention will be further described, by way of example only, with reference to the accompanying drawings wherein like reference numerals are applied to like elements and wherein:

**[0017]** FIG. 1 shows a perspective view of a first embodiment of a filter cigarette with variable ventilation;

**[0018]** FIG. 2 shows a plan view of a second embodiment of a filter cigarette with variable ventilation;

**[0019]** FIG. 3 shows a perspective view of a third embodiment of a filter cigarette with variable ventilation;

**[0020]** FIG. 4 shows a schematic side view of the filter cigarette with variable ventilation according to the third embodiment of the invention shown in FIG. 3 in a high ventilation position; and

**[0021]** FIG. 5 shows a schematic side view of the filter cigarette with variable ventilation according to the third embodiment of the invention shown in FIG. 3 in a low ventilation position.

#### DETAILED DESCRIPTION

**[0022]** A smoking article with variable ventilation and in particular a filter cigarette with variable ventilation is described herein.

**[0023]** In a preferred embodiment, a filter cigarette with variable ventilation includes a rod of smokable material; a mouthpiece attached to the rod of smokable material; and a ventilation indicator including a scale extending circumferentially about the periphery of the filter cigarette and a cursor. Preferably, the mouthpiece includes an element rotatable relative to the rest of filter cigarette about the longitudinal axis thereof to vary the level of ventilation obtained during smoking of the filter cigarette. Also preferably, the scale is symmetric about the longitudinal axis of the filter cigarette and the cursor and the scale are rotatable relative to one another about the longitudinal axis of the filter cigarette. Moreover, one of the cursor and the scale rotate with the rotatable element of the mouthpiece, and the level of ventilation is visually indicated by the longitudinal distance between the cursor and a longitudinally aligned point on the scale.

**[0024]** Preferably, the rotatable element of the mouthpiece is rotatable relative to the rest of filter cigarette about the longitudinal axis thereof between a high ventilation position and a low ventilation position. Also preferably, the filter cigarette is initially provided to a consumer with the rotatable element of the mouthpiece in the high ventilation position or the low ventilation position.

**[0025]** As used throughout the specification, the terms “high ventilation” and “low ventilation” are used to indicate the level of air admitted to the mouthpiece of the filter cigarette during smoking and the resultant air dilution of the mainstream smoke obtained. The greater the level of ventilation, the greater the air dilution of the mainstream smoke.

**[0026]** Allowing a consumer to vary the level of ventilation obtained during smoking of filter cigarettes through rotation of the rotatable element of the mouthpiece thereof advantageously enables the consumer to alter the taste or flavor of the filter cigarettes.

**[0027]** The cursor and scale of the ventilation indicator provide a visual indication to a consumer of the level of ventilation obtained during smoking and thereby advantageously enable a consumer to simply and easily select a desired level of ventilation either prior to or during smoking of filter cigarettes.

**[0028]** The scale of the ventilation indicator may extend around substantially the entire circumference of the filter cigarette. Alternatively, the scale may extend around only a portion of the circumference of the filter cigarette.

**[0029]** The scale may include a continuous line at an acute angle to the longitudinal axis of the filter cigarette. For example, the ventilation indicator may include a logo, shape or symbol that includes a continuous line at an acute angle to the longitudinal axis of the filter cigarette that forms part or all of the scale.

**[0030]** Alternatively or in addition, the scale may include a plurality of circumferentially spaced apart markers of the same or different color, shape and size. For example, the scale may include a plurality of circumferentially spaced apart lines, bars, circles, squares, numbers or other shapes or symbols or any combination thereof.

**[0031]** Moreover, the scale may include a plurality of circumferentially spaced apart markers of different length. For example, the scale may include a plurality of circumferentially spaced apart longitudinally extending lines or bars of different length.

**[0032]** Alternatively or in addition, the scale may include a plurality of circumferentially spaced apart markers of the same length that are longitudinally offset relative to one

another. For example, the scale may include a plurality of circumferentially spaced apart longitudinally extending lines or bars of the same length that are longitudinally offset relative to one another.

**[0033]** The cursor of the ventilation indicator may be any suitable pointer. For example, the cursor may include a triangle, dot or longitudinally extending line, bar or arrow.

**[0034]** The ventilation indicator may further include one or more of direction signs (for example, chevrons or arrows), symbols (for example, '-' and '+' symbols) or words (for example, 'min' and 'max') to indicate the direction in which the rotatable element of the mouthpiece should be rotated by a consumer in order to increase or decrease the level of ventilation obtained during smoking of the filter cigarette.

**[0035]** Alternatively or in addition, the color of the scale may vary or the shade of the scale may be graded in the transverse direction of the filter cigarette in order to provide a further visual indication of the level of ventilation obtained during smoking.

**[0036]** In the preferred embodiment, the ventilation indicator may include a tactile cursor and a tactile scale. This advantageously enables a consumer to select a desired level of ventilation by touch instead of or in addition to by sight and so facilitates selection of a desired ventilation level in low light conditions and during smoking.

**[0037]** Preferably, the cursor and the scale of the ventilation indicator may be raised radially outward of the rest of the filter cigarette or inset radially inward of the rest of the filter cigarette. Alternatively or in addition, one or both of the cursor and the scale of the ventilation indicator may have a different surface texture to the rest of the filter cigarette.

**[0038]** Also preferably, the cursor and the scale of the ventilation indicator may be formed in any suitable known manner. For example, the cursor and the scale may be: formed by embossing or debossing; adhered or otherwise affixed to the outer surface of the filter cigarette; printed on the outer surface of the filter cigarette; or any combination thereof.

**[0039]** In the preferred embodiment, the filter cigarette may be of the same or similar construction as conventional filter cigarettes with variable ventilation that include a mouthpiece including an element rotatable relative to the rest of filter cigarette about the longitudinal axis thereof to vary the level of ventilation obtained during smoking. For example, the filter cigarette may be of the same or similar construction as the variable dilution filter cigarettes described in U.S. Pat. No. 4,570,649, the entire content of which is incorporated herein by this reference thereto.

**[0040]** Preferably, the filter cigarette with variable ventilation includes a mouthpiece including a filter. Also preferably, the filter includes a filter plug circumscribed by a filter wrapper. Moreover, the filter cigarette includes a rod of smokable material. Preferably the rod of smokable material is a rod of tobacco cut filler.

**[0041]** In the preferred embodiment, the filter cigarette with variable ventilation includes a mouthpiece including a filter having a filter plug circumscribed by a filter wrapper. Preferably, the filter wrapper includes a mouth-end band, a central band and a rod-end band. Also preferably, the rod-end band and the mouth-end band are affixed to the filter and the central band is rotatable about the longitudinal axis of the filter cigarette.

**[0042]** In the preferred embodiment, the filter cigarette further includes a band of tipping paper circumscribing the filter and an adjacent portion of the rod. Preferably, the band of

tipping paper includes a first band extending from the mouth end of the filter to a position overlying the rod-end band of the filter wrapper and a second band extending from the first band to a position overlying the rod. Also preferably, the first band is affixed only to the central band for rotation therewith. Moreover, one of the cursor and the scale of the ventilation indicator is provided on the outer surface of the first band of tipping paper and the other of the cursor and the scale of the ventilation indicator is provided on the second band of tipping paper.

**[0043]** Preferably, at least one of the filter wrapper and the tipping paper is substantially air-impermeable and the rod-end band of the filter wrapper has at least one opening therein. Also preferably, the first band of tipping paper has at least one opening therein positioned such that rotation of the first band of tipping paper about the longitudinal axis of the filter cigarette rotates the at least one opening in the first band of tipping paper into varying degrees of registry with the at least one opening in the rod-end band of the filter wrapper thereby varying the level of ventilation obtained during smoking of the filter cigarette.

**[0044]** In another embodiment, a filter cigarette with variable ventilation also includes a mouthpiece including a filter. Preferably, the filter includes a filter plug circumscribed by a filter wrapper. However, in this embodiment the filter cigarette also includes: a rod end band of tipping paper attaching the rod to the filter, a mouth end band of tipping paper, and a sleeve disposed between the rod end and mouth end bands of tipping paper. Preferably, the sleeve overlies a portion of the filter wrapper and is rotatable relative thereto about the longitudinal axis of the filter cigarette.

**[0045]** Moreover, one of the cursor and the scale is provided on the outer surface of the sleeve and the other of the cursor and the scale is provided on the rod end band of tipping paper or the mouth end band of tipping paper. Preferably, one of the cursor and the scale is provided on the outer surface of the sleeve and the other of the cursor and the scale is provided on the rod end band of tipping paper.

**[0046]** Preferably at least one of the sleeve and the filter wrapper is substantially air-impermeable and the sleeve includes at least one opening therein. Also preferably, the portion of the filter wrapper underlying the sleeve includes at least one opening therein. Rotation of the sleeve about the longitudinal axis of the filter cigarette rotates the at least one opening in the sleeve into varying degrees of registry with the at least one opening in the filter wrapper thereby varying the level of ventilation obtained during smoking.

**[0047]** In the preferred embodiment, the filter cigarette may include a mouthpiece such as a filter including any suitable filtration materials including, but not limited to, cellulose acetate tow (optionally including activated carbon on the tow), crepe paper and activated carbon.

**[0048]** The filter cigarette may also include a mouthpiece including filters including flavor-bearing material such as, for example, plant material, breakable capsules containing flavorants, flavor-bearing granules or other materials loaded with flavor.

**[0049]** The filter cigarette may include a mouthpiece including multi-segment filters. For example, the filter cigarette may include mouthpieces including up to four filter segments or up to three filter segments and a recess at the mouth end thereof.

**[0050]** Preferably, the filter cigarette has an overall length ranging from about 70 millimeters (mm) to about 128 mm.

[0051] Also preferably, the filter cigarette may include a mouthpiece having an overall length, for example, ranging from about 24 mm to about 48 mm and a diameter, for example, ranging from about 5 mm to about 8.5 mm.

[0052] The filter cigarettes, shown in FIGS. 1 to 5 have several components in common and these components have been given the same reference numerals.

[0053] Referring to FIG. 1, in a preferred embodiment, the filter cigarette 10 with variable ventilation generally includes an elongate, cylindrical wrapped rod 1 of smokable material attached at one end to an axially aligned, elongate, cylindrical, mouthpiece 3.

[0054] Preferably, the mouthpiece 3 includes an element (not shown) which is rotatable about a longitudinal axis of the filter cigarette 10. As will be explained in further detail below with reference to the filter cigarette with variable ventilation according to a third embodiment of the invention shown in FIGS. 3 to 5, the rotatable element of the mouthpiece 3 is rotatable relative to the rest of the filter cigarette 10 to vary the ventilation of the filter cigarette 10 obtained during smoking thereof.

[0055] Also preferably, the filter cigarette 10 also includes a ventilation indicator or gauge 5 which allows a consumer to select the level of ventilation of the cigarette obtained during smoking and hence the flavor delivered to the consumer. The ventilation indicator 5 includes a triangular cursor 7 and a scale 9. The triangular cursor 7 is located on the exterior of the rotatable element of the mouthpiece 3. However, it will be appreciated that alternative configurations in which the scale 9 is located on the exterior of the rotatable element mouthpiece 3 are also possible.

[0056] Preferably, the scale 9 includes a plurality of circumferentially spaced apart bars of different length which extend substantially parallel to the longitudinal axis of the filter cigarette 10. In use, the position of the triangular cursor 7 along the scale 9 indicates the degree of rotation of the rotatable element of the mouthpiece 3 relative to the rest of the filter cigarette 10 and hence the level of ventilation that will be obtained during smoking of the filter cigarette 10, the level of ventilation being indicated by the longitudinal distance between the triangular cursor 7 and the longitudinally aligned point on the scale 9.

[0057] As previously described, the triangular cursor 7 and the scale 9 may be tactile to enable the consumer to select a desired level of ventilation by touch as well as or in addition to by sight.

[0058] In the preferred embodiment, the scale 9 is symmetrical about the longitudinal axis of the filter cigarette 10. Preferably, the bar at the center of the scale 9 is shortest and the bars at the extremities of the scale are longest. This indicates that the consumer may rotate the rotatable element of the mouthpiece 3 and the triangular cursor 7 either clockwise or anticlockwise to obtain the same ventilation level. Moreover, the consumer may select a desired level of ventilation by rotating the rotatable element of the mouthpiece 3 relative to the rest of the filter cigarette 10 such that the triangular cursor 7 is longitudinally aligned with a particular bar of the scale 9.

[0059] As shown in FIG. 1, when the triangular cursor 7 is aligned with the shortest bar of the scale 9, the longitudinal distance between the triangular cursor 7 and the longitudinally aligned point on the scale 9 is at a maximum indicating a high level of ventilation. When the rotatable element of the mouthpiece 3 is rotated such that the triangular cursor 7 is aligned with one of the longest bars of the scale 9, the longi-

tudinal distance between the triangular cursor 7 and the longitudinally aligned point on the scale 9 is at a minimum indicating a low level of ventilation.

[0060] It will be appreciated that the filter cigarette may alternatively include ventilation indicators with cursors and scales wherein a minimum longitudinal distance between the cursor and a longitudinally aligned point on the scale indicates a low level of ventilation and a maximum longitudinal distance between the cursor and a longitudinally aligned point on the scale indicates a high level of ventilation.

[0061] It will also be appreciated that the filter cigarette may include ventilation indicators with cursors and scales wherein alignment of the cursor with a point at the center of the scale indicates a low level of ventilation and alignment of the cursor with points at the extremities of the scale indicates a high level of ventilation.

[0062] The ventilation indicator 5 of the filter cigarette 20 according to a second embodiment of the invention, shown in FIG. 2, is largely identical to the filter cigarette 10 shown in FIG. 1, but includes a triangular cursor 7 and a scale 9 symmetrical about the longitudinal axis of the filter cigarette 10 including a logo having a v-shaped edge proximate to the cursor.

[0063] As shown in FIG. 3, a filter cigarette 30 according to a third embodiment of the invention has a suitable mechanism for varying the level of ventilation obtained during smoking.

[0064] As shown, the mouthpiece 3 of the filter cigarette 30 of the third embodiment includes a single segment filter 31 adjacent to and abutting a wrapped tobacco rod 1.

[0065] Preferably, the filter segment 31 may be about 27 mm in length and composed of a high efficiency cellulose acetate plug, which is circumscribed along its entire length by an air impermeable filter wrapper 33. Also preferably, the wrapper 33 includes a pair of opposed, elongate openings 35 which are positioned about 15 mm from the mouth end of the filter and each extend about 90 degrees circumferentially around the filter. Moreover, in FIG. 3 only one of the elongate openings can be seen, and in fact only a single elongate opening 35 is required.

[0066] In the preferred embodiment, the wrapped tobacco rod 1 and the filter segment 31 are joined by a rod end band of tipping paper 37, which is about 10 mm in length and circumscribes a portion of the filter segment 31 and an adjacent portion of the wrapped tobacco rod 1. Preferably, a mouth end band of tipping paper 32 circumscribes the filter segment 31 at the mouth end thereof and may a length of about 12 mm. Also preferably, both the rod end 37 and mouth end 32 bands are fixed in place by means of an adhesive.

[0067] Preferably, between the rod end 37 and mouth end 32 bands of tipping paper is sleeve 34 of tipping paper which circumscribes the filter and abuts both the rod end 37 and mouth end 32 bands. The sleeve 34, which is the rotatable element of the mouthpiece in this embodiment, is not adhered to the filter wrapper and so is freely rotatable about the longitudinal axis of the filter cigarette 30. Moreover, the rod end 37 and mouth end 32 bands act as stops to prevent any axial movement of the sleeve 34. The sleeve 34 may be about 12 mm in length and includes a pair of opposed, elongate openings 39 which are positioned about 15 mm from the mouth end of the filter and each extend about 90 degrees circumferentially around the filter. Preferably, as shown in FIG. 3, only one of the elongate openings can be seen, and in fact only a single elongate opening 39 is required.

**[0068]** As shown in FIGS. 4 and 5, the annular position of the sleeve 39 relative to the underlying filter wrapper 33 may be altered in order to change the level of ventilation and therefore the level of air dilution to the mainstream smoke which is obtained during smoking of the filter cigarette 30. This is achieved by selecting the degree of alignment of the openings 35 in the filter wrapper and the openings 39 in the sleeve 34.

**[0069]** FIG. 4 shows the filter cigarette 30 in a high ventilation “open” position, in which the sleeve 34 is rotated to a position in which the openings 39 therein are fully aligned with the openings 35 in the underlying filter wrapper 33. In this “open” position, the openings 35 in the filter wrapper 33 are fully uncovered. During smoking of the filter cigarette 30 in the “open” position, a high level of air dilution of the mainstream smoke is therefore obtained.

**[0070]** FIG. 5 shows the filter cigarette 30 in a low ventilation “closed” position, in which the sleeve 34 is rotated to a position in which the openings 35 in the filter wrapper 33 are completely covered by the sleeve 34. In this “closed” position, the openings in the air impermeable filter wrapper 33 are substantially sealed by the sleeve. During smoking of the cigarette 30 in the “closed” position, a low level of air dilution of the mainstream smoke is therefore obtained.

**[0071]** In the “open” position, the level of air dilution of the mainstream smoke is high as a result of a high level of ventilation and conversely, in the “closed” position, the level of air dilution of the mainstream smoke is low as a result of a low level of ventilation. Thus, the ventilation obtained is effectively varied through rotation of the sleeve.

**[0072]** The filter cigarette 30 of FIGS. 3-5 further includes a ventilation indicator 5 (not shown) including a cursor 7 and a scale 9 like those shown in FIGS. 1 and 2, one of the cursor 7 and the scale 9 being located on the exterior of the sleeve 34 and the other of the cursor 7 and the scale 9 being located on either the rod end band 37 of tipping paper or the mouth end band 32 of tipping paper.

**[0073]** To form the variable ventilation filter cigarette 30 according to the third embodiment, the wrapped filter segment 31 and wrapped tobacco rod 1 may be produced in a conventional manner. A pre-perforated sheet of tipping paper is used to provide the rod end 37 and mouth end 32 bands and the sleeve 34. The layer of tipping paper includes a first row of perforations about 10 mm from one end, which must be broken to form the mouth end band, and a second row of perforations about 12 mm from the first row, which must be broken to separate the central and rod end bands. A double length of tipping paper may be used if preferred, as in conventional manufacturing processes. One or more specially shaped guides are incorporated into the conventional cigarette making equipment in order to break the lines of perforation in the tipping paper and ensure that they are glued in the correct position on the cigarette. Additional cutting knives may also be incorporated to cut one or more of the lines of perforation. All of the lines of perforation are broken during the manufacturing process, at the same or different stages, to ensure that the cigarette is provided to the consumer ready for use, with the sleeve already able to rotate freely and easily around the filter. The openings in the filter wrapper and the sleeve are made simultaneously using a laser, once the filter cigarette has been assembled.

**[0074]** In this specification, the word “about” is sometimes used in connection with numerical values to indicate that mathematical precision is not intended. Accordingly, where

the word “about” is used with a numerical value, that numerical value should be interpreted to include a tolerance  $\pm 10\%$  of the stated numerical value.

**[0075]** It will now be apparent to those skilled in the art that the foregoing specification describes with particularity a filter cigarette with variable ventilation. Moreover, it will also be apparent to those skilled in the art that various modifications, substitutions, variations, and equivalents exist for claimed features of the filter cigarette. Accordingly, it is expressly intended that all such modifications, substitutions, variations, and equivalents for claimed features of the filter cigarette, which fall within the spirit and scope of the invention as defined by the appended claims, be embraced thereby.

We claim:

1. A filter cigarette with variable ventilation comprising:
  - a rod of smokable material;
  - a mouthpiece attached to the rod of smokable material, the mouthpiece including an element rotatable relative to the rest of filter cigarette about a longitudinal axis thereof to vary the ventilation of the filter cigarette; and
  - a ventilation indicator including a scale extending circumferentially about the periphery of the filter cigarette and a cursor,
 wherein the scale is symmetric about the longitudinal axis of the filter cigarette and the cursor and the scale are rotatable relative to one another about the longitudinal axis of the filter cigarette, one of the cursor and the scale rotating with the rotatable element, the level of ventilation being indicated by the longitudinal distance between the cursor and a longitudinally aligned point on the scale.
2. The filter cigarette of claim 1, wherein the scale includes a line at an acute angle to the longitudinal axis of the filter cigarette.
3. The filter cigarette of claim 2, wherein the line is a continuous line.
4. The filter cigarette of claim 1, wherein the scale includes a plurality of circumferentially spaced apart markers.
5. The filter cigarette of claim 4, wherein the markers are longitudinally offset relative to one another.
6. The filter cigarette of claim 4, wherein the markers are of different length in the longitudinal direction of the filter cigarette.
7. The filter cigarette of claim 6, wherein the markers are longitudinally extending lines of bars.
8. The filter cigarette of claim 1, wherein the ventilation indicator includes a tactile cursor and a tactile scale.
9. The filter cigarette of claim 1, wherein the mouthpiece includes a filter including a filter plug circumscribed by a filter wrapper.
10. The filter cigarette of claim 9, wherein the filter wrapper includes a mouth-end band, a central band and a rod-end band, the rod-end band and the mouth-end band being affixed to the filter and the central band being rotatable about the longitudinal axis of the filter cigarette, the filter cigarette further including:
  - a band of tipping paper circumscribing the filter and an adjacent portion of the rod, the band of tipping paper including a first band extending from the mouth end of the filter to a position overlying the rod-end band of the filter wrapper and a second band extending from the first band to a position overlying the rod, the first band being affixed only to the central band for rotation therewith,

wherein one of the cursor and the scale of the ventilation indicator is provided on the outer surface of the first band of tipping paper and the other of the cursor and the scale of the ventilation indicator is provided on the second band of tipping paper.

**11.** The filter cigarette of claim **10**, wherein at least one of the filter wrapper and the tipping paper is substantially air-impermeable and the rod-end band of the filter wrapper has at least one opening therein and the first band of tipping paper has at least one opening therein positioned such that rotation of the first band of tipping paper about the longitudinal axis of the filter cigarette rotates the at least one opening in the first band of tipping paper into varying degrees of registry with the at least one opening in the rod-end band of the filter wrapper thereby varying the level of ventilation obtained during smoking.

**12.** The filter cigarette of claim **9**, further including:

a rod end band of tipping paper attaching the rod to the filter;

a mouth end band of tipping paper; and

a sleeve disposed between the rod end and mouth end bands of tipping paper,

wherein the sleeve overlies a portion of the filter wrapper and is rotatable relative thereto about the longitudinal axis of the filter cigarette and wherein one of the cursor and the scale of the ventilation indicator is provided on the outer surface of the sleeve and the other of the cursor and the scale of the ventilation indicator is provided on the rod end band of tipping paper or the mouth end band of tipping paper.

**13.** The filter cigarette of claim **12**, wherein at least one of the sleeve and the filter wrapper is substantially air-impermeable and the sleeve includes at least one opening therein and the portion of the filter wrapper underlying the sleeve includes at least one opening therein, such that rotation of the sleeve about the longitudinal axis of the filter cigarette rotates the at least one opening in the sleeve into varying degrees of registry with the at least one opening in the filter wrapper thereby varying the level of ventilation obtained during smoking.

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