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54 Adjustable filter cigarette and a method of manufacture thereof.

57 A filter cigarette is provided which comprises a tobacco rod which includes a charge of tobacco 1 wrapped in cigarette paper 3, an integral, axially aligned cylindrical filter plug 4, and tipping paper 8. In one embodiment, the filter plug is divided into first 6 and second 7 segments with the first segment being rotatable with respect to the second segment. Rotation of the first segment with respect to the second segment, in one embodiment of the invention, serves to vary the air dilution value of the cigarette. A cigarette having a variable resistance to draw is also provided, and a cigarette which maintains a constant resistance to draw value as the air dilution value is varied. In yet another embodiment, an encapsulated flavourant is provided which is released responsive to rotation of the first segment with respect to the second segment.

In another embodiment, the tipping paper is air transmissive, and the wrapping is substantially air impermeable and has a plurality of first longitudinally extending, substantially air impermeable depressions spaced about the circumference of the first segment which are registrable with corresponding second longitudinally extending, substantially air impermeable depressions spaced about the circumference of the second segment, such that as the first segment is

rotated relative to the second segment, the degree of registry of the first and second depressions varies, thereby admitting varying amounts of air to the filter.

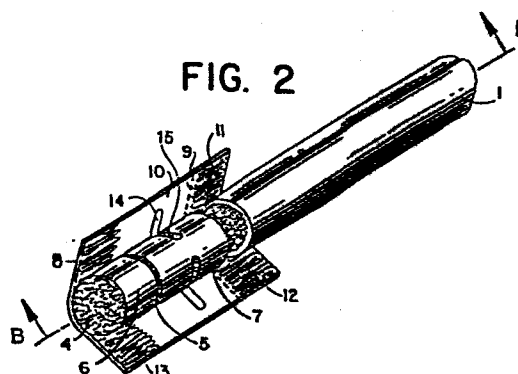


FIG. 2

ADJUSTABLE FILTER CIGARETTE
AND A METHOD OF MANUFACTURE THEREOF

The present invention relates to filter cigarettes which are adjustable by the smoker to vary one or more of the air dilution value, the resistance to draw value, and the flavour of the cigarette.

5 Various mechanisms have been disclosed in heretofore issued patents which provide for adjustment of the air dilution value of a filter cigarette, but these mechanisms are not without certain disadvantages. While many complicated mechanisms have been disclosed,
10 the simpler mechanisms generally involved making one or more openings in a substantially air impermeable filter plug wrap and the overlying, substantially air impermeable tipping paper. A sleeve containing one or more corresponding openings is placed over the tipping
15 paper and is then either rotated or moved axially to select the degree to which the two sets of openings are in registry. In another embodiment found in the art, the filter is not glued to the tipping paper and thus may be moved axially within the cylinder formed by the
20 tipping paper. Openings are made in the tipping paper which correspond to openings made in the filter plug wrap. The air dilution value is adjusted by axially moving the filter plug within the tipping paper to adjust the degree to which the two sets of openings are
25 in registry.

 Among the problems associated with such mechanisms are that the sleeve or the filter plug may be removed from the cigarette by the smoker and not readily replaced. Also, registry between the two sets of
30 openings may be inadvertently destroyed by a slight axial movement of the sleeve or plug. Accordingly, the air dilution value selected by the smoker is not ensured of any degree of consistency. Yet another

problem associated with a number of these prior devices is that they have not been readily adaptable to a high rate of production on cigarette making machinery of conventional design.

5 These prior adjustable cigarettes also do not provide a means to maintain the resistance to draw value constant as the air dilution value changes, nor are such cigarettes adjustable to vary the resistance to draw value while maintaining a substantially
10 constant air dilution value. Also, these prior adjustable cigarettes do not provide an encapsulated flavourant which is released in varying amounts during adjustment of the air dilution value, the resistance to draw value or both values.

15 Accordingly, it is an object of the present invention to provide a filter cigarette, which can be readily manufactured on conventional cigarette making equipment, that is adjustable by the smoker to vary one or more of the air dilution value, the resistance to
20 draw value, and the flavour of the cigarette.

 According to the invention there is provided a filter cigarette comprising a tobacco rod, a substantially cylindrical filter plug, a substantially air impermeable plug wrapping circumscribing the filter
25 plug, and tipping paper circumscribing and joining the filter plug and a portion of the tobacco rod, characterised in that the filter plug comprises a mouth-end segment connected at least axially to a rod-end segment for rotation about the axis of the cigarette.

30 In some preferred variable air dilution embodiments, at least one opening is made through the tipping paper, which is substantially air impermeable, and in the underlying portion of the filter plug wrap, such that, as the first segment of the filter is
35 rotated about the axis of the central core, the opening in the tipping paper and the opening in the underlying

portion of the filter plug are in varying degrees of registry to permit varying amounts of air to enter the filter and combine with smoke, thereby varying the air dilution value of the cigarette. The air dilution value is the ratio of the volume of air to the volume of smoke exiting the mouth end of the filter and is expressed as a percentage.

The present invention also includes within its scope a filter cigarette without the variable dilution feature but which has a variable resistance to draw provided by assembling the filter and impermeable tipping paper as described above but without the openings therethrough and providing a plurality of longitudinally extending channels in the first segment and a plurality of longitudinally extending channels in the second segment of the filter which are in varying degrees of registry as the first segment is rotated about the axis of the core, thereby providing paths of less resistance for the flow of the smoke through the filter, thus varying the resistance to draw value of the cigarette.

Also included within the scope of the present invention is a filter cigarette having the previously described variable dilution feature as well as the sets of channels of the variable resistance to draw embodiment. As the first segment is rotated about the central core to increase the air dilution value, the resistance to draw decreases. The channels of this embodiment are configured such that, as the air dilution value is decreased by rotation of the first segment, the channels are subject to increasing deregistry which increases the resistance to draw. The net effect of the increased air dilution and deregistry of the channels is to maintain a constant resistance to draw.

Yet another embodiment included within the scope of the present invention is a filter cigarette with or without the variable dilution feature and with or without the variable or constant resistance to draw
5 feature which is provided with an encapsulated flavourant which is released in varying amounts responsive to rotation of the first segment about the longitudinal axis of the core.

In other preferred embodiments, the wrapping has a
10 plurality of first longitudinally extending, substantially air impermeable depressions spaced about the circumference of the first segment which are registrable with corresponding second longitudinally extending, substantially air impermeable depressions
15 spaced about the circumference of the second segment, such that as the first segment is rotated relative to the second segment, the degree of registry of the first and second depressions varies, thereby admitting varying amounts of air to the interior of the first
20 segment. The air enters through the air transmissive tipping paper and travels along the depressions into the exposed portions of the abutting ends of the first and second segments. The air transmissive property of the tipping paper may be provided either by employing
25 air permeable tipping paper or by providing a plurality of openings in air impermeable tipping paper which overlie and communicate with the depressions in the first segment or the second segment or both segments.

The cigarettes of the present invention may be
30 manufactured employing conventional equipment with only minor modifications and a method of manufacturing is provided characterised in that it comprises cutting a tobacco rod and a wrapped filter plug to a desired length, bringing the tobacco rod and the wrapped filter
35 plug into axial alignment, overwrapping the tobacco rod and the wrapped filter plug with tipping paper, forming

a circumferential cut in the wrapped filter plug and the tipping paper, the circumferential cut extending partially through the wrapped filter plug so as to leave a central bore along the longitudinal axis of the wrapped filter plug, thereby permitting rotational movement of the segments of the filter plug defined by the circumferential cut.

The invention will be further described, by way of example, with reference to the drawings, in which:

Fig. 1 is an enlarged fragmentary perspective view of the filter plug and tobacco rod of the filter cigarette of the present invention taken from the mouth end;

Fig. 2 is a fragmentary perspective view of one embodiment of the filter cigarette of the present invention taken from the mouth end and showing the tobacco rod, filter, and tipping paper as well as the openings provided through the tipping paper and plug wrap to provide for variable dilution;

Fig. 3 is a longitudinal section taken on the line A-A of Fig. 2;

Fig. 4 is a fragmentary perspective view of a second embodiment of the present invention taken from the mouth end;

Fig. 5 is a perspective view of the assembled embodiment of Fig. 4;

Fig. 6 is a fragmentary perspective view of a third variable resistance to draw embodiment of the cigarette of the present invention;

Fig. 7 is a partial cross-sectional view of a fourth embodiment of the invention which provides a variable amount of flavourant;

Fig. 8 is a partial cross-sectional view of a fifth embodiment of the invention in which the segments of the filter plug are joined by a plastic extrusion;

Fig. 9 is an enlarged, partially fragmentary, perspective view, taken from the mouth end, of a sixth preferred embodiment of the filter cigarette of the present invention;

5 Fig. 10 is an enlarged perspective view, taken from the mouth end, of the assembled embodiment of Fig. 9;

Fig. 11 is a cross-sectional view taken along the line B-B of Fig. 10;

10 Fig. 12 is an enlarged, partially fragmentary, perspective view, taken from the mouth end, of a seventh preferred embodiment of the filter cigarette of the present invention;

Fig. 13 is an enlarged perspective view, taken
15 from the mouth end, of the assembled embodiment of Fig. 12;

Fig. 14 is a cross-sectional view taken along the line C-C of Fig. 13;

Fig. 15 is an enlarged, partially fragmentary,
20 perspective view, taken from the mouth end, of an eighth preferred embodiment of the filter cigarette of the present invention;

Fig. 16 is an enlarged perspective view, taken
25 from the mouth end, of the assembled embodiment of Fig. 15;

Fig. 17 is a cross-sectional view taken along the line D-D of Fig. 16;

Fig. 18 is a perspective view of a wrapped filter
30 plug of the present invention showing the circular cutting disc forming the circumferentially extending cut in the filter plug;

Fig. 19 is a sectional view taken along the line E-E of Fig. 18 showing the depth of the cut of the circular blade into the filter plug and the resultant
35 axial core;

Fig. 20 is a longitudinal section taken on the line F-F of Fig. 1;

Fig. 21 is a view in perspective of a laser system for use in making the openings in the tipping paper and underlying plug wrap of the variable
5 dilution filter cigarette of the present invention;

Fig. 22 is a partial elevational view of a mechanical apparatus for use in making openings in the tipping paper and underlying plug wrap of the variable
10 dilution cigarette of the present invention;

Fig. 23 is a partial elevational view of the cutting mechanism of the apparatus of Fig. 22; and

Fig. 24 shows an alternative embodiment of the apparatus of Fig. 22.

15 A preferred embodiment of the variable dilution cigarette of the present invention is shown in Figs. 1, 2 and 3 and comprises a tobacco rod 1, which is a substantially cylindrical charge of tobacco 2 wrapped in cigarette paper 3. The tobacco rod is joined in
20 abutting end-to-end relation to a wrapped filter plug 4 which has a circumferentially extending cut 5 intermediate the mouth end and the tobacco rod end defining a central axial core 16, as shown in Figs. 3, 7 and 21, and which divides the filter plug into a
25 first mouth-end segment 6 and a second rod-end segment 7.

The filter plug and a portion of the mouth end of the tobacco rod are circumscribed by non-porous tipping paper 8. The tipping paper has a circumferentially
30 extending row of closely spaced perforations 9 which overlie the second segment 7 of the filter plug adjacent the mouth end of the tobacco rod 1. This row of perforations divides the tipping paper into a first mouth-end band 10 and a second rod-end band 11.

35 The inner surface of band 10 is attached adjacent the mouth end to the first segment 6 of the filter

plug, preferably by means of an adhesive band 13. The inner surface of band 11 joins the second segment 7 of the filter plug to the mouth end of the tobacco rod 1, preferably by means of a band of adhesive 12 extending, in width, between the row of perforations 9 and the rod end of band 11. At least one opening is made through the tipping paper and the underlying plug wrap at a position on band 10 intermediate the row of perforations 9 and the cut 5.

Since the openings, 14 and 15 respectively, are formed simultaneously, they are initially in registry and variable dilution is achieved by rotating band 10 and breaking the row of perforations 9, thereby allowing band 10 and the segment 6 to rotate in unison about the central core 16. This core may typically have a diameter within the range of from about 12.7% to about 38.1% of the diameter of the filter plug, a value of about 25.4% being preferable. This range will permit segment 6 to be rotated 360° without breaking the core 16. Rotation of the band 10 rotates opening 14 relative to opening 15 thus varying the degree of registry, thereby varying the air dilution value of the cigarette.

Both the tipping paper 8 and the wrapping of the filter plug 4 are substantially air impermeable wrappings which restrict any radial air flow through the filter paper and underlying plug wrap to the area of registry between openings 14 and 15. The filter paper may be any commercially available, substantially air impermeable, paper and the filter plug may be any conventional, substantially cylindrical filter such as a cellulose acetate filter or the like. The filter material can be of uniform density or it can contain a substantially cylindrical axial core of relatively high density filter material circumscribed by filter material of relatively lower density. When it is

desired to use the non-uniform density filter plug, the higher density filter material preferably forms the previously described axial core 16. Any conventional, substantially air impermeable plug wrap may be employed.

Means for permitting the smoker to select the specific air dilution ratio may be provided through indicia (not shown) printed on opposite sides of the row of perforations 9, and which are made readily visible and are designed to show the degree of registry of the openings.

A second preferred embodiment shown in Figs. 4 and 5 comprises a tobacco rod 1 containing a charge of tobacco 2 wrapped in cigarette paper 3 and joined to filter plug 4 in abutting, end-to-end relation. The filter plug has a circumferentially extending cut 5 intermediate the mouth end and the tobacco rod end which divides the filter plug into a first mouth-end segment 6 and a second rod-end segment 7. The filter plug is joined to the tobacco rod by tipping paper 17, preferably by a band of adhesive 18 on the inner surface of the tipping paper which overlaps the abutting ends of the filter and the tobacco rod. The tipping paper extends from a position on the tobacco rod adjacent the filter to a point intermediate the cut 5 and the mouth end of the segment 6. An opening 14 is made through the tipping paper at a position between the cut 5 and the mouth end of the tipping paper. A corresponding opening 15 is made in the plug wrap at a position underlying opening 14. Openings 14 and 15 are preferably made simultaneously and thus are initially in registry.

The circumferentially extending cut 5 defines a central, axially extending core 16 having a preferred diameter as noted in connection with the first preferred embodiment. In practice, that portion of

filter plug segment 6 which is not wrapped by tipping paper 17 is grasped by the smoker and rotated about the central core 16, thus rotating openings 15 relative to openings 14, thereby varying the degree of registry of the two sets of openings and, accordingly, the air dilution value of the cigarette.

In a third embodiment of the present invention shown in Fig. 6, the openings 14 and 15 of the first and second embodiment may be omitted or retained and a plurality of axially extending passages 19 made in the first and second segments 6 and 7 of the filter plug. These passages in the first and second segments 6 and 7 are made such that, as the first segment 6 of the filter plug is rotated about the axis of the central core 16, the passages in the first and second segments are in varying degrees of registry thus varying the resistance to draw of the cigarette. Variable resistance to draw may be selected in conjunction with variable dilution such that the resistance to draw is constant as the dilution is varied or may be selected in the absence of variable dilution to provide a variable resistance to draw.

In a fourth preferred embodiment shown in Fig. 7, a flavour encapsulation means is inserted within the filter. This means may comprise an axially extending cellophane tube 20 containing individual cells 21 of flavourant which are ruptured in response to rotation of the first segment of the filter plug about the central core 16. As can be seen from Fig. 6, increased rotation of the first segment of the filter plug serves to increase the twist experienced by the cellophane tube, thereby rupturing an increasing number of flavourant cells. The smoker can thus vary the intensity of flavour released by the flavour capsule by rotating the filter plug a desired amount. The

- 11 -

flavour system of this embodiment may be used in conjunction with any of the embodiments.

Fig. 8 shows an alternative arrangement for maintaining a rotational connection between the first
5 segment 6 and the second segment 7 of the filter plug 4. In this arrangement, plastic extrusion 22, formed as part of the filter plug, lies along the axis of the first and second segments. The cut 5 extends down to
10 this extrusion. It will be appreciated by those of ordinary skill in the art that the plastic extrusion shown in Fig. 8 can be used with any of the first, second and third embodiments.

Three further embodiments of the present invention will now be described with reference to Figs. 9 to 17
15 in which like parts are given like reference numbers throughout.

Common to these three embodiments are the following elements: A tobacco rod 100, comprising a substantially cylindrical charge of tobacco 101
20 enclosed in cigarette paper 102, is axially aligned in abutting end-to-end relation with a filter plug 103, which comprises a first segment 104 and a second segment 105. The first and second segments are axially aligned and abut each other at the line of abutment
25 106. The second segment abuts the tobacco rod 100 at the line of abutment 107 and is joined thereto. Means are provided joining the first segment to the second segment for rotation of the first segment about the longitudinal axis of the cigarette. The first and
30 second segments are wrapped in a substantially air impermeable plug wrap 108 which has a plurality of first depressions 109 which are substantially air impermeable and spaced about the circumference of the first segment. These depressions extend from a
35 position intermediate the mouth end of the first segment and the line of abutment 106, to the line 106.

A corresponding set of depressions 110, which are registrable with the first depressions, extend from the line 106 to a position intermediate line 106 and line 107. When the depressions 109 and 110 are in registry, the filter tow is not exposed and air does not flow through the tipping paper, along the depressions and into the filter tow. The filter plug 103 and the tobacco rod 100 are circumscribed by a layer of tipping paper 111 which extends from a position on the first segment to a position on the tobacco rod adjacent line 107.

The tipping paper 111 is air transmissive, and, as shown in the figures, comprises an air impermeable paper which is rendered air transmissive by means of rows of perforations 112, which communicate with the second set of depressions 110. In an alternative embodiment, the tipping paper 111 may be air permeable and the perforations 112 omitted. These perforations, when present, may overlie the second segment, or the first segment, or both segments. The perforations may be formed by conventional means known to those skilled in the art, such as electrostatic discharge, mechanical perforation, or laser perforation. The depressions may be formed by passing the filter rod between rollers having ridges which make the depressions in the plug wrap.

Means join the first and second segments such that the first segment is rotatable about the longitudinal axis of the cigarette. This means, in one preferred embodiment shown in the figures, is an extruded plastic rod 113. This embodiment may be formed by extruding a plastic rod, enveloping it in the filter tow and overwrapping with plug wrap. The filter is then slit circumferentially down to the extruded rod, whereby the first segment is rendered rotatable relative to the second segment. Alternatively, a conventional

- 13 -

cellulose acetate filter may be cut circumferentially so as to leave a central core about which the first segment may be rotated, or a filter may be prepared having an axial core of a denser filter tow surrounded by a less dense filter tow and then circumferentially slit down to the denser core, thereby rendering the first segment rotatable relative to the second segment.

In one preferred embodiment shown in Figs. 9 to 11, the tipping paper 111 extends from the mouth end of the first segment 104 to a position on the tobacco rod adjacent the line of abutment 107. The tipping paper 111 has a circumferentially extending row of closely spaced perforations forming a break-away line 113 which overlies the second segment intermediate the depressions 110 and the line of abutment 107. This line 113 divides the tipping paper into a mouth-end sleeve and a rod-end sleeve. The rod-end sleeve attaches the second segment to the tobacco rod, preferably by means of an overlapping band of adhesive material 114 as shown in Figs. 9 to 11. The mouth-end sleeve is attached to the first segment 104, preferably by a band of adhesive 115 intermediate the mouth end and the depressions 109, as shown in Figs. 9 to 11.

This embodiment may be fabricated using existing cigarette making equipment known to those skilled in the art with only minor modifications. The row of perforations 113 is preferably made employing a laser perforation system to provide closely spaced and small diameter perforations such that the line 113 retains only sufficient strength to remain intact during application of the tipping paper to the plug wrap and tobacco rod. Preferably the laser system is employed to make about 39 perforations per cm (about 100 perforations per inch).

In practice, the mouth end of the cigarette and the tobacco column are grasped and rotated one relative

to the other to break the row of perforations 113 and rotate the first segment, thereby varying the degree of registry of the depressions 109 and 110 and varying the amount of air flowing through the openings 112 into the depressions and then into the filter material where the
5 air mixes with the smoke, thereby diluting the smoke and changing the air dilution value of the cigarette.

In another preferred embodiment shown in Figs. 12 to 14, the tipping paper 111 extends as in the first
10 embodiment but bands 116 and 117 are interposed between the tipping paper 111 and the plug wrap 108. The first band 116 extends from the mouth end of the filter plug 103 to a position intermediate the mouth end and the depressions 109. This band 116 is attached to the
15 underlying plug wrap, preferably by an adhesive material 118. A second band extends from a position intermediate the depressions 110 and the line of abutment 107 to a position on the tobacco rod 100 which corresponds to the position of the rod end of the
20 tipping paper 111.

This band 117 joins the second segment 105 to the tobacco rod 100, preferably by means of an adhesive material 119. The tipping paper is attached only to the first band 116, preferably by means of an adhesive
25 material 120. Thus, the entire tipping paper rotates with the first segment 104, about the longitudinal axis of the cigarette. Air dilution occurs as described for the embodiment of Figs. 9 to 11.

In another preferred embodiment, as shown in Figs. 15 to 17, the tipping paper 111 extends from a position intermediate the mouth end of the first segment 104 and the depressions 109 to a position on tobacco rod 100 adjacent the line of abutment 107. The tipping paper joins the second segment 105 to the tobacco rod 100,
30 preferably by means of an overlapping band of adhesive material 121. Thus, the tipping paper is attached only to the
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- 15 -

tobacco column 100 and the second segment 105. The first segment 104 protrudes from the mouth end of the tipping paper 111 and may be grasped by the smoker and rotated within the tipping paper 111 to vary the degree of registry of the depressions 109 and 110. Air dilution occurs as described for the embodiment of Figs. 9 to 11.

The cigarettes of the present invention may be readily produced on conventional cigarette making and tipping apparatus with a minimum of modification. Forming and cutting the cigarette rod and the filter plug to length are done conventionally. Also, bringing the filter plug into axial alignment with the cigarette rod and the overwrapping with tipping paper are accomplished in the same manner as in the manufacture of conventional cigarettes.

Furthermore, additional simplicity in manufacturing is made possible in the embodiments of Figs. 1 to 8 by simultaneously forming the openings in the tipping paper and the underlying plug wrap. This is accomplished, in one manner, simply by slitting or perforating the tipping paper and underlying plug wrap on each cigarette as it passes through the conventional cigarette making machinery at or near a rolling shoe station.

As shown in Figs. 18 and 19, the circumferentially extending cut 5 in the filter plug 4 may be made using a circular knife 22 which is set to penetrate a specified distance into the filter plug, perpendicular to the longitudinal axis of the filter plug.

Typically, the circular knife and the filter plug are both rotated as shown in Fig. 19, resulting in a circumferentially extending cut which leaves a central core 16 along the longitudinal axis of the filter plug.

The row of perforations 9 in the tipping paper in the first embodiment may be made by any conventional

means such as laser perforation, electrostatic perforation, or mechanical perforation using points or knives. In practice, the tipping paper is fed through a perforation zone where it is exposed to a laser light beam. The power setting and focusing of the laser and the rate of feed of the tipping paper are selected so as to all but part the paper along the "break away" line 9 shown in Fig. 2. The attachment which remains is selected to retain only enough strength to hold the first and second bands of the tipping paper together during assembly. Preferably, a laser system is employed to make about 39 perforations per cm (about 100 perforations per inch) in the paper.

The tipping paper may be applied to the filter plug and tobacco rod employing conventional cigarette making equipment and then the openings 14 and 15 are made through the tipping paper and underlying plug wrap employing either a laser system as shown in Fig. 21 or a mechanical system as shown in Figs. 22, 23 and 24.

Preferably, as shown in Fig. 21, a laser perforation system is employed which uses a laser 23 to generate a laser beam 25 that is reflected by mirror 26 and collected by lens 27 which focuses the beam. The laser beam 25 is focused to traverse the rotating cigarette and is set to remain on for a time period sufficient to make an opening, preferably a slit of a desired length, through the tipping paper and the underlying plug wrap. Slits one millimeter wide are preferred. If it is desired to establish a line of perforations instead of slits, the laser beam may be pulsed.

The openings through the tipping paper and the underlying plug wrap may also be made by mechanical means as shown in Figs. 22, 23 and 24. As shown in Fig. 22, cigarettes 28 are passed between rotating drums 32 and 33. Drum 32 feeds the cigarettes beneath

- 17 -

a fixed plate 31 into contact with a circular knife 29 rotating about shaft 30 and having a V-shaped edge 34 as shown in Fig. 23. In an alternative embodiment shown in Fig. 24, the cigarettes 28 are fed between a
5 rotating drum 35 and a fixed plate 36 past semi-circular knife blades 37 which are fixed to the plate 36.

It will be understood that the particular
embodiments described above are only illustrative of
10 the principles of the present invention, and that various modifications can be made by those skilled in the art.

CLAIMS

1. A filter cigarette comprising a tobacco rod (1, 100), a substantially cylindrical filter plug (4,103), a substantially air impermeable plug wrapping circumscribing the filter plug, and tipping paper (8, 111) circumscribing and joining the filter plug and a portion of the tobacco rod, characterised in that the filter plug (4,103) comprises a mouth-end segment (6,104) connected at least axially to a rod-end segment (7,105) for rotation about the axis of the cigarette.
2. A filter cigarette according to claim 1, wherein mouth-end segment (6,104) and said rod-end segment (7,105) are defined by a circumferential cut (5,106) in said filter plug.
3. A filter cigarette according to claim 2 wherein the cut (5) extends partially through the filter plug (4) and defines a central axis core (16) connecting the mouth-end segment (6) to the rod-end segment (7).
4. A filter cigarette according to claim 2 including an axial plastic extrusion (20,22,113) connecting the segments, the cut (5,106) extending to the extrusion.
5. A filter cigarette according to claim 2 wherein the filter plug (4) comprises an inner substantially cylindrical core of filter material and an outer substantially cylindrical layer of filter material circumscribing the inner filter material, wherein the density of the inner filter material is greater than the density of the outer filter material, and wherein the cut (5) extends to the inner filter material.

6. A filter cigarette according to any preceding claim in which the mouth end is provided with means operable by rotation of the mouth-end segment (6,104) of the filter relative to the rod-end segment (7,105) of the filter to alter at least one smoking characteristic of the cigarette.

7. A filter cigarette of any one of claims 1 to 6 further comprising a means for varying the air dilution value of the filter cigarette by rotation of the mouth-end segment (6,104) with respect to the rod-end segment (7,105).

8. A filter cigarette according to claim 7 wherein the tipping paper (8) is substantially air impermeable and comprises, in sequence, first (11), second (10) and third bands, the first band (11) fixedly connecting the tobacco rod (1) to the rod-end segment (7), the second band (10) containing a first opening (14), and the third band attaching the second band (10) to the mouth-end segment (6) and wherein the plug wrap overlying the rod-end segment contains a second opening (15) underlying the first opening (14) so that rotation of the mouth-end segment (6) with respect to the rod-end segment (7) varies the registry between the first and second openings.

9. A filter cigarette according to claim 7 wherein the tipping paper (17) is substantially air impermeable and comprises, in sequence, first and second bands, the first band fixedly connecting the tobacco rod (1) to the rod-end segment (7) and the second band containing a first opening (14) and further wherein the plug wrap overlying the mouth-end segment (6) contains a second opening (15) underlying the first opening (14) so that rotation of the mouth-end segment (6) with respect to

the rod-end segment (7) varies the registry between the first and second openings.

- 5 10. A filter cigarette according to any one of claims 1 to 7 further comprising a means for varying the resistance to draw of the filter cigarette by rotation of the mouth-end segment (6) with respect to the rod-end segment (7).
- 10 11. A filter cigarette according to claim 10 wherein the means for varying the resistance to draw comprises a first longitudinal bore (19) extending through the mouth-end segment (6) and a second longitudinal bore (19) extending through the rod-end segment (7), whereby
15 rotation of the mouth-end segment with respect to the rod-end segment varies the registry between the first and second bores.
- 20 12. A variable air dilution filter cigarette according to claim 10 or 11 wherein the means for varying the resistance to draw is adapted to maintain the resistance to draw value of said cigarette constant as the air dilution value is varied.
- 25 13. A filter cigarette according to claim 8 wherein the second band (10) is perforatedly connected to the first band (11).
- 30 14. A filter cigarette according to any one of claims 1 to 7 further comprising an encapsulated flavourant disposed within the filter plug (4) and adapted to release varying amounts of flavourant by rotation of the mouth-end segment (6) with respect to the rod-end segment (7).

- 21 -

15. A filter cigarette according to any one of claims 1 to 6, wherein the tipping paper (111) is air transmissive, and the wrapping has a plurality of first longitudinally extending, substantially air impermeable depressions (109) spaced about the circumference of the mouth-end segment (104) extending from a position intermediate the ends of the mouth-end segment to the rod-end segment (105), the first depressions being registrable with corresponding second, longitudinally extending, substantially air impermeable depressions (110) spaced about the circumference of the rod-end segment, such that as the mouth-end segment is rotated relative to the rod-end segment, the degree of registry of the first and second depressions varies, thereby varying the amount of air admitted to the interior of the filter plug.

16. A filter cigarette according to claim 14 wherein the tipping paper (111) extends from the mouth end of the filter plug to a position on the tobacco rod (100) adjacent the line of abutment (107) of the rod-end segment (105) with the tobacco rod, the tipping paper including a circumferentially extending row of closely spaced perforations (113) overlying the rod-end segment at a position intermediate the tobacco rod and the second depressions (110), thereby dividing said paper into a mouth-end sleeve and a rod-end sleeve, the mouth-end sleeve being attached to the mouth-end segment for rotation therewith about the longitudinal axis, the rod-end sleeve joining the rod-end segment to the tobacco rod.

17. A filter cigarette according to claim 14 wherein a first contiguous band (116) extends from the mouth end of the filter plug (103) to a position on the mouth-end segment (104) intermediate the mouth end of the first

- depressions (109) and the first depressions (109) and attached to the mouth-end segment for rotation therewith, and the rod-end segment (105) is joined to the tobacco rod by a second contiguous band (117) extending from a position on the tobacco (100) adjacent the rod-end segment to a position on the rod-end segment, the tipping paper overlying the first and second bands, and the tipping paper being attached to the first band for rotation therewith.
18. A filter cigarette according to claim 14 wherein the tipping paper (111) extends from a position on the mouth-end segment (104) intermediate the mouth end and the first depressions (109) to a position on the tobacco rod (100) adjacent the rod-end segment (105), the tipping paper joining the rod-end segment to the tobacco rod, so that the mouth-end segment is rotatable within the tipping paper.
19. A method of manufacturing the filter cigarette of any one of claims 1 to 4 characterised in that it comprises cutting a tobacco rod and a wrapped filter plug to a desired length, bringing the tobacco rod and the wrapped filter plug into axial alignment, overwrapping the tobacco rod and the wrapped filter plug with tipping paper, forming a circumferential cut in the wrapped filter plug and the tipping paper, the circumferential cut extending partially through the wrapped filter plug so as to leave a central bore along the longitudinal axis of the wrapped filter plug, thereby permitting rotational movement of the segments of the filter plug defined by the circumferential cut.

FIG. 1

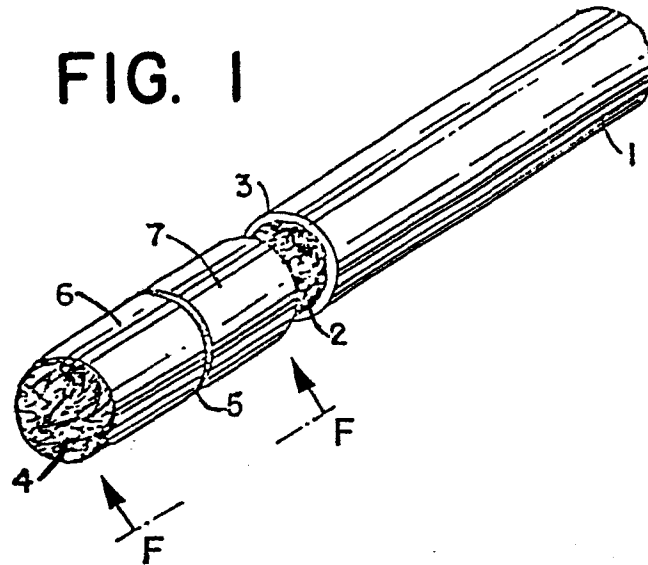


FIG. 2

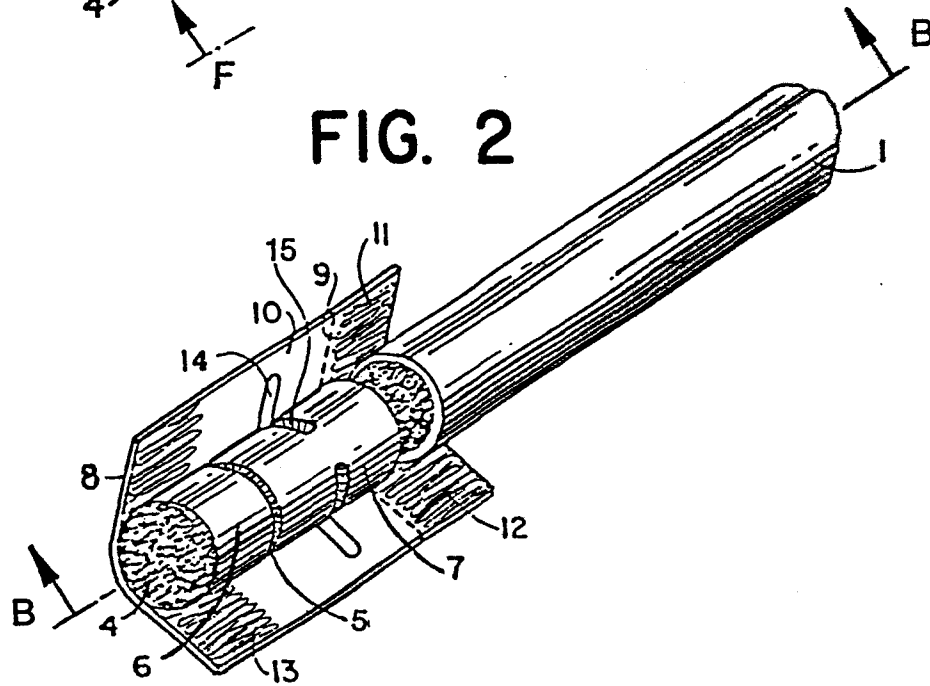


FIG. 3

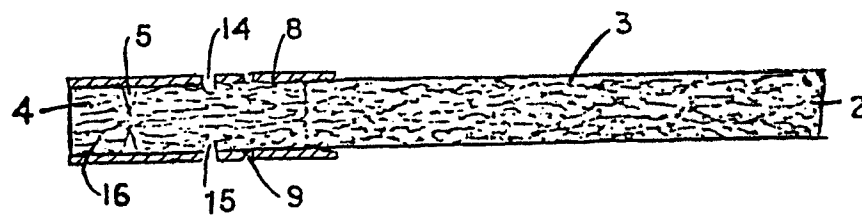


FIG. 4

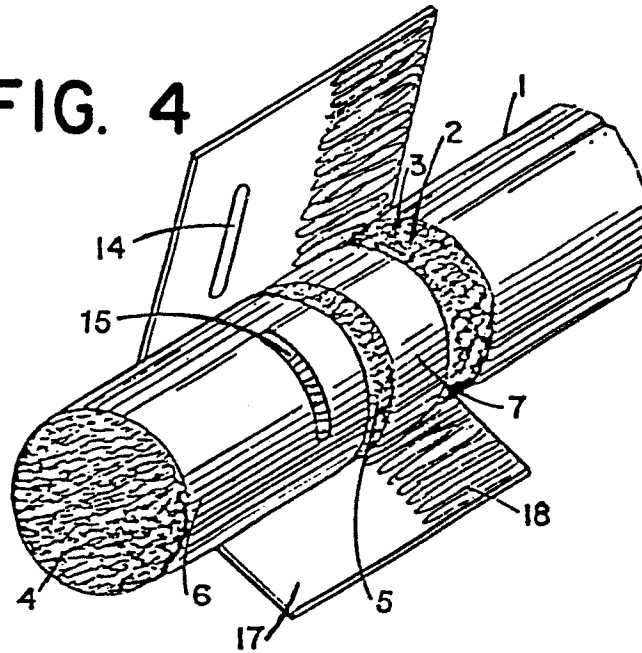


FIG. 5

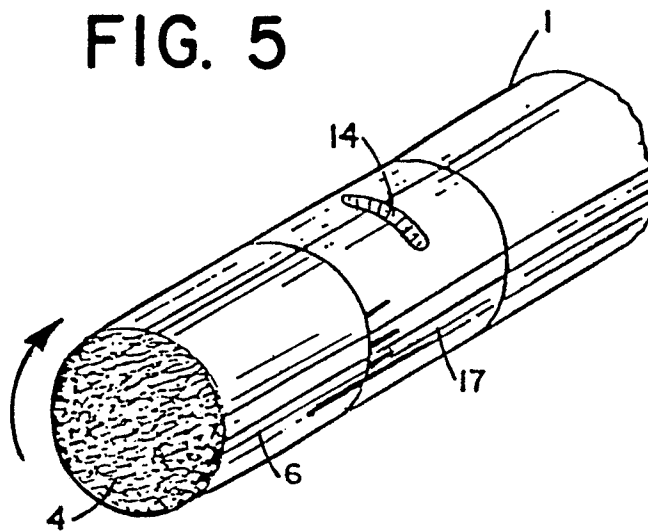


FIG. 6

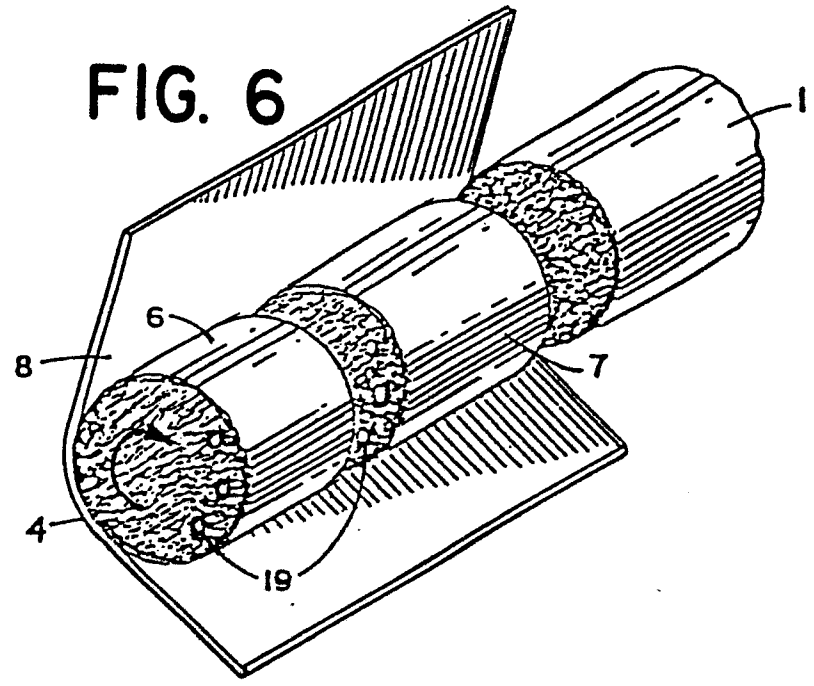


FIG. 7

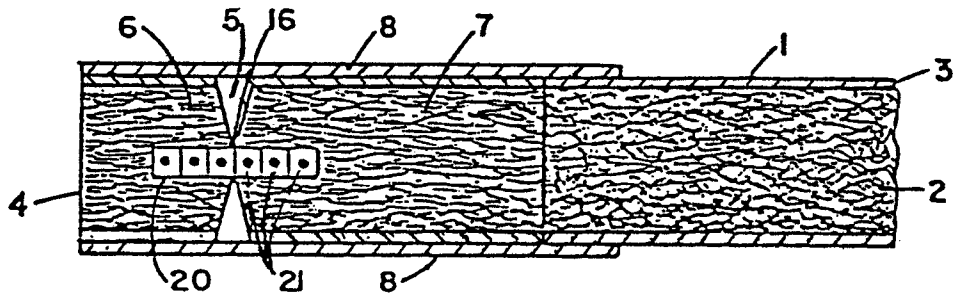


FIG. 8

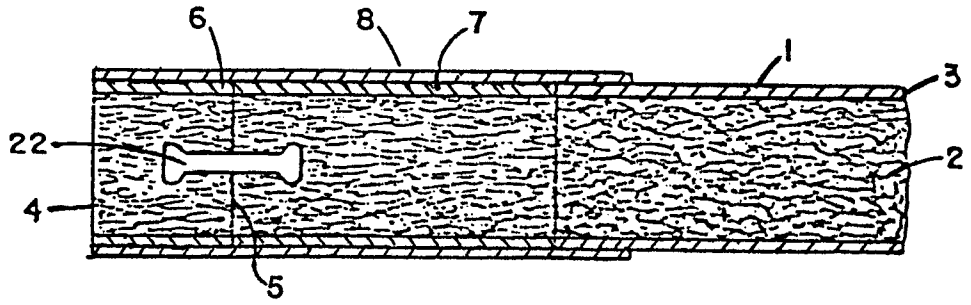


FIG. 9

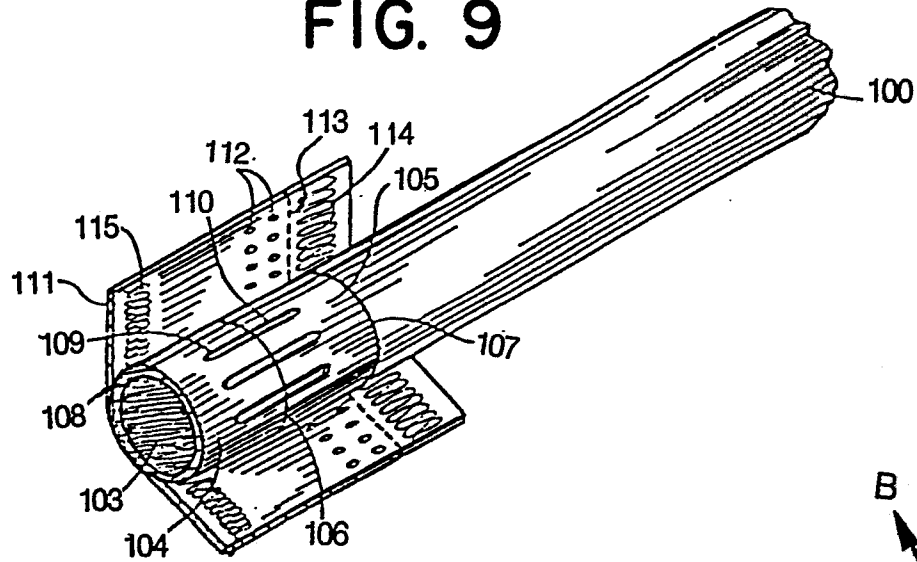


FIG. 10

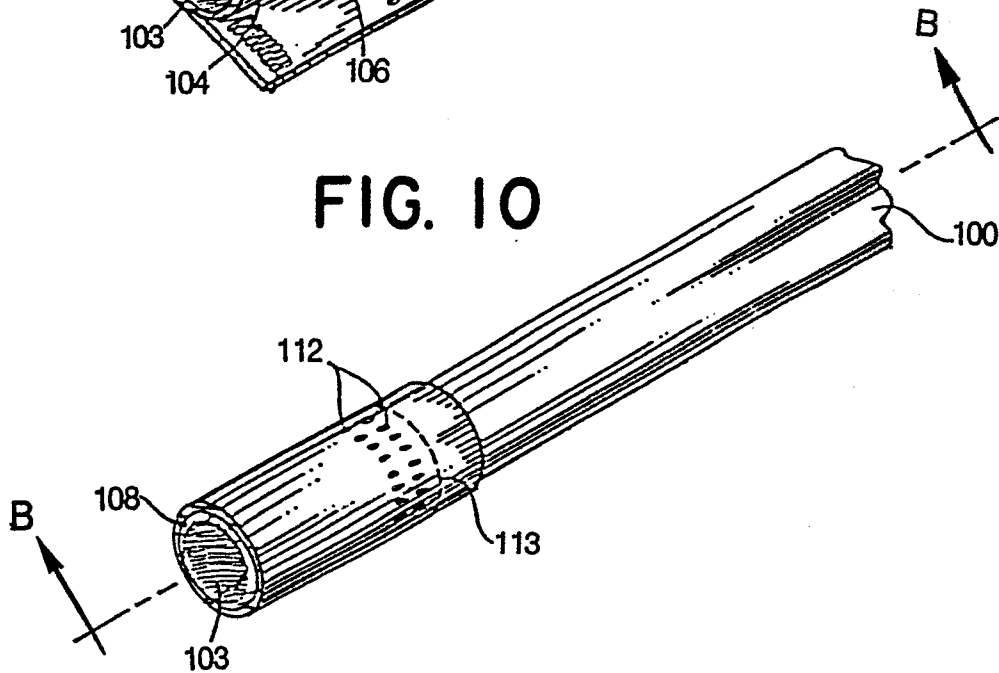


FIG. 11

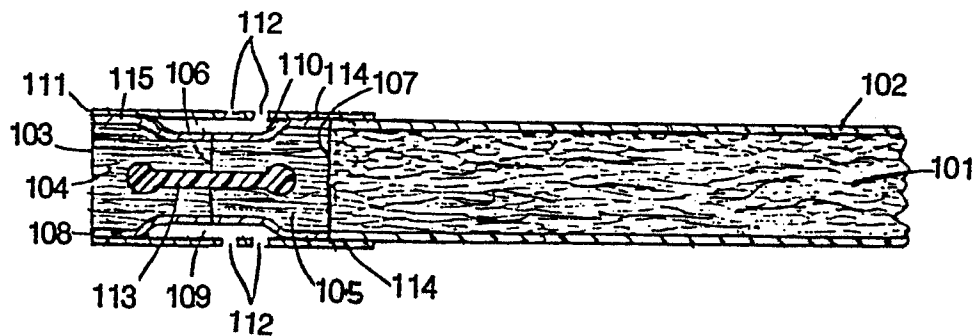


FIG. 12

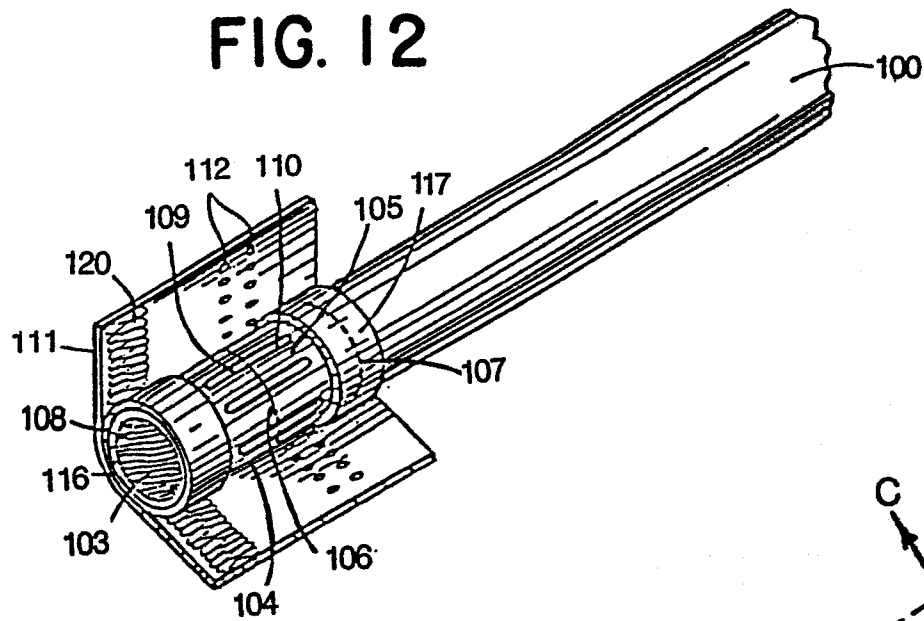


FIG. 13

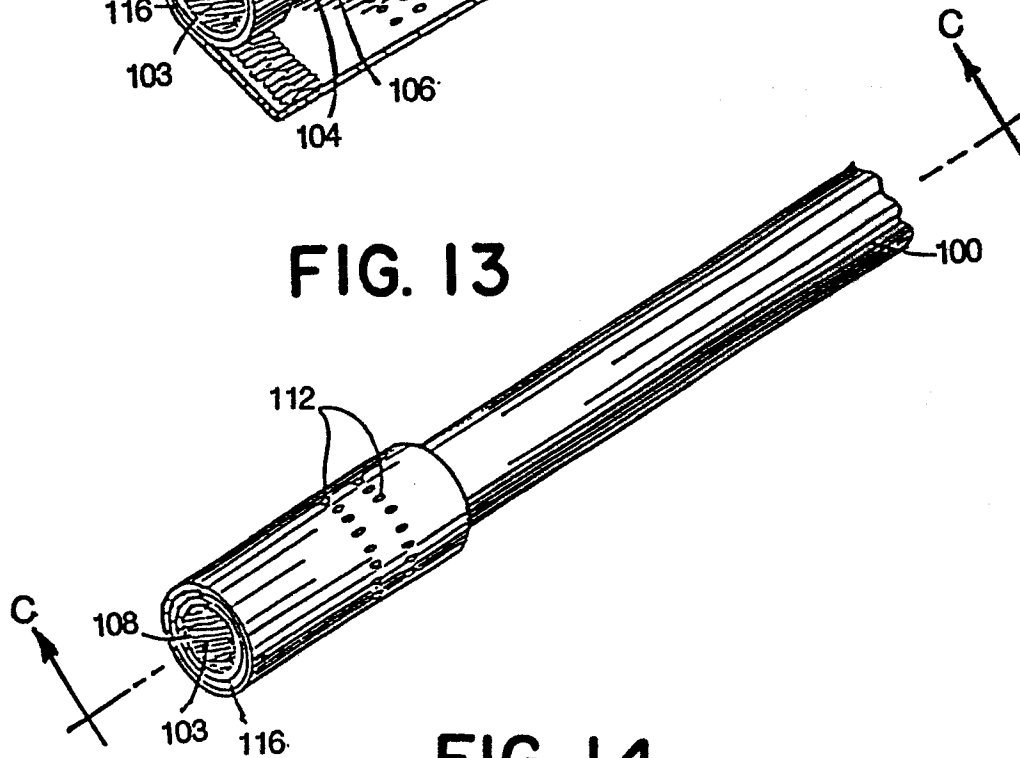
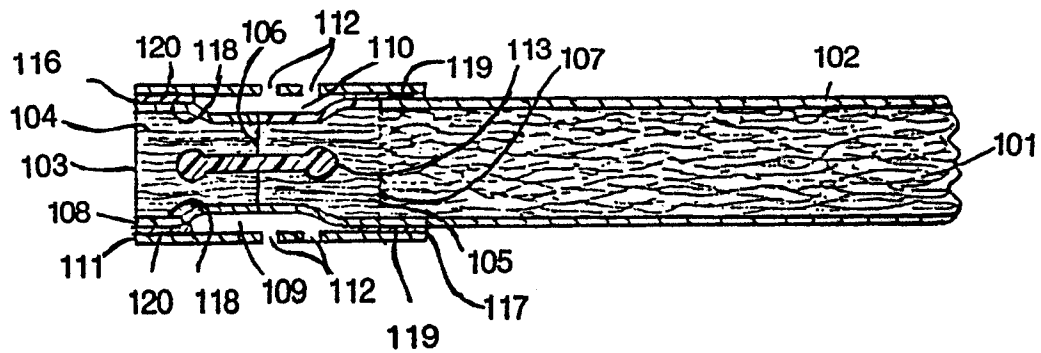


FIG. 14



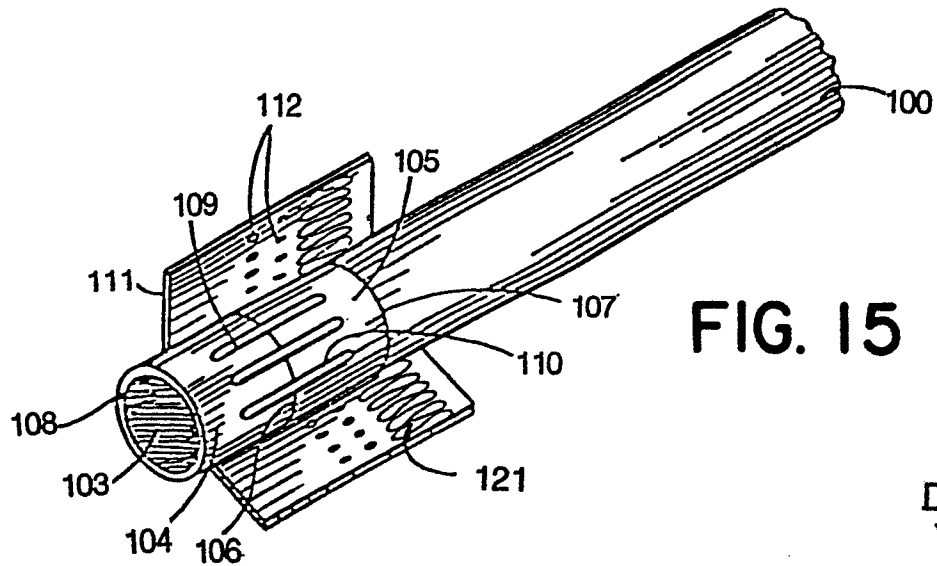


FIG. 15

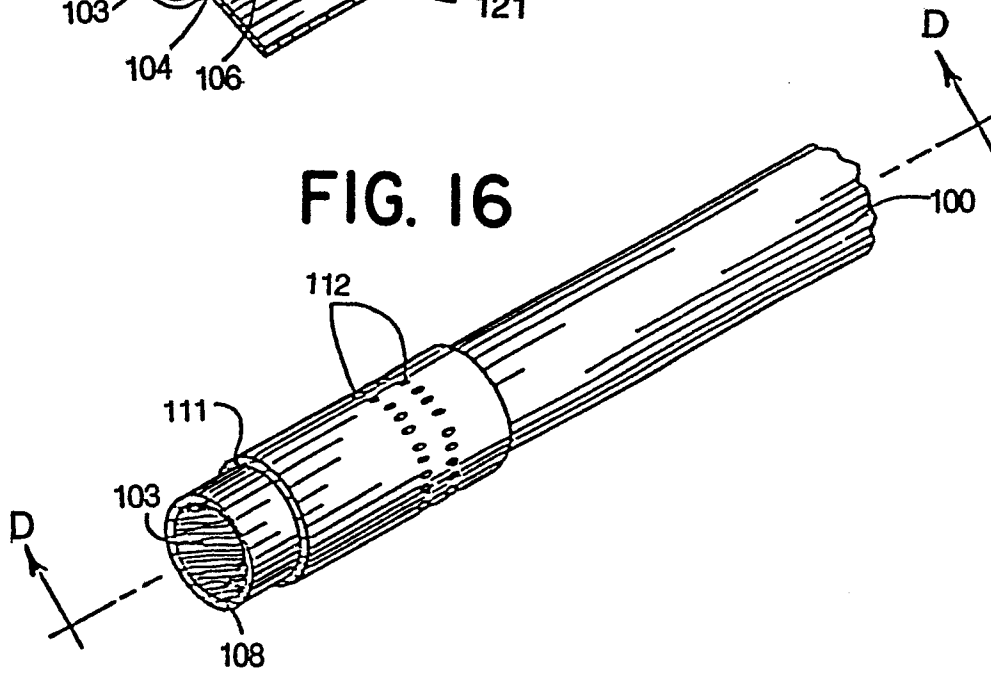
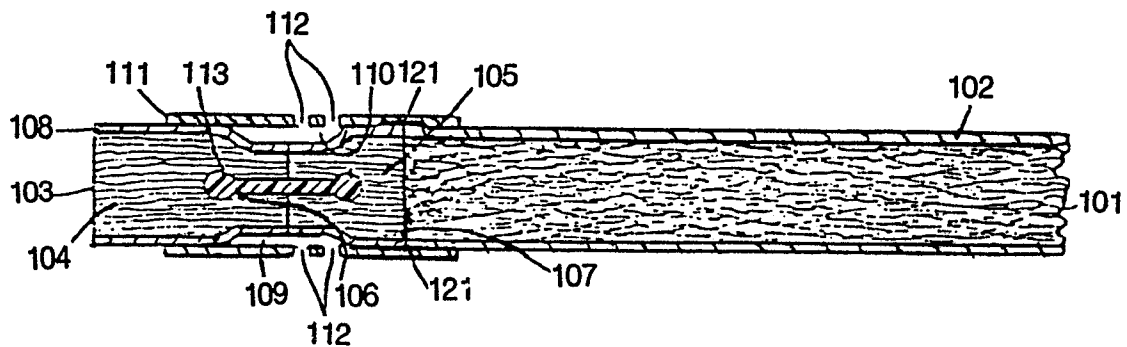


FIG. 16

FIG. 17



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7/8

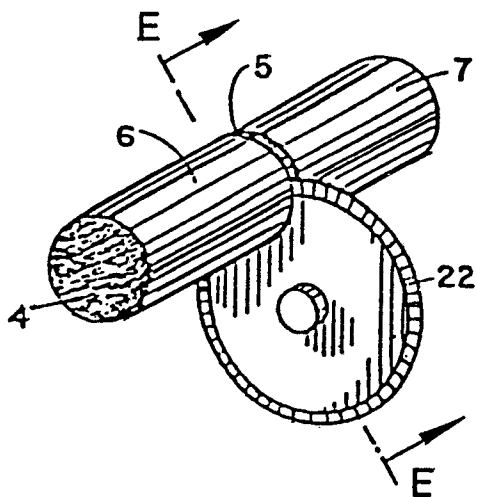


FIG. 19

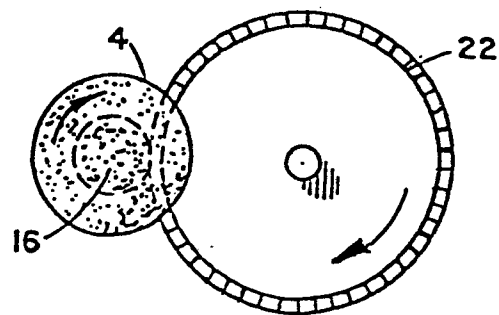


FIG. 21

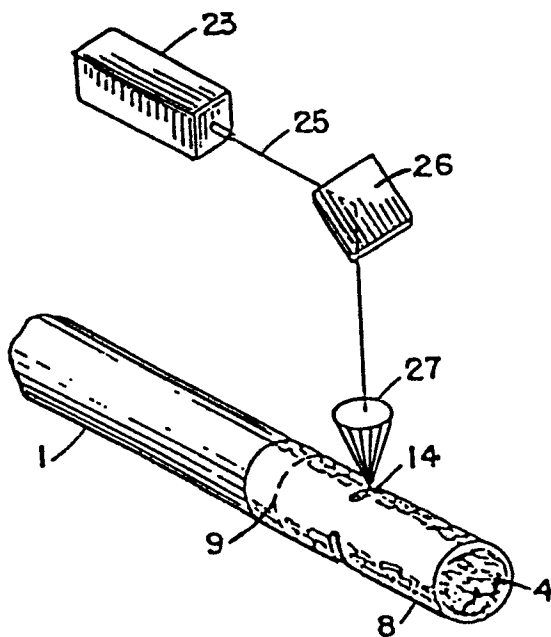


FIG. 20

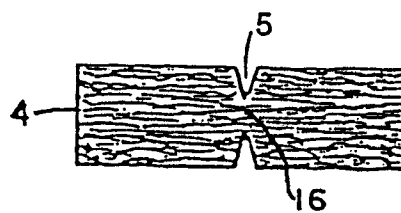


FIG. 22

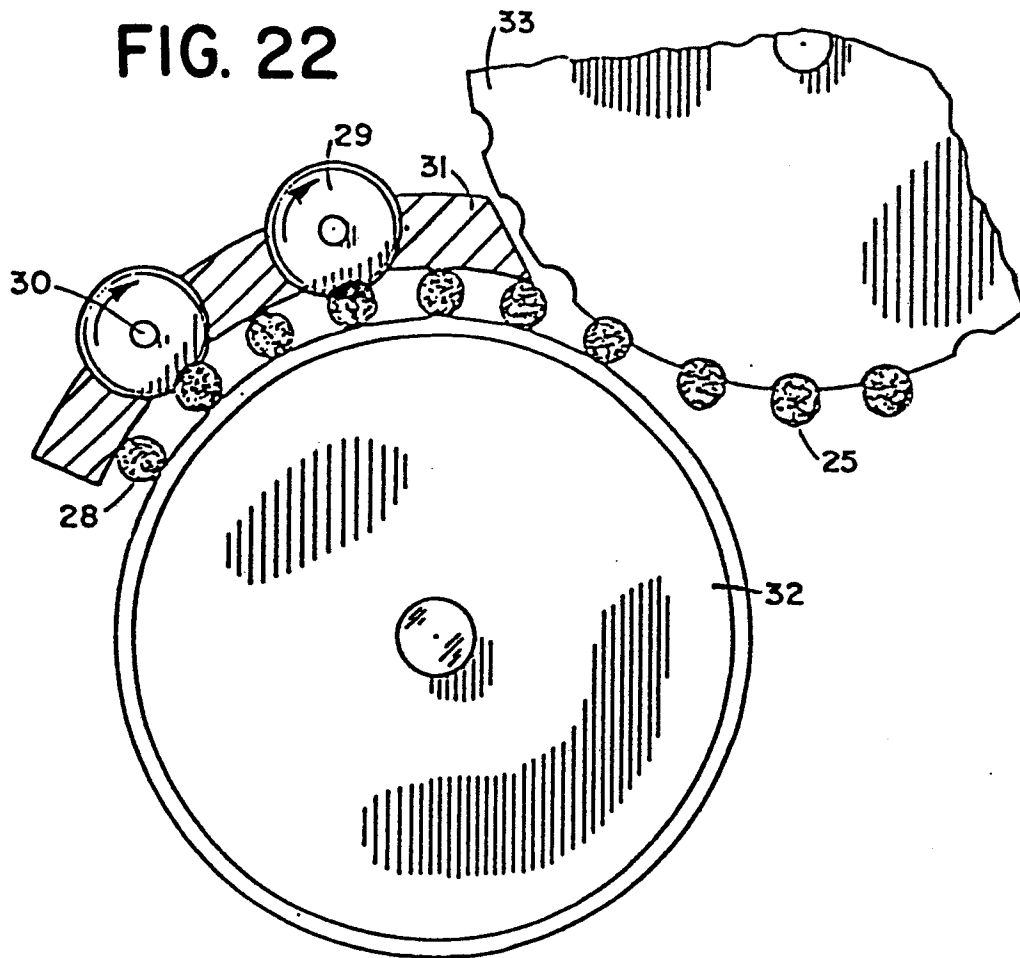


FIG. 23

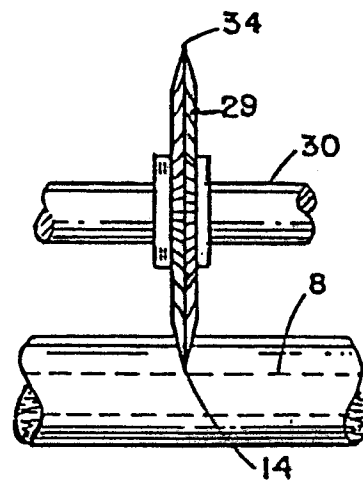
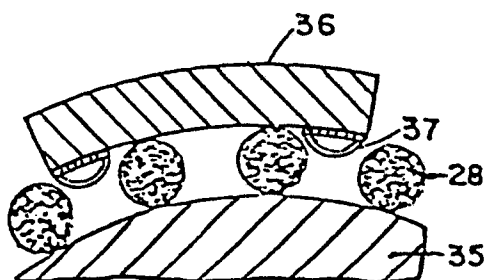


FIG. 24





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EUROPEAN SEARCH REPORT

0105683

Application number

EP 83305690.6

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl. 7)
A	FR - A - 2 273 443 (FAHIR) * Claim 1 * --	1	A 24 D 1/04 A 24 D 3/04 A 24 D 3/02
A,P	GB - A - 2 099 678 (JULIUS GLATZ GMBH) * Abstract * --	1	A 24 D 3/18 A 24 D 3/14
A	GB - A - 1 058 343 (PHILIP MORRIS INCORPORATED) * Page 3, lines 71-97 * --	1,14	
A	DE - A - 1 782 545 (MOLINS MACHINE CO. LTD.) * Page 5, line 19 - page 6, line 14 * --	1	
A	US - A - 4 201 234 (NEUKOMM) * Abstract * --	1	
A	US - A - 3 759 268 (PLOURDE) * Abstract * --	1	
A	US - A - 3 596 665 (LINDGARD) * Column 3, lines 45-55; fig. 3,4 * --	1	
The present search report has been drawn up for all claims			
Place of search VIENNA		Date of completion of the search 23-12-1983	Examiner WOLF
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			



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EUROPEAN SEARCH REPORT

0105683

Application number

EP 83305690.6

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
A	<u>US - A - 3 327 718</u> (KILBURN) * Column 2, lines 26-42 * --	1	
A	<u>GB - A - 1 095 848</u> (THE AMERICAN TOBACCO COMPANY) * Claim 1; page 2, lines 72-75 * ----	1,14	
			TECHNICAL FIELDS SEARCHED (Int. Cl.)