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(54) **CIGARETTE WITH FILTER**

(57) A filter-tipped cigarette, comprising a cylindrical cigarette rod (110) which includes a circular distal end surface (111) and a circular proximal end surface (112), and a filter (120) which is connected to the cigarette rod (110), wherein the filter (120) has a shape of a slant cut cylinder which has a lower bottom surface (122) that has a circular shape equal to the proximal end surface (112) of the cigarette rod (110), and an oblique surface (121) that is inclined with respect to a line that is extended from an axis of the cigarette rod (110), and the filter (120) is connected at the lower bottom surface (122) to the cigarette rod (110).

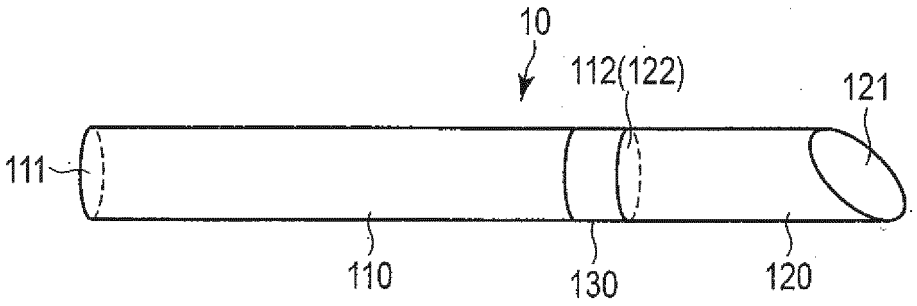

FIG. 1

EP 2 554 061 A1

Description

Technical Field

[0001] The present invention relates to a filter-tipped cigarette, more specifically, a filter-tipped cigarette which can be easily taken out of a package.

Background Art

[0002] Filter-tipped cigarettes are contained and sold in a package such that their filters are located at an opening end of the package, when the package is opened. When the user smokes a cigarette, the user opens the purchased cigarette package, and tries to take out a first cigarette by holding it between finger and thumb or by the nails. The filter-tipped cigarettes, however, are closely filled into the package, and thus it is difficult to take out the cigarette, in particular in the case where the package is a soft package, or it is necessary to take out the cigarette with such a strong force that the filter is deformed. Some users strike the package to cause the cigarette to project from the package, and then take out the cigarette by holding the cigarette between finger and thumb. Even after the first cigarette is taken out, some users feel it comparatively difficult to take out the second and following cigarettes.

[0003] To make it easy to take out cigarettes contained in the package, Jpn. U.M. Appln. KOKAI Pub. No. 50-112798 proposes providing the filter with a knob which projects from the filter.

Prior Art Document

Patent Document

[0004] Patent Document 1: Jpn. U.M. Appln. KOKAI Pub. No. 50-112798

Summary of Invention

Problem to be Solved by Invention

[0005] The object of the present invention is to provide a filter-tipped cigarette which can be easily taken out of a package and has a comparatively simple structure.

Means for Solving the Problem

[0006] According to one aspect of the present invention, there is provided a filter-tipped cigarette, comprising a cylindrical cigarette rod which includes a circular distal end surface and a circular proximal end surface, and a filter which is connected to the cigarette rod, wherein the filter has a shape of a slant cut cylinder which has a lower bottom surface that has a circular shape equal to the proximal end surface of the cigarette rod, and an oblique surface that is inclined with respect to a line that is extended from an axis of the cigarette rod, and the filter is connected at the lower bottom surface to the cigarette rod.

Effects of Invention

[0007] The filter-tipped cigarette of the present invention has a comparatively simple structure and can be easily taken out of a package, in particular, a soft package.

Brief Description of Drawings

[0008]

FIG. 1 is a perspective view of a filter-tipped cigarette according to a first embodiment of the present invention.
FIG. 2 is a side view of the filter-tipped cigarette illustrated in FIG. 1.
FIG. 3 is a perspective view of a filter-tipped cigarette according to a second embodiment of the present invention.
FIG. 4 is a side view of the filter-tipped cigarette illustrated in FIG. 3.
FIG. 5 is a side view of a part of a filter-tipped cigarette according to a third embodiment of the present invention.
FIG. 6 is a perspective view of a part of the filter-tipped cigarette illustrated in FIG. 5.
FIG. 7 is a side view of a part of a filter-tipped cigarette according to a fourth embodiment of the present invention.

FIG. 8 is a perspective view of a part of the filter-tipped cigarette illustrated in FIG. 7.
FIG. 9 is a schematic front view of a cigarette package, which contains a plurality of the filter-tipped cigarettes illustrated in FIG. 1 and FIG. 2, and part of which is cut away.

Best Mode for Carrying Out the Invention

[0009] Embodiments of the present invention will be explained in more detail hereinafter.

[0010] A filter-tipped cigarette according to one aspect of the present invention has the same structure as that of an ordinary filter-tipped cigarette, except for a structure of a filter. Specifically, the filter-tipped cigarette according to one aspect of the present invention comprises a cylindrical cigarette rod which includes a circular distal end surface (flat surface) and a circular proximal end surface (flat surface), and a filter which is connected to the cigarette rod. The filter has a shape of a slant cut cylinder, which has a circular lower bottom surface (flat surface) that has the same shape as the proximal end surface of the cigarette rod, and an oblique surface which is inclined with respect to a line extended from the axis of the cigarette rod. The filter abuts, at the lower bottom surface, against the proximal end surface of the cigarette rod.

[0011] The slant cut cylinder includes a structure which is obtained by cutting a cylinder by a plane which is inclined at an angle that exceeds zero and is less than 90° with respect to a cylinder axis (which exists on the line extended from the axis of the cigarette rod, and which corresponds to the central axis of the filter). In an embodiment of the present invention, the plane which cuts the cylinder does not cut the lower bottom surface of the cylinder, but the plane may cut, or not cut, an upper bottom surface of the cylinder. When the cutting plane does not cut the upper bottom surface of the cylinder, the cut cylinder is a so-called obliquely cut cylinder. In the obliquely cut cylinder, the oblique surface is a flat surface which has an elliptical shape. When the cutting plane cuts the upper bottom surface of the cylinder, the upper surface of the slant cut cylinder is formed of a circular arc-shaped flat surface which is parallel with the lower bottom surface, and an elliptical arc-shaped oblique flat surface that has a chord equal to a chord of an arc of the circular arc-shaped flat surface. The elliptical arc has a line-symmetrical shape with respect to a major axis of an ellipse that includes the elliptical arc. In these cases, generally, the oblique flat surface of the filter crosses the line extended from the axis of the cigarette rod.

[0012] In the present invention, the slant cut cylinder includes the case where the oblique surface is a curved surface. Specifically, the oblique elliptical surface forms a convex curved surface or a concave curved surface, not a flat surface. In this case, the fact "the convex curved surface or the concave curved surface is inclined" means that a straight line which connects two points that define the maximum length among straight lines that connect two points on a contour line of the convex curved surface or the concave curved surface crosses the axis of the cigarette rod.

[0013] Next, embodiments of the present invention will be explained with reference to drawings. The same constituent element is denoted by the same reference symbol through the drawings, and repeated explanation thereof is omitted.

[0014] FIG. 1 is a perspective view of a filter-tipped cigarette 10 according to a first embodiment of the present invention, and FIG. 2 is a side view of the filter-tipped cigarette 10.

[0015] The filter-tipped cigarette 10 comprises a cigarette rod 110, which is formed by wrapping a periphery of a cylindrical rod that is formed of an ordinary tobacco filler, such as tobacco shreds, in ordinary cigarette paper. The cigarette rod 110 includes a distal end surface 111 and a proximal end surface 112, and the distal end surface 111 and the proximal end surface 112 are circular flat surfaces, as a matter of course. The cigarette rod 110 may have a length of 49 to 68 mm, and a diameter of 7.2 to 8.3 mm, like ordinary cigarettes.

[0016] A filter 120 is connected to the proximal end surface 112 of the cigarette rod 110, by tipping paper 130, like ordinary filter-tipped cigarettes. The filter 120 is formed of a filter main body that is formed of, for example, a cellulose acetate fiber tow, and a shaping paper which wraps the filter main body. The filter 120 has a shape of an obliquely cut cylinder. Specifically, the filter 120 has an elliptical oblique flat surface 121, and a lower bottom surface 122 which has a circular shape equal to the distal end of the cigarette rod 110. The elliptical oblique flat surface 121 crosses a cylinder axis (i.e., a line extended from an axis AX of the cigarette rod 110). The lower bottom surface 122 of the filter 120 abuts against the proximal end surface 112 of the cigarette rod 110. Like ordinary filter-tipped cigarettes, the tipping paper 130 covers peripheries of the cigarette rod 110 and the filter 120 to extend from the proximal end part of the cigarette rod 110 to an upper end of the filter 120.

[0017] A diameter of the filter 120 is equal to a diameter of the cigarette rod 110. As described above, although the cigarette rod 110 and the filter 120 are connected to each other by the tipping paper 130, the diameter of the filter 120 does not include a thickness (generally, 40 μm) of the tipping paper 130.

[0018] With reference to FIG. 2, an acute angle θ which is made between the elliptical oblique flat surface 121 and the line extended from the axis AX of the cigarette rod 110 is preferably greater than 28° and less than 72°, more preferably greater than 28° and less than 58°, from the viewpoint of ease of taking out the cigarette (i.e., ease of holding the cigarette between finger and thumb). In addition, a distance d in an axial direction of the cigarette rod 10 between two points on the peripheral surface of the filter 120, wherein the two points define a major axis of the ellipse of the

oblique flat surface 121, is preferably greater than 2.5 mm and less than 12.5 mm, more preferably fall within a range of 5.0 to 7.5 mm, in consideration of ease of smoking when the user holds the cigarette in the mouth. Here, the two points are actually located on the peripheral surface of the tipping paper 130, but expressed as being located on the filter 120 for simple explanation hereinafter. In other words, the distance d is a difference between a maximum length and a minimum length of the filter 120 in an axial direction of the cigarette rod 110. The maximum length LL of the filter rod 120 in the axial direction of the cigarette rod 110 is generally 18.25 to 36.25 mm. The two points on the peripheral surface of the filter 120, which define the major axis of the ellipse of the oblique flat surface 121, are also expressed as two points which define the longest straight line among straight lines which connect two points on the contour line of the oblique flat surface 121.

[0019] Two filter-tipped cigarettes 10 illustrated in FIG. 1 and FIG. 2 can be simultaneously manufactured from one cigarette-connected body, by manufacturing the cigarette-connected body wherein two cigarette rods are connected by tipping paper to both ends of a filter member that has a length twice as great as the filter of the filter-tipped cigarette of an end product, according to a usual method, and thereafter putting the cigarette-connected body on a circumferential surface of a cutting drum having a truncated cone shape, and pressing a circular knife against the filter member in a direction vertical to the axis of the cutting drum.

[0020] FIG. 3 is a perspective view illustrating a filter-tipped cigarette according to a second embodiment of the present invention, and FIG. 4 is a side view of the filter-tipped cigarette 20.

[0021] The filter-tipped cigarette 20 has the same structure as that of the filter-tipped cigarette illustrated in FIG. 1 and FIG. 2, except for a structure of a filter 210.

[0022] The filter 210 has a structure of a slant cut cylinder which is obtained by cutting a cylinder by a plane which cuts an upper bottom surface of the cylinder. Specifically, the filter 210 includes a lower end surface 213 which corresponds to a lower bottom surface of the cylinder and has the same circular shape as that of a proximal end surface 112 of a cigarette rod 110. An upper end surface of the filter 210 is formed of a circular arc-shaped flat surface 211 which is parallel with the lower end surface 213, and an elliptical arc-shaped oblique flat surface 212 which has a chord equal to a chord 211a of an arc of the circular arc-shaped flat surface 211. The elliptical arc 212 has a line-symmetrical shape with respect to a major axis LA of an ellipse which includes the elliptical arc 212. The elliptical arc-shaped flat surface 211 crosses a cylinder axis (i.e., a line extended from an axis AX of the cigarette rod 110).

[0023] An acute angle θ which is made between the elliptical arc-shaped oblique flat surface 212 and the line extended from the axis of the cigarette rod 110 can be the same as the angle θ in the filter-tipped cigarette 10 explained with reference to FIG. 1 and FIG. 2. In addition, a difference d between a maximum length and a minimum length of the filter 210 in an axial direction of the cigarette rod 110 can be the same as the distance d in the filter-tipped cigarette 10 explained with reference to FIG. 1 and FIG. 2. The maximum length LL of the filter 210 in the axial direction of the cigarette rod 110 can be the same as the length LL in the filter-tipped cigarette 10 explained with reference to FIG. 1 and FIG. 2. In the circular arc-shaped flat surface 211 that forms the upper end surface of the filter 210 together with the elliptical arc-shaped oblique flat surface 212, a length of a line segment from the chord 211a to the arc, which passes through a center of a circle that includes the circular arc and is perpendicular to the chord 211a, preferably corresponds to 10 to 100% of a radius of the circle.

[0024] The filter-tipped cigarette illustrated in FIG. 3 and FIG. 4 can be manufactured by obtaining the filter-tipped cigarette illustrated in FIG. 1 and FIG. 2, and thereafter cutting a distal end part of the filter in a direction vertical to the axis of the cigarette rod.

[0025] FIG. 5 is a side view of a part of a filter-tipped cigarette 30 according to a third embodiment of the present invention, and FIG. 6 is a perspective view of a part of the filter-tipped cigarette 30.

[0026] The filter-tipped cigarette 30 has the same structure as that of the filter-tipped cigarette illustrated in FIG. 1 and FIG. 2, except for a structure of a filter 310. The filter 310 includes a lower bottom flat surface 312 which is a circular flat surface that is equal to a proximal end surface 112 of a cigarette rod 110, and includes an oblique surface that forms a convex curved surface 311. An acute angle θ, which is made between a longest straight line LB among straight lines that connect two points on a contour line of the convex curved surface 311 and a line AX that is extended from an axis of the cigarette rod 110, is equal to the angle θ in the filter-tipped cigarette 10 explained with reference to FIG. 1 and FIG. 2. In addition, a distance d in the axial direction of the cigarette rod 110 between two points which define the longest straight line LB among straight lines that connect two points on the contour line of the convex curved surface 312, is equal to the distance d in the filter-tipped cigarette 10 explained with reference to FIG. 1 and FIG. 2. In other words, a maximum length LL of the filter 310 in the axial direction of the cigarette rod 110 is eual to the length LL in the filter-tipped cigarette 10 explained with reference to FIG. 1 and FIG. 2.

[0027] FIG. 7 is a side view of a part of a filter-tipped cigarette 40 according to a fourth embodiment of the present invention, and FIG. 8 is a perspective view of a part of the filter-tipped cigarette 40.

[0028] The filter-tipped cigarette 40 has the same structure as that of the filter-tipped cigarette illustrated in FIG. 1 and FIG. 2, except for a structure of a filter 410. The filter 410 includes a lower bottom flat surface 412 which is a circular flat surface that is equal to a proximal end surface 112 of a cigarette rod 110, and includes an oblique surface that forms

a concave curved surface 411. An acute angle θ, which is made between a longest straight line LB among straight lines that connect two points on a contour line of the concave curved surface 411 and a line AX that is extended from an axis of the cigarette rod 110, is equal to the angle θ in the filter-tipped cigarette 10 explained with reference to FIG. 1 and FIG. 2. In addition, a distance d in the axial direction of the cigarette rod 110 between two points which define the longest straight line LB among straight lines that connect two points on the contour line of the concave curved surface 412, is equal to the distance d in the filter-tipped cigarette 10 explained with reference to FIG. 1 and FIG. 2. In other words, a maximum length LL of the filter 410 in the axial direction of the cigarette rod 110 is equal to the length LL in the filter-tipped cigarette 10 explained with reference to FIG. 1 and FIG. 2.

[0029] The filter-tipped cigarettes illustrated in FIG. 5 and FIG. 6, as well as FIG. 7 and FIG. 8, can be manufactured by obtaining the cigarette-connected body explained above and thereafter cutting the filter material to have curved surfaces by a laser beam. One filter-tipped cigarette illustrated in FIG. 5 and FIG. 6 and one filter-tipped cigarette illustrated in FIG. 7 and FIG. 8 are obtained from one cigarette-connected body.

[0030] The filter-tipped cigarettes explained above according to one aspect of the present invention are contained in a package like ordinary cigarettes. In the package, the filter-tipped cigarettes are contained such that their filters are located on an opening side of the package. Preferably, the filter-tipped cigarettes are located in the package such that the oblique surfaces of the filters are parallel with each other.

[0031] FIG. 9 is a schematic front view of a tobacco package 50, in which a plurality of (for example, twenty) filter-tipped cigarettes illustrated in FIG. 1 and FIG. 2 are contained in a soft package 510, and part of which is cut away. The tobacco package 50 is the same as an ordinary tobacco package, except that the contained filter-tipped cigarettes are those of the present invention.

[0032] Specifically, the soft package 510 is the same as an ordinary soft package, and includes an exterior soft pack 511 which is formed of paper and has a box shape. In the exterior soft pack 511, twenty filter-tipped cigarettes 10 are closely filled and contained, wherein the cigarettes are wrapped in an interior soft pack 512 that is formed of paper backed with aluminum foil. The package 510 is sealed with sealing paper 513 from its top surface to its front surface and back surface. Generally, the package 510 is enclosed by a thin resin film (not shown).

[0033] As illustrated in FIG. 9, the filter-tipped cigarettes 10 are preferably contained in the package such that oblique surfaces 121 of the filters 120 are parallel with each other, from the viewpoint of ease of taking the cigarettes out of the package.

Example

Example 1

[0034] Filter-tipped cigarettes which have the same structure as that of the filter-tipped cigarette illustrated in FIG. 1 and FIG. 2 were manufactured, by varying the inclination angle θ of the oblique surface 121 and the difference d between the maximum length and the minimum length of the filter 120 in the axial direction of the cigarette rod 110. The length of the cigarette rod 110 was 59 mm, and the diameter of the cigarette rod 110 was 7.9 mm. The length of the filter 120 along the central axis thereof was 25 mm. The cigarette rod 110 was connected with the filter 120 by tipping paper having a thickness of 40 μm. Each tobacco package 50 was manufactured by putting twenty filter-tipped cigarettes having the same structure into the soft package 510 as illustrated in FIG. 9, and sealing the package 510 with sealing paper. For each of manufactured tobacco packages, ease of taking out the first cigarette (ease of holding the cigarette between finger and thumb) and ease of smoking the cigarette were investigated, by asking panelists about them. Table 1 shows results of the investigation.

Table 1

d (mm)	θ (degree)	Ease of holding	Ease of smoking
0	90	Reference	Reference
2.5	72	Slightly good	No discomfort
5.0	58	Good	Not much discomfort
7.5	46	Good	Not much discomfort
10.0	38	Good	Slight discomfort (since the part held in the mouth is long)
12.5	32	Good	Slight difficulty in smoking (since the part held in the mouth is long)
15.0	28	Good	Difficulty in smoking (the part held in the mouth is long, and part of the tip surface easily goes out of the lips)

[0035] The results in Table 1 show that cigarettes with filters having oblique surfaces can be more easily taken out of the package, and that the inclination angle θ preferably falls within a range of greater than 28° and less than 72°. The results also show that the distance d preferably falls within a range of greater than 2.5 mm and less than 12.5 mm.

[0036] As detailed above, the filter-tipped cigarettes according to the present invention can be easily taken out of the package, in particular, the soft package, and has a comparatively simple structure.

Claims

1. A filter-tipped cigarette, comprising:

a cylindrical cigarette rod which includes a circular distal end surface and a circular proximal end surface; and a filter which is connected to the cigarette rod,
wherein the filter has a shape of a slant cut cylinder which has a lower bottom surface that has a circular shape equal to the proximal end surface of the cigarette rod, and an oblique surface that is inclined with respect to a line that is extended from an axis of the cigarette rod; and is connected at the lower bottom surface to the cigarette rod.

2. The filter-tipped cigarette according to claim 1, wherein the oblique surface forms a flat surface.

3. The filter-tipped cigarette according to claim 2, wherein the oblique surface has an elliptical shape.

4. The filter-tipped cigarette according to claim 2, wherein the oblique surface has an elliptical arc shape.

5. The filter-tipped cigarette according to any one of claims 2 to 4, wherein the oblique surface crosses the line that is extended from the axis of the cigarette rod.

6. The filter-tipped cigarette according to any one of claims 2 to 5, wherein an acute angle which is made between the oblique surface and the line that is extended from the axis of the cigarette rod is greater than 28° and less than 72°.

7. The filter-tipped cigarette according to claim 1, wherein the oblique surface forms a curved surface.

8. The filter-tipped cigarette according to claim 7, wherein an acute angle which is made between a longest straight line among straight lines that connect two points on a contour line of the oblique surface and the line that is extended from the axis of the cigarette rod is greater than 28° and less than 72°.

9. The filter-tipped cigarette according to any one of claims 1 to 8, wherein the cigarette rod has a length of 49 to 68 mm, and a diameter of 7.2 to 8.3 mm.

10. The filter-tipped cigarette according to any one of claims 1 to 9, wherein the filter has a maximum length of 18.25 to 36.25 mm in an axial direction of the cigarette rod.

11. The filter-tipped cigarette according to any one of claims 1 to 10, wherein a difference between a maximum length and a minimum length of the filter in an axial direction of the cigarette rod is greater than 2.5 mm and less than 12.5 mm.

12. The filter-tipped cigarette according to any one of claims 1 to 11, wherein the cigarette rod has a length of 49 to 68 mm, and a diameter of 7.2 to 8.3 mm.

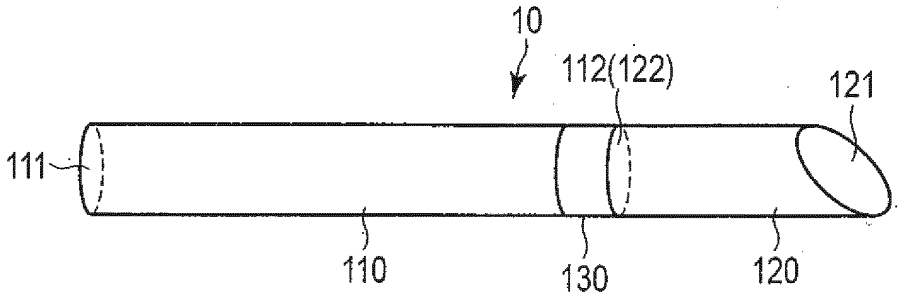

FIG. 1

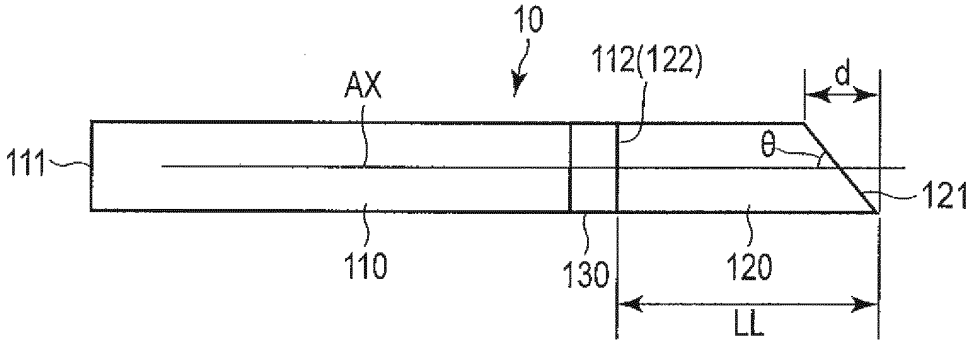

FIG. 2

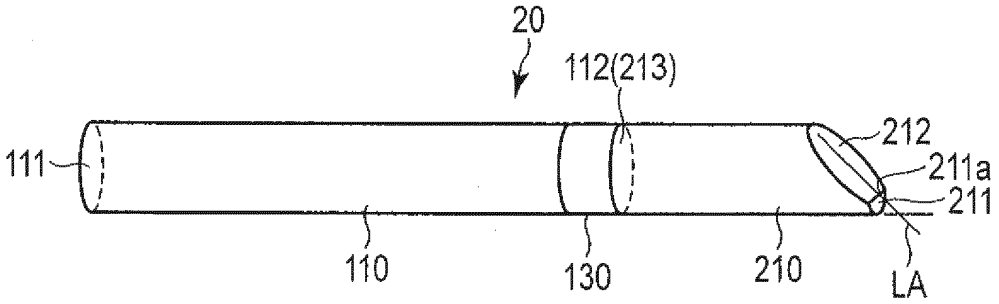

FIG. 3

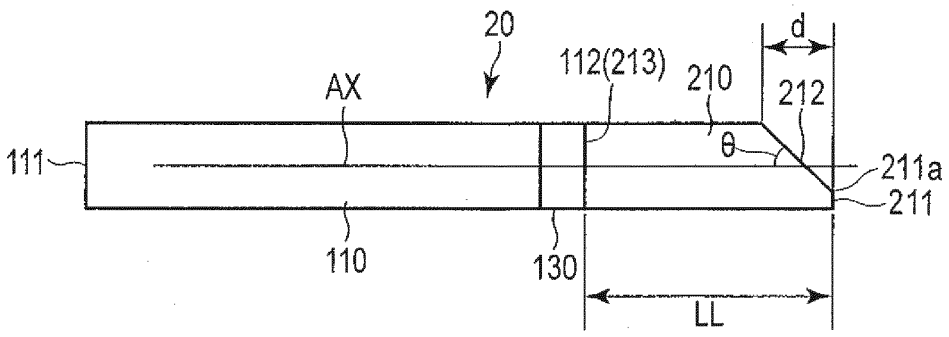

FIG. 4

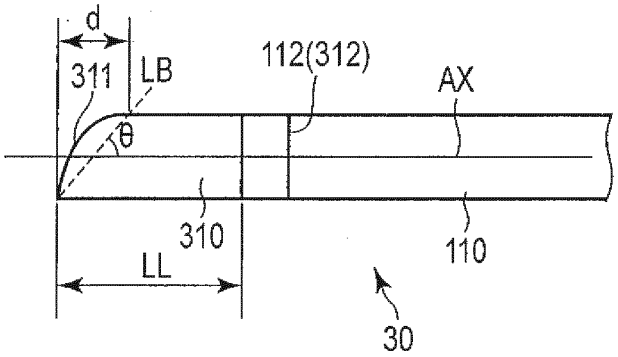

FIG. 5

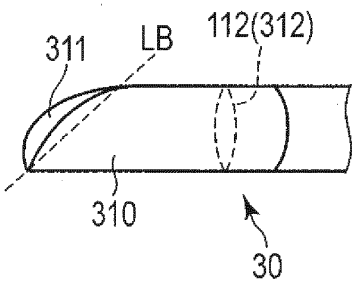

FIG. 6

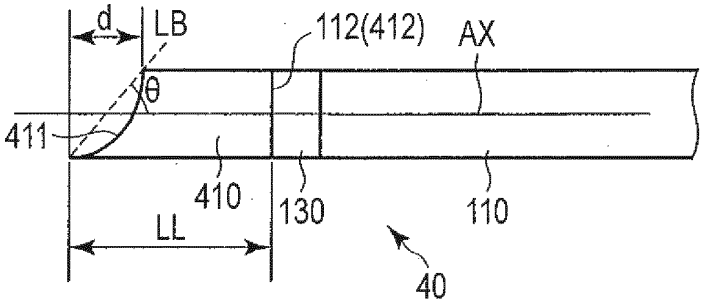

FIG. 7

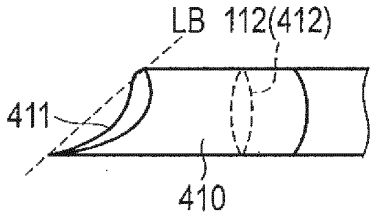

FIG. 8

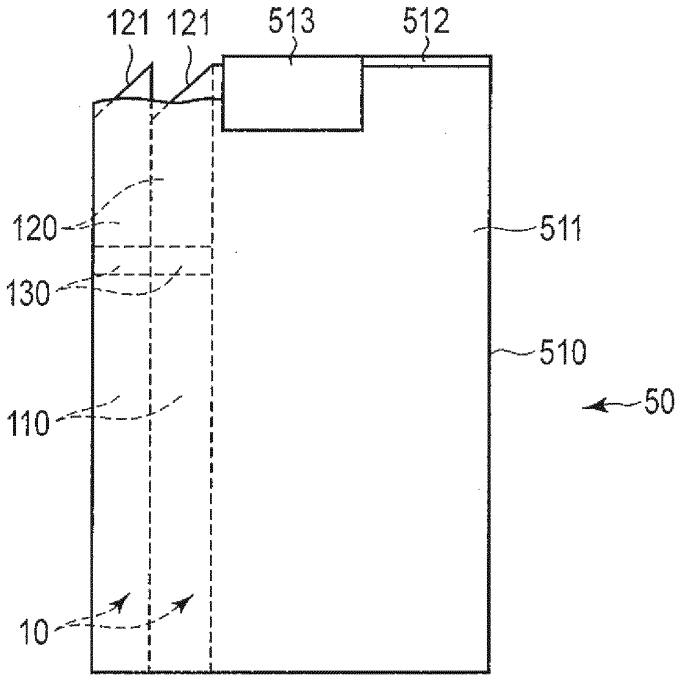

FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2011/055761

A. CLASSIFICATION OF SUBJECT MATTER
A24D3/04(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
A24D3/04

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2011
Kokai Jitsuyo Shinan Koho 1971-2011 Toroku Jitsuyo Shinan Koho 1994-2011

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 155358/1974(Laid-open No. 81400/1976) (Takehide OTA), 29 June 1976 (29.06.1976), detailed explanation of the device; fig. 2 (Family: none)	1,2,6,9-12 3-5
X A	JP 59-102386 A (B.A.T Cigaretten-Fabriken GmbH), 13 June 1984 (13.06.1984), page 3, upper left column, line 18 to upper right column, line 15; fig. 1 to 5 & US 4621651 A & EP 0108975 A1	1,7-12 3-5

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:
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Date of the actual completion of the international search	Date of mailing of the international search report
04 April, 2011 (04.04.11)	12 April, 2011 (12.04.11)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 50112798 A **[0003] [0004]**