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(71) Applicant: **Japan Tobacco, Inc.**
Tokyo 105-8422 (JP)

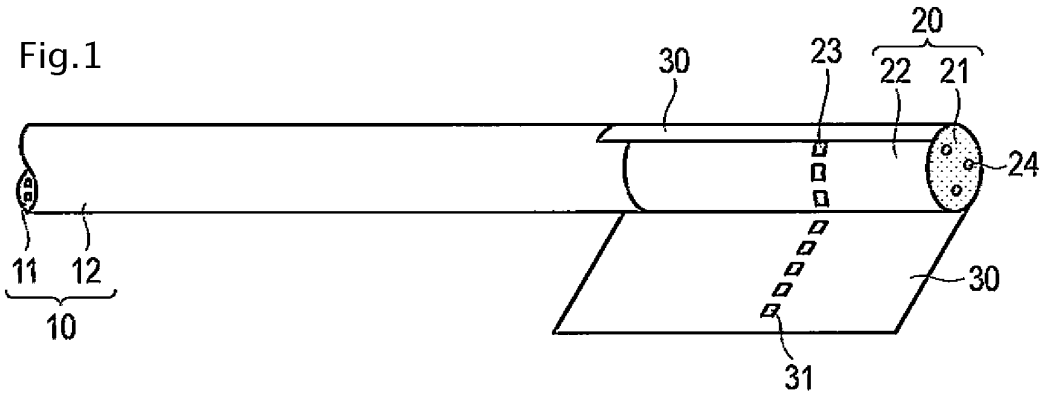
(72) Inventors:
- **SASAKAWA, Kiyohiro**
Tokyo 130-8603 (JP)
- **ITABASHI, Kenichi**
Tokyo 130-8603 (JP)
- **IZUMI, Ryohei**
Tokyo 130-8603 (JP)

(74) Representative: **Isarpatent**
Patentanwälte Behnisch Barth Charles Hassa Peckmann & Partner mbB
Friedrichstrasse 31
80801 München (DE)

(54) **CIGARETTE**

(57) A cigarette comprising: a tobacco rod including a tobacco filler and a cigarette paper wrapped around a periphery of the tobacco filler; a filter including a filter member and a filter wrapping paper integrally wrapped around a periphery of the filter member; and a tipping paper bonded on the tobacco rod and the filter to connect the tobacco rod and the filter to each other, a perforation for letting air flow in during puffing being formed so as to pierce the tipping paper and the filter wrapping paper in the filter portion, wherein the cigarette has a diameter of 3.0 to 6.0 mm, the filter member contains an acetate tow having a filament denier of more than 8.0 g/9000 m and a total denier of less than 15000 g/9000 m, and the filter contains 35 mg or more of a flavor releasing material.

Fig.1



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Description

Technical Field

[0001] The present invention relates to a thinly rolled cigarette.

Background Art

[0002] As a thinly rolled cigarette, for example, a cigarette called "Superslim", which has a diameter of 5.4 mm, is on the market. A further thinner cigarette called "Microslim" is also known. These thinly rolled cigarettes have a specific problem resulting from their thinness. Namely, thinly rolled cigarette is apt to have an increased draw resistance of the cigarette because of its thinness. The cigarette draw resistance is correlated to the ease of smoking by a smoker, and a cigarette having an excessively high draw resistance is difficult to be smoked. It is generally said that the cigarette draw resistance is desired to be 80 to 150 mmH_2O.

[0003] Common practices for designing a cigarette having a desired low cigarette draw resistance include:

(1) lowering the draw resistance of a filter;
(2) lowering the draw resistance of a tobacco rod; and
(3) increasing an air inflow quantity (Qf) from perforations of a tipping paper, and decreasing an air inflow quantity (Qt) from a cigarette top. The draw resistance of the filter can be reduced by changing production conditions of a filter production machine to decrease the filling amount of an acetate tow in a filter rod. However, when the filter rod is uniformly filled with the acetate tow, there is a limit on reduction of the filling amount of the acetate tow. Particularly in a thinly rolled cigarette having a diameter of 6.0 mm or less, it is difficult to suppress an increase in draw resistance, which results from the thinness of the cigarette, only by reduction of the filling amount of the acetate tow. Similarly, there is a limit on reduction of the draw resistance by decreasing the filling amount of a tobacco filler in the tobacco rod. For these reasons, in order to reduce the cigarette draw resistance, the air inflow quantity (Qf) from perforations of a tipping paper is increased, and the air inflow quantity (Qt) from a cigarette top is decreased. However, in this case, the amount of air supplied for combustion of cut tobacco decreases, leading to a decrease in amount of tar generated by combustion.

[0004] Thus, in a thinly rolled cigarette which is apt to have an increased draw resistance of the cigarette, it has been difficult to achieve both a desired low cigarette draw resistance and a high tar amount. Actually, in commercially available cigarettes having a diameter of 5.4 mm, the air inflow quantity (Qf) from perforations of a tipping paper is increased in order to achieve a desired low cigarette draw resistance. Such cigarettes generally have a low tar amount of about 1 to 8 mg as compared to conventional-size cigarettes having a tar amount of about 1 to 20 mg. For example, Patent Document 1 discloses a thinly rolled cigarette (diameter: 5 to 7 mm) having a tar amount of 1 mg or less and including a dual-segment filter. Actually, the present inventors analyzed some commercial available thinly rolled cigarettes, but could not find a cigarette having a cigarette draw resistance of 150 mmH_2O or less and a tar value of 8 mg or more in mainstream smoke.

[0005] Further, it is known that when a flavor releasing material is added to a filter, the flavor releasing material dispersed in a filter material acts as a factor to boost the filter draw resistance depending on the added amount. Therefore, such a filter containing a flavor releasing material has a higher filter draw resistance as compared to a filter consisting of only a filter material. Thus, when a flavor releasing material is added to a filter of a thinly rolled cigarette, the filter draw resistance greatly increases.

[0006] Further, it is known that when a multi-segment filter is employed in a cigarette, the multi-segment filter has a higher filter draw resistance as compared to a plain filter because the multi-segment filter has a plurality of segments. That is, the multi-segment filter has a larger amount of paper surrounding a filter material as compared to the plain filter, and therefore the filter material should have a smaller diameter. Thus, when a multi-segment filter is employed in a thinly rolled cigarette, the filter draw resistance greatly increases.

[0007] As mentioned above, a flavor releasing material-containing filter and a multi-segment filter are apt to have an increased filter draw resistance. Therefore, in a thinly rolled cigarette including such a filter, it is further difficult to achieve both a desired low cigarette draw resistance and a high tar amount.

Prior Art Documents

Patent Documents

[0008]

Patent Document 1: Jpn. PCT National Publication No. 2001-520874
Patent Document 2: International Publication No. WO 2011/042175
Patent Document 3: GB Patent Application Publication No. 2091078
Patent Document 4: International Publication No. WO 93/08707
Patent Document 5: U.S. Patent No. 5058608
Patent Document 6: Jpn. PCT National Publication No. 2006-503572
Patent Document 7: U.S. Patent No. 4273141

Summary of Invention

Technical Problem

[0009] In view of the situations described above, an object of the present invention is to provide a thinly rolled cigarette comprising a flavor releasing material-containing filter, the thinly rolled cigarette having a low cigarette draw resistance and a high tar amount. Particularly, an object of the present invention is to provide a thinly rolled cigarette comprising a flavor releasing material-containing multi-segment filter, the thinly rolled cigarette having a low cigarette draw resistance and a high tar amount.

Solution to Problem

[0010] The present inventors have found that even when a flavor releasing material is added to a filter of a thinly rolled cigarette, both a desired low cigarette draw resistance and a high tar amount can be achieved by using as a filter material an acetate tow having a filament denier of more than 8.0 g/9000 m and a total denier of less than 15000 g/9000 m, leading to completion of the present invention.

[0011] Specifically, according to the present invention, there is provided a cigarette comprising:

> a tobacco rod including a tobacco filler and a cigarette paper wrapped around a periphery of the tobacco filler; a filter including a filter member and a filter wrapping paper integrally wrapped around a periphery of the filter member; and a tipping paper bonded on the tobacco rod and the filter to connect the tobacco rod and the filter to each other, a perforation for letting air flow in during puffing being formed so as to pierce the tipping paper and the filter wrapping paper in the filter portion,
> wherein the cigarette has a diameter of 3.0 to 6.0 mm,
> the filter member contains an acetate tow having a filament denier of more than 8.0 g/9000 m and a total denier of less than 15000 g/9000 m, and
> the filter contains 35 mg or more of a flavor releasing material.

[0012] Particularly, according to the present invention, there is provided the above-mentioned cigarette, wherein the filter is a multi-segment filter including a plurality of filter segments, and at least one of the filter segments contains an acetate tow having a filament denier of more than 8.0 g/9000 m and a total denier of less than 15000 g/9000 m.

Advantageous Effects of Invention

[0013] The present invention provides a thinly rolled cigarette comprising a flavor releasing material-containing filter, the thinly rolled cigarette having a desired low cigarette draw resistance and a high tar amount. Particularly, the present invention provides a thinly rolled cigarette comprising a flavor releasing material-containing multi-segment filter, the thinly rolled cigarette having a desired low cigarette draw resistance and a high tar amount.

[0014] Brief Description of Drawings

> FIG. 1 is an exploded perspective view showing one example of a cigarette according to the present invention.
> FIG. 2 is an explanatory view for explaining an air inflow in the cigarette according to the present invention.

Description of Embodiments

[0015] The present invention will be explained below with reference to the drawings. The following explanations are intended to describe the present invention in detail, and are not intended to limit the present invention.

[0016] FIG. 1 shows one example of a thinly rolled cigarette. In FIG. 1, an end of a tobacco rod 10 is cut off so that the inside of the tobacco rod 10 can be seen.

[0017] The cigarette according to the present invention has a diameter of 3.0 to 6.0 mm, and is thinly rolled. The cigarette according to the present invention has a diameter of, for example, 4.5 mm or 5.4 mm. The cigarette according to the present invention has a structure similar to that of a usual filter-tipped cigarette except that the diameter is small. That is, the cigarette according to the present invention includes the tobacco rod 10 and a filter 20, and the tobacco rod 10 and the filter 20 are connected to each other by a tipping paper 30. The total length of the cigarette according to the present invention may be, for example, 80 to 100 mm.

[0018] The tobacco rod 10 is formed of a tobacco filler 11 and a cigarette paper 12 wrapped around the periphery of the tobacco filler 11, as in a usual cigarette. The tobacco rod 10 has a diameter of 3.0 to 6.0 mm and may have a length of, for example, 50 to 75 mm. The cigarette paper 12 may have a thickness of 10 to 100 μm, and a paper having air permeability is generally used as the cigarette paper 12.

[0019] The filter 20 is disposed at an end of the tobacco rod 10, and is formed of a filter member 21 and a filter wrapping paper 22 wrapped around the periphery of the filter member 21. The filter 20 has a diameter almost equal to that of the tobacco rod 10, and may have a length of, for example, 25 to 30 mm. The filter member 21 shown in FIG. 1 has a single filter structure, so called plain filter structure. The filter wrapping paper 22 which is integrally wrapped around the periphery of the filter member 21 may have a thickness of 10 to 100 μm, and may or may not have air permeability. The filter wrapping paper 22 has perforations 23 at the same positions as those of the perforations 31 of the tipping paper 30 so that the perforations 23 communicate with the perforations 31.

[0020] The filter member 21 is constituted of an acetate tow having a filament denier of more than 8.0 g/9000 m and a total denier of less than 15000 g/9000 m. The acetate tow of the filter member 21 generally has a filament denier of more than 8.0 g/9000 m and not more than 15 g/9000 m, and preferably has a filament denier of 10 g/9000 m to 13 g/9000 m. The filter member 21 generally has a total denier of not less than 10000 g/9000 m and less than 15000 g/9000 m, and preferably has a total denier of 11000 g/9000 m to 13000 g/9000 m. The cross section of each of acetate filaments that form the acetate tow may have any shape, for example, a Y-shape or a circular shape, and a circular shape is preferred for reducing the filter draw resistance.

[0021] The filter 20 contains a flavor releasing material 24. The flavor releasing material 24 contains a flavor component and a component for suppressing volatilization of the flavor component. For example, the flavor releasing material 24 may be in the form of a capsule containing a flavor component. Such a flavor releasing material in the form of a capsule has a diameter size of several ten micrometers, and a large number of flavor releasing materials are dispersively contained in the filter member 21 (see FIG. 1) (see, for example, WO 2009/157240). Alternatively, the flavor releasing material in the form of a capsule has a diameter size of several millimeters, and one to several flavor releasing materials may be embedded in the filter member 21 (see, for example, WO 2011/024068), or may be contained in a cavity formed between two filter segments spaced apart from each other (see, for example, WO 2006/117697). Alternatively, the flavor releasing material 24 may be in the form of a thread (string) impregnated with a flavor component, and it is contained so as to pass through the center of the filter (see, for example, Jpn. Pat. Publication No. 63-38187).

[0022] The flavor component contained in the flavor releasing material 24 may be any flavor component used in a cigarette, such as menthol. The flavor releasing material 24 can be added in an amount of 35 mg or more per cigarette, for example 35 to 235 mg per cigarette.

[0023] The cigarette according to the present invention may further include an adsorbent such as activated carbon in the filter member 21.

[0024] The tipping paper 30 is bonded by an adhesive so as to cover the whole of the filter wrapping paper 22 and a part of the cigarette paper 12. A portion of the tipping paper 30 which covers the filter wrapping paper 22, is called a "tipping paper of a filter portion". For example, the tipping paper 30 may have a length (width) of 30 to 37 mm in an axis direction of the tobacco rod, and a thickness of 10 to 100 μm. As in a usual filter-tipped cigarette, the tipping paper has perforations 31 for letting air flow into the inside of the cigarette (filter member 21) from the outside during puffing. The perforations for air permeation (ventilation holes) have a function of letting air flow into the inside of the cigarette therefrom during puffing, and as a result, the air inflow quantity from the cigarette top is decreased to reduce the cigarette draw resistance. The perforations for air permeation (ventilation holes) are provided in a line along a circumferential direction of the cigarette in FIG. 1, but may be provided in a plurality of lines along the circumferential direction of the cigarette, or a large number of perforations may be irregularly provided. The perforations 31 are formed so as to pierce the tipping paper of the filter portion and the filter wrapping paper 22.

[0025] As shown in FIG. 2, in a usual cigarette, a total air quantity (Q) sucked out from a mouthpiece of the cigarette consists of an air quantity (Qt) flowing in from the cigarette top, an air quantity (Qp) flowing in by passing through the cigarette paper 12, and an air quantity (Qf) flowing in from perforations 31 of the tipping paper 30. A ratio (Vt) of the air quantity (Qt) flowing in from the cigarette top is represented by $100 \times Qt/Q$ (%); a ratio (Vp) of the air quantity (Qp) flowing in by passing through the cigarette paper is represented by $100 \times Qp/Q$ (%); and a ratio (Vf) of the air quantity (Qf) flowing in from the perforations of the tipping paper is represented by $100 \times Qf/Q$ (%). The ratios of the air quantities (Vt, Vp and Vf) can be obtained by measuring the air quantities under standard smoking conditions in accordance with the ISO standard method using a cigarette quality measurement device (ISO 9512).

[0026] The target tar amount in the cigarette according to the present invention is 8 mg or more. When the above-mentioned acetate tow defined in the present invention is used in the filter, the ratio (Vf) of the air quantity flowing in from the perforations of the tipping paper to the total air quantity (Q) may be appropriately set for the purpose of achieving the target tar amount, and may be set to, for example, 10 to 60%, preferably 20 to 50%. In the cigarette according to the present invention, the ratio (Vt) of the air quantity flowing in from the cigarette top to the total air quantity (Q) is generally 28 to 90%, and the ratio (Vp) of the air quantity flowing in by passing through the cigarette paper to the total air quantity (Q) is generally 0 to 12%.

[0027] The above-mentioned Vf value can be obtained by adjusting the size and number of perforations of the tipping paper by changing the power and pulse length of a laser perforator mounted in a cigarette production machine.

[0028] In the present invention, the filter wrapping paper 22 has perforations 23 at the same positions as those of the perforations 31 of the tipping paper 30 so that the perforations 23 communicate with the perforations 31, as described above. Therefore, the perforations can be provided by making holes using the laser perforator so as to pierce not only the tipping paper but also the filter wrapping paper. Therefore, the air permeability of the filter wrapping paper does not matter.

[0029] In order to obtain the above-mentioned Vp value, it is preferred that a paper having an air permeability of 5 to 100 CU, preferably 60 CU or less is used as a raw material of the cigarette paper 12. The cigarette paper

12 may contain a combustion regulator such as citrate in an amount of 1.0% by mass or less based on the mass of the cigarette paper.

[0030] Thus, in the cigarette according to the present invention, a low filter draw resistance, preferably a filter draw resistance of 50 to 90 mmH_2O can be achieved by using as a filter material an acetate tow having a filament denier of more than 8.0 g/9000 m and a total denier of less than 15000 g/9000 m, even when a flavor releasing material is added to a filter. Consequently, even when the ratio (Vf) of the air quantity flowing in from perforations of the tipping paper to the total air quantity (Q) is not increased, a low cigarette draw resistance can be achieved, and a high tar value can be also obtained. In addition, the cigarette according to the present invention did not suffer deterioration in firmness of the filter portion of the cigarette as compared to the existing thinly rolled cigarettes including an acetate filter, although the acetate tow having the above-mentioned specific filament denier and total denier is used. As a result, the cigarette according to the present invention had no problem in the feeling of holding the cigarette in a mouth and the ease of handling under stress applied during smoking. As described above, in the cigarette according to the present invention, a low cigarette draw resistance (i.e., 150 mmH_2O or less) and a high tar value (i.e., 8 mg or more) can be achieved without deteriorating the firmness of the thinly rolled cigarette, even when a flavor releasing material is added to the filter. In the present invention, the "low cigarette draw resistance" means a draw resistance of 150 mmH_2O, generally 100 to 150 mmH_2O. In the present invention, the "high tar value" means a tar value of 8 mg or more, generally 8 to 13 mg.

[0031] In the present invention, the "filter draw resistance" refers to a value measured in accordance with the ISO standard method (ISO 6565) using, for example, "Draw Resistance Meter A11" (manufactured by Burghart Company). The "cigarette draw resistance" refers to a value measured in accordance with the ISO standard method (ISO 6565) using, for example, "NCQA" (manufactured by JT Toshi Inc.). The "tar value" refers to a value measured in accordance with the ISO standard smoking conditions (ISO 3380 and ISO 3402).

[0032] In the cigarette according to the present invention, the filter may be a multi-segment filter including a plurality of filter segments, for example a dual filter or a triple filter. In this case, at least one of the filter segments (consisting of a filter material and a paper wrapped around the filter material) has a filter material formed of an acetate tow having a filament denier of more than 8.0 g/9000 m and a total denier of less than 15000 g/9000 m. Preferably, all the filter segments have a filter material formed of an acetate tow having a filament denier of more than 8.0 g/9000 m and a total denier of less than 15000 g/9000 m.

[0033] For example, in the cigarette according to the present invention, the filter is a dual-segment filter consisting of a first filter segment disposed on the tobacco filler side and a second filter segment disposed on the mouthpiece side. The first filter segment is an acetate tow filter containing an adsorbent (e.g., activated carbon), and the second filter segment is an acetate tow filter containing a large number of flavor releasing materials in the form of a capsule. The filter materials of the first and second filter segments are each formed of an acetate tow having a filament denier of more than 8.0 g/9000 m and a total denier of less than 15000 g/9000 m.

[0034] Thus, in the case of employing a multi-segment filter in the cigarette according to the present invention, the cigarette can similarly have a low cigarette draw resistance (i.e., 150 mmH_2O or less) and a high tar value (i.e., 8 mg or more) when an acetate tow having a filament denier of more than 8.0 g/9000 m and a total denier of less than 15000 g/9000 m is used as a filter material of at least one filter segment. When the filter segment contains a flavor releasing material or an adsorbent, it is preferred that the filter segment uses as a filter material an acetate tow having a filament denier of more than 8.0 g/9000 m and a total denier of less than 15000 g/9000 m.

[0035] In the case of employing a multi-segment filter in the cigarette according to the present invention, the filter may include another filter segment formed using a filter material other than the "acetate tow having a filament denier of more than 8.0 g/9000 m and a total denier of less than 15000 g/9000 m". For example, the filter may include another filter segment formed using a paper filter, a Neo filter made of a nonwoven sheet of natural pulp, or an acetate filter other than the above-mentioned acetate tow. A filter segment having a low draw resistance is preferably used as another filter segment. In the case of a filter paper and a Neo filter, one having a low draw resistance can be obtained by adjusting the width of the sheet, the basis weight of the sheet, the density of the sheet, and the like.

[0036] Thus, in present invention, even when a flavor releasing material-containing filter, which is apt to cause an increase in cigarette draw resistance, is employed in a thinly rolled cigarette, the effects of the present invention (i.e., a low cigarette draw resistance and a high tar amount) can be exhibited by using as a filter material an acetate tow having a filament denier of more than 8.0 g/9000 m and a total denier of less than 15000 g/9000 m.

Description of Reference Numbers

[0037]

10: tobacco rod
11: tobacco filler
12: cigarette paper
20: filter
21: filter member
22: filter wrapping paper
23: perforation
24: flavor releasing material
30: tipping paper

31: perforation

Claims

1. A cigarette comprising:

   a tobacco rod including a tobacco filler and a cigarette paper wrapped around a periphery of the tobacco filler; a filter including a filter member and a filter wrapping paper integrally wrapped around a periphery of the filter member; and a tipping paper bonded on the tobacco rod and the filter to connect the tobacco rod and the filter to each other, a perforation for letting air flow in during puffing being formed so as to pierce the tipping paper and the filter wrapping paper in the filter portion,
   wherein the cigarette has a diameter of 3.0 to 6.0 mm,
   the filter member contains an acetate tow having a filament denier of more than 8.0 g/9000 m and a total denier of less than 15000 g/9000 m, and the filter contains 35 mg or more of a flavor releasing material.

2. The cigarette according to claim 1, wherein the filter is a multi-segment filter including a plurality of filter segments, and at least one of the filter segments contains an acetate tow having a filament denier of more than 8.0 g/9000 m and a total denier of less than 15000 g/9000 m.

3. The cigarette according to claim 1, wherein the filter is a dual-segment filter including a first filter segment disposed on the tobacco filler side and a second filter segment disposed on the mouthpiece side, and at least one of the filter segments contains an acetate tow having a filament denier of more than 8.0 g/9000 m and a total denier of less than 15000 g/9000 m.

4. The cigarette according to any one of claims 1 to 3, wherein a tar value in mainstream smoke is 8 mg or more, and a cigarette draw resistance is 150 mmH_2O or less.

Fig.1

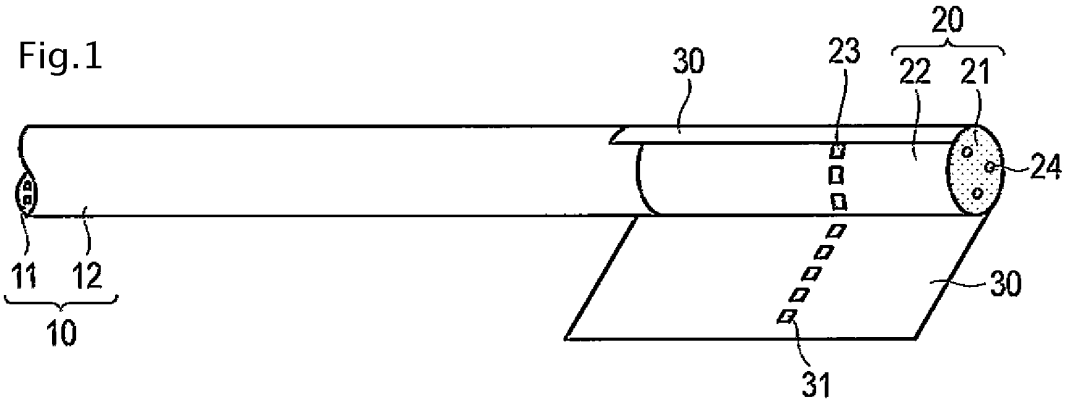
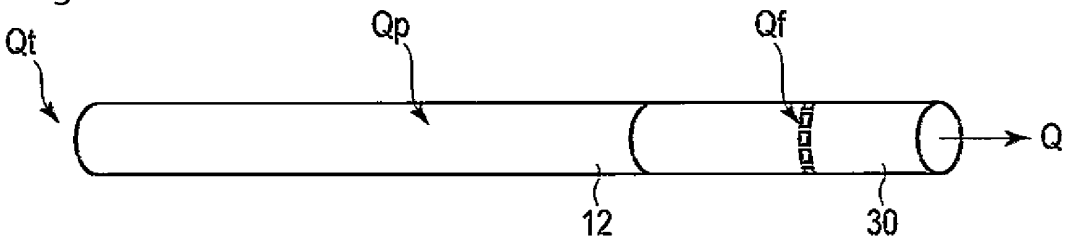


Fig.2



INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2012/082389

A. CLASSIFICATION OF SUBJECT MATTER
A24D3/02(2006.01)i, *A24D3/04*(2006.01)i, *A24D3/06*(2006.01)i, *A24D3/10*(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)
A24D3/02, A24D3/04, A24D3/06, A24D3/10

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 1996-2013
Kokai Jitsuyo Shinan Koho 1971-2013 Toroku Jitsuyo Shinan Koho 1994-2013

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.
Y	JP 2003-525043 A (Reemtsma Cigarettenfabriken GmbH), 26 August 2003 (26.08.2003), claims 6, 13, 14; paragraphs [0014] to [0045]; all drawings & US 2003/0140932 A1 & EP 1259130 A & WO 2001/064061 A1 & DE 10009829 A & DE 50100499 D & AU 3548501 A & CZ 20023262 A & BG 107159 A & AT 246882 T & SK 14122002 A & HU 300441 A & TW 544288 B & PT 1259130 E & ES 2204833 T & PL 365130 A & HK 1054300 A	1-4

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

* Special categories of cited documents:
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 February, 2013 (28.02.13)	12 March, 2013 (12.03.13)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2012/082389

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2012/082389

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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