



(11)

**EP 4 074 195 A1**

(12)

**EUROPEAN PATENT APPLICATION**  
published in accordance with Art. 153(4) EPC

(43) Date of publication:

**19.10.2022 Bulletin 2022/42**

(51) International Patent Classification (IPC):

**A24D 1/20** <sup>(2020.01)</sup> **A24D 1/04** <sup>(2006.01)</sup>

(21) Application number: **19880930.3**

(52) Cooperative Patent Classification (CPC):

**A24D 1/04; A24D 1/20**

(22) Date of filing: **16.12.2019**

(86) International application number:

**PCT/JP2019/049122**

(87) International publication number:

**WO 2021/117256 (17.06.2021 Gazette 2021/24)**

(84) Designated Contracting States:

**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB  
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO  
PL PT RO RS SE SI SK SM TR**

Designated Extension States:

**BA ME**

Designated Validation States:

**KH MA MD TN**

(71) Applicant: **Future Technology Co., Ltd.**

**Izumi-shi, Kagoshima-ken 899-0501 (JP)**

(72) Inventor: **WATANABE, Ryuji**

**Tokyo**

**1010021 (JP)**

(74) Representative: **Schmid, Wolfgang**

**Lorenz & Kollegen**

**Patentanwälte Partnerschaftsgesellschaft mbB**

**Alte Ulmer Strasse 2**

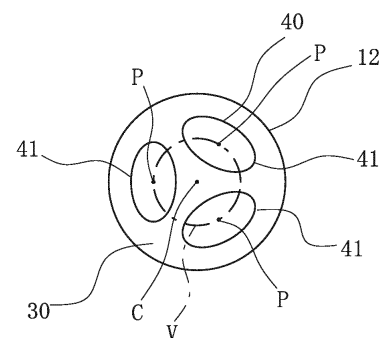
**89522 Heidenheim (DE)**

(30) Priority: **12.12.2019 JP 2019224785**

(54) **HEATING TYPE TOBACCO SUPPORT MEMBER AND HEATING TYPE TOBACCO CARTRIDGE**

(57) A supporting member for heated tobacco which adjusts the shape and the arrangement of the hole part and a cartridge for heated tobacco, are provided.

A supporting member for heated tobacco 12 which is provided between a cigarette filling packed body 10 and an inhalation opening 14 of a cartridge for heated tobacco 1, the supporting member for heated tobacco 10 comprising: a first end surface 30; a second end surface 31; and a peripheral surface portion 32: wherein a hole part 40 penetrating between the first end surface 30 and the second end surface 31 is formed, and the hole part 40 has, on the first end surface 30 or the second end surface 31, a first through hole 41 arranged so as not to include a central axis C of the peripheral surface portion 32.



**Fig. 4**

**EP 4 074 195 A1**

**Description**

[Technical Field]

**[0001]** The invention relates to a supporting member for heated tobacco used in heated tobacco with a cigarette filling which is formed of a tobacco or non-tobacco plant, and a cartridge for heated tobacco having the same.

[Background Art]

**[0002]** In recent years, in order to match a tendency to quit smoking, heated tobacco products for enjoying tobacco by heating a cartridge containing a tobacco component without using a flame so as to inhale a vaporized tobacco component are beginning to spread. A cartridge for heated tobacco has a cigarette filling which is inserted to be heated into a heating body, such as a blade, which a heated tobacco body has, a filter provided on an inhalation opening, and a supporting member provided between the cigarette filling and the filter, and is formed by wrapping these with a packaging body such as paper. Examples of such supporting members for heated tobacco and cartridges for heated tobacco include Patent Literature 1.

[Citation List]

**[0003]** [Patent Literature 1] JP 3212228 U

[Summary of Invention]

[Technical Problem]

**[0004]** A supporting member for heated tobacco allows an air flow from a cigarette filling to pass and also has the function of preventing the filling fall out by supporting the cigarette filling from one end portion when a heating body is inserted into the cigarette filling. Thus, the supporting member for heated tobacco has a hole part penetrating in the length direction and supports the cigarette filling on other parts.

**[0005]** In a cross section of cutting the supporting member for heated tobacco with a plane orthogonal to the length direction, a region of a hole part is void. If a porosity in the cross section is high, the fluidity of the air flow from the cigarette filling to the inhalation opening can be improved. However, if the porosity is too high, the function of supporting the cigarette filling drops. In addition, how the hole part is arranged in the cross section affects the function of supporting the cigarette filling. Thus, by adjusting the shape and the arrangement of the hole part, the compatibility of the fluidity of the air flow and the function of supporting the cigarette filling can be attained.

**[0006]** The present invention is made in consideration of the above-described problems, and an object thereof

is to provide a supporting member for heated tobacco which adjusts the shape and the arrangement of the hole part and a cartridge for heated tobacco.

[Solution to Problem]

**[0007]** In order to achieve the object, according to an invention of claim 1, there is provided a supporting member for heated tobacco which is provided between a cigarette filling packed body and an inhalation opening of a cartridge for heated tobacco, the supporting member for heated tobacco including:

a first end surface; a second end surface; and a peripheral surface portion: wherein a hole part penetrating between the first end surface and the second end surface is formed, and the hole part has, on the first end surface or the second end surface, a first through hole arranged so as not to include a central axis of the peripheral surface portion.

**[0008]** In addition, in the supporting member for heated tobacco according to claim 2, a plurality of the first through holes are, on the first end surface or the second end surface, provided along a peripheral direction.

**[0009]** In addition, in the supporting member for heated tobacco according to claim 3, the first through hole has at least in part, on the first end surface or the second end surface, an elliptic arc whose center is on a circle with a constant radius from a central axis of the peripheral surface portion.

**[0010]** In addition, in the supporting member for heated tobacco according to claim 4, the hole part has, on the first end surface or the second end surface, a part of the elliptic arc on an outer peripheral side.

**[0011]** In addition, in the supporting member for heated tobacco according to claim 5, the hole part has a second through hole penetrating between the first end surface and the second end surface and including a central axis of the peripheral surface portion.

**[0012]** In addition, in the supporting member for heated tobacco according to claim 6, in the peripheral surface portion, uneven parts having an uneven shape along a peripheral direction are formed over the entire length in the length direction from the first end surface to the second end surface.

**[0013]** In addition, in the supporting member for heated tobacco according to claim 7, a plurality of the uneven parts are formed over the entire periphery of the peripheral surface portion.

**[0014]** In addition, the cartridge for heated tobacco according to claim 8 includes a cigarette filling packed body, an inhalation opening, and the supporting member according to any one of claims 1 to 7 which is provided between the cigarette filling packed body and the inhalation opening.

# [Advantageous Effects of the Invention]

**[0015]** According to the supporting member for heated tobacco of the present invention, having a first through hole, even if an area of a hole part is enlarged a cigarette filling packed body can be supported surely, and when a cartridge for heated tobacco is held by a hand the supporting member can avoid being collapsed.

# [Brief Description of the Drawings]

## [0016]

Fig. 1 is a cross sectional view being cut with a plane including a central axis along the length direction of a cartridge for heated tobacco in the present embodiment.

Fig. 2 is a cross sectional view showing a usage form of the cartridge for heated tobacco.

Fig. 3 is a perspective view of a supporting member.

Fig. 4 is a view showing the front of a first end surface of the supporting member.

Fig. 5 is a perspective view of a supporting member of a first variation.

Fig. 6 is a cross sectional view of cutting the supporting member of the first variation provided on a cartridge for heated tobacco with a plane orthogonal to the length direction.

Fig. 7 is a view showing the front of a first end surface of a supporting member of a second variation.

Fig. 8 is a view showing the front of a first end surface of a supporting member of a third variation.

Fig. 9 is a view showing the front of a first end surface of a supporting member of a fourth variation.

Fig. 10 is a view showing the front of a first end surface of a supporting member of a fifth variation.

Fig. 11 is a view showing the front of a first end surface of a supporting member of a sixth variation.

# [Description of the Embodiments]

**[0017]** An embodiment of the present invention will be described in detail with reference to the drawings. Fig. 1 is a cross sectional view of a cartridge for heated tobacco 1 with a cigarette filling packed body 10 in the present embodiment. As shown in Fig. 1, in the cartridge for heated tobacco 1, the approximately cylindrical tobacco filling packed body 10 which is filled with a lot of tobacco fillings 20, a supporting member for heated tobacco 12 (hereinafter, simply referred to as a supporting member 12), and a filter 14 serving as an inhalation opening are arranged in the length direction and wrapped around by a sheet-shaped packaging member 16 to be integrally formed.

**[0018]** The elongated cigarette fillings 20 are bundled in the length direction and wrapped around by a sheet-shaped packaging body 25, and thus, the cigarette filling packed body 10 is formed to have an approximately cylindrical shape. The cigarette filling 20 is formed of a non-

tobacco plant. However, the cigarette filling 20 can be formed of a tobacco plant.

**[0019]** The cigarette filling 20 is formed by mixing a dried and crushed non-tobacco plant with an aerosol former for generating an aerosol, a microcrystalline cellulose, an additive for adding a flavor, a preservative, an adhesive, a thickener, or the like so as to form a sheet shape, and thereafter, cutting the sheet such that the sheet has a predetermined width and length. However, the cigarette filling 20 can be formed in a dust shape.

**[0020]** The supporting member 12 allows an air flow including an aerosol generated in the cigarette filling packed body 10 to flow to a side of the filter 14. A first end surface 30 of the supporting member 12 is in contact with an end surface of the cigarette filling packed body 10, and a second end surface 31 of the supporting member 12 is in contact with an end surface of the filter 14. The supporting member 12 has a hole part 40 extending from the first end surface 30 to the second end surface 31 and an air flow flows through the hole part 40. The filter 14 is a sponge-like porous body and is formed in a cylindrical shape.

**[0021]** In the present embodiment, the cartridge for heated tobacco 1 is formed to have a diameter of 6.5 to 4.5 mm and a length of 40 to 49 mm. In addition, the cigarette filling packed body 10 has a length of 11 to 13 mm. However, the cartridge for heated tobacco 1 and the cigarette filling packed body 10 may have dimensions other than these.

**[0022]** Fig. 2 is a cross sectional view showing a usage form of the cartridge for heated tobacco 1. The cartridge for heated tobacco 1 is used by being mounted on a heated tobacco body 2. The heated tobacco body 2 has an insertion section 51 into which the cartridge for heated tobacco 1 is inserted. The insertion section 51 includes a needle-shaped or blade-shaped heating unit 50 to be inserted into the cigarette filling 20 of the cartridge for heated tobacco 1. The heating unit 50 can generate an aerosol from the cigarette filling 20 by generating heat in a state of being inserted into the cigarette filling 20. In this state, a user inhales from the filter 14, and thus, can inhale an air flow including the aerosol.

**[0023]** The supporting member 12 will be described in detail. Fig. 3 is a perspective view of the supporting member 12. The supporting member 12 is a cylindrical member formed of resin. A kind of Silicon is a known example of the resin material forming the supporting member 12. However, the supporting member 12 may be formed of resin materials other than this, wood enhancing the cooling, or of materials such as metal (aluminum or the like) other than resin materials.

**[0024]** As shown in Fig. 3, the supporting member 12 has a first end surface 30, a second end surface 31, and a peripheral surface portion 32. The supporting member 12 has a hole part 40 penetrating from the first end surface 30 to the second end surface 31. The hole part 40 serves as a channel which allows an air flow including an aerosol generated in the cigarette filling packed body

10 to flow to a side of the filter 14.

**[0025]** Fig. 4 is a view showing the front of the first end surface 30 of the supporting member 12. The cross section of the supporting member 12 being cut with a plane orthogonal to the length direction has the same shape from the first end surface 30 to the second end surface 31. Thus, the cross section has the same shape as in Fig. 4.

**[0026]** As shown in Fig. 4, a hole part 40 has a first through hole 41 arranged on an outer peripheral portion so as not to include a central axis C of a peripheral surface portion 32. The first through hole 41 has an elliptic shape, with a longer shape in the peripheral direction than in the radial direction of the supporting member 12. Three of the first through holes 41 are provided along the radial direction. An ellipse center P of the first through hole 41 is arranged on a virtual circle V with a constant radius from the central axis C respectively. In addition, the ellipse center P is arranged with each interval of 120 degrees in the peripheral direction around the central axis C respectively. Thus, three of the first through holes 41 are arranged at equal intervals in the peripheral direction.

**[0027]** The first end surface 30 has a part of the hole part 40 as void with other part as solid, and this solid part is in contact with an end surface of the cigarette filling packed body 10. The cigarette filling packed body 10 receives force in the length direction when a heating unit 50 of a heated tobacco body 2 is inserted, thereby the solid part of the supporting member 12 that is in contact with it being able to support the cigarette filling packed body 10. The hole part 40 of the present embodiment, being arranged on an outer peripheral portion of the supporting member 12 so as not to include a central axis C of the peripheral surface portion 32 and having the first through hole 41 with a longer shape in the peripheral direction than in the radial direction of the supporting member 12, allows a thickness between an outer peripheral end of the first end surface 30 and an outer peripheral end of the first through hole 41 to be enlarged. Thus, the solid part of the outer peripheral portion of the first end surface 30 can be widened, thereby the cigarette filling packed body 10 being able to be supported surely. In addition, the solid part of the outer peripheral portion of the first end surface 30 being wide can prevent the shape from being collapsed when a part of the supporting member is held by a hand.

**[0028]** The area of the hole part 40 to the area of the first end surface 30 is calculated as porosity. The porosity can be set in the range of 50% or less, or of 75% or more. Preferably, the porosity is set at 35 to 50%. The porosity in Fig. 4 is 34.3%. By forming the first through hole 41 longer in the peripheral direction of the supporting member 12, the porosity can be secured and the fluidity of the air flow can be enhanced, and by forming a thick solid part on an outer peripheral portion a retention of the cigarette filling packed body 10 can be enhanced.

**[0029]** Next, a first variation of the supporting member will be described. Fig. 5 is a perspective view of a sup-

porting member 13 of the first variation. As shown in Fig. 5, the supporting member 13 has a first end surface 30, a second end surface 31, and a peripheral surface portion 32, and a hole part 40 penetrating from the first end surface 30 to the second end surface 31 being formed. The hole part 40 has the same shape as the supporting member 12 shown in Fig. 3 and 4.

**[0030]** The supporting member 13 in Fig. 5 has a lot of uneven parts 45 on the peripheral surface portion 32. The uneven parts 45 have a finely uneven shape along the peripheral direction of the supporting member 13. In addition, the uneven parts 45 are formed over the entire length in the length direction from the first end surface 30 to the second end surface 31 of the peripheral surface portion 32 of the supporting member 13.

**[0031]** Fig. 6 is a cross sectional view of cutting the supporting member 13 of the first variation provided on the cartridge for heated tobacco 1 with a plane orthogonal to the length direction. As shown in Fig. 6, between a packaging member 16 wrapped around an outer periphery of the supporting member 13 and the peripheral surface portion 32 of the supporting member 13, a lot of small void portions are formed by the uneven parts 45. These void portions are formed continuously from the first end surface 30 to the second end surface 31 of the supporting member 13, allowing a part of the air flow from the cigarette filling packed body 10 to the filter 14 to flow. Thus, a channel of the air flow can be added to the hole part 40 to extend, allowing the fluidity to be enhanced.

**[0032]** In addition, by forming the uneven parts 45 on the peripheral surface portion 32, in the manufacture of the cartridge for heated tobacco 1, the supporting member 13 can be held by an assembling machine and the manufacture can be made easily.

**[0033]** Next, a second variation of the supporting member will be described. Fig. 7 is a view showing the front of a first end surface 61 of a supporting member 60 of the second variation. The supporting member 60 of the variation has a hole part 63 in a different form from the supporting member 12 in Fig. 3. As shown in Fig. 7, the hole part 63 doesn't include a central axis C and has a first through hole 64 longer in the peripheral direction than in the radial direction.

**[0034]** The first through hole 64 has an elliptic arc on a side facing a peripheral surface portion 62 of the supporting member 60, and has a semicircular shape with a straight part T on a side facing the central axis C of the supporting member 60. A center position P of an ellipse with the elliptic arc S is arranged on a virtual circle V with a constant radius from the central axis C of the peripheral surface portion 62. Four of the first through holes 64 are arranged along the peripheral direction, with each center position P on the virtual circle V arranged with an interval of 90 degrees from each other.

**[0035]** The first through hole 64 has the elliptic arc S on an outer peripheral side facing the peripheral surface portion 62, thereby a thickness between an outer periphery of the first through hole 64 and the peripheral surface

portion 62 can be secured sufficiently. In the case of Fig. 4, the whole of the first through hole 41 is an elliptic arc, but in the case of Fig. 7, a part of the first through hole 64 is an elliptic arc. It is preferable that the first through hole at least has an elliptic arc in the range of 60 degrees around the center position P of the ellipse.

**[0036]** In addition, the hole part 63 has a second through hole 65 including the central axis of the peripheral surface portion 62. The second through hole 65 has a circular shape around the central axis C. By providing the second through hole 65, the porosity of the supporting member 60 can be improved.

**[0037]** Next, a third variation of the supporting member will be described. Fig. 8 is a view showing the front of a first end surface 71 of a supporting member 70 of the third variation. The supporting member 70 of the variation also has a hole part 73 in a different form from the supporting member 12 in Fig. 3. As shown in Fig. 8, the hole part 73 has a first through hole 74 which doesn't include a central axis C and a second through hole 75 which includes the central axis C.

**[0038]** Four of the first through holes 74, with a circular shape, are arranged with each interval of 90 degrees in the peripheral direction. In addition, the second through hole 75, with a circular shape, is arranged around the central axis C. In the variation, by decreasing a diameter of the first through hole 74 a thickness of the outer peripheral surface portion of the supporting member 70 is secured, and by increasing the number of the first through holes 74 the porosity is secured. The porosity in the variation is 24.8%.

**[0039]** Next, a fourth variation of the supporting member will be described. Fig. 9 is a view showing the front of a first end surface 81 of a supporting member 80 of the fourth variation. The supporting member 80 of the variation also has a hole part 83 in a different form from the supporting member 12 in Fig. 3. As shown in Fig. 9, the hole part 83 has a first through hole 84 which doesn't include a central axis C and has a second through hole 85 which includes the central axis C.

**[0040]** Five of the first through hole 84, with a circular shape, are arranged with each interval of 72 degrees. In addition, the second through hole 85, with a circular shape, is arranged around the central axis C. In the variation, by increasing the number of the first through holes 84 furthermore the porosity is secured. The porosity in the variation is 29.7%.

**[0041]** Next, a fifth variation of the supporting member will be described. Fig. 10 is a view showing the front of a first end surface 91 of a supporting member 90 of the fifth variation. The supporting member 90 of the variation also has a hole part 93 in a different form from the supporting member 12 in Fig. 3. As shown in Fig. 10, the hole part 93 has a first through hole 94 which doesn't include a central axis C and a second through hole 95 which includes the central axis C.

**[0042]** In the first through hole 94, an outer peripheral side facing the peripheral surface portion 92 is arcuate

on the outer peripheral side, and a side of the central axis C is also arcuate on the outer peripheral side. The center position of a circle with the circular arc of the outer peripheral side of the first through hole 94 has each interval of 72 degrees similarly to the fourth variation, five of the first through holes 94 being arranged. The second through hole 95, with a circular shape, is arranged around the central axis C. The porosity in the variation is 27.4%.

**[0043]** Next, a sixth variation of the supporting member will be described. Fig. 11 is a view showing the front of a first end surface 101 of a supporting member 100 of the sixth variation. The supporting member 100 of the variation also has a hole part 103 in a different form from the supporting member 12 in Fig. 3. As shown in Fig. 11, the hole part 103 has, in the radial direction, three of the first through holes 104 which don't include a central axis C of the peripheral surface portion 102. The first through hole 104 has a circular shape whose center position is arranged with each interval of 120 degrees in the peripheral direction of the first end surface 101. The porosity in the variation is 34.5%.

**[0044]** As mentioned above, the embodiment of the present invention is described. However, the application of the present invention is not restricted to this embodiment, and the present invention can be variously applied within a range of a technical idea. For example, in the present embodiment, only the support member 12 is provided between the cigarette filling packed body 10 and the filter 14. However, a cooling member may be provided between the support member 12 and the filter 14.

**[0045]** Moreover, the first through hole longer in the peripheral direction than in the radial direction may have a non-ellipse shape.

**[0046]** Moreover, the supporting 13 member having the uneven parts 45 on the peripheral surface portion 32 is described as an example of the variation of the supporting member 12 shown in Fig. 3. However, uneven parts may be provided on a peripheral surface portion of the supporting member of the second to sixth variation.

[Reference Signs List]

**[0047]**

- |    |    |                               |
|----|----|-------------------------------|
| 45 | 1  | cartridge for heated tobacco  |
|    | 2  | heated tobacco body           |
|    | 10 | cigarette filling packed body |
|    | 12 | supporting member             |
|    | 14 | filter                        |
| 50 | 16 | packaging member              |
|    | 20 | cigarette filling             |
|    | 25 | packaging body                |
|    | 30 | first end surface             |
|    | 31 | second end surface            |
| 55 | 32 | peripheral surface portion    |
|    | 40 | hole part                     |
|    | 41 | first through hole            |
|    | 45 | uneven parts                  |

50 heating unit  
51 insertion section

rette filling packed body; an inhalation opening; and the supporting member according to any one of claims 1 to 7 which is provided between the cigarette filling packed body and the inhalation opening.

## Claims

5

1. A supporting member for heated tobacco which is provided between a cigarette filling packed body and an inhalation opening of a cartridge for heated tobacco, the supporting member for heated tobacco comprising:
 

a first end surface; a second end surface; and a peripheral surface portion: wherein

a hole part penetrating between the first end surface and the second end surface is formed, and the hole part has, on the first end surface or the second end surface, a first through hole arranged so as not to include a central axis of the peripheral surface portion.
2. The supporting member for heated tobacco according to claim 1, wherein a plurality of the first through holes are, on the first end surface or the second end surface, provided in the peripheral direction.
3. The supporting member for heated tobacco according to claim 1 or 2, wherein the first through hole has at least in part, on the first end surface or the second surface, an elliptic arc whose center is on a circle with a constant radius from a central axis of the peripheral surface portion.
4. The supporting member for heated tobacco according to claim 3, wherein the hole part has, on the first end surface or the second end surface, a part of the elliptic arc on an outer peripheral side.
5. The supporting member for heated tobacco according to any one of claims 1 to 4, wherein the hole part has a second through hole penetrating between the first end surface and the second end surface and including a central axis of the peripheral surface portion.
6. The supporting member for heated tobacco according to any one of claims 1 to 5, wherein in the peripheral surface portion uneven parts having an uneven shape along the peripheral direction are formed over the entire length in the length direction from the first end surface to the second end surface.
7. The supporting member for heated tobacco according to claim 6, wherein a plurality of the uneven parts are formed over the entire periphery of the peripheral surface portion.
8. A cartridge for heated tobacco comprising: a ciga-

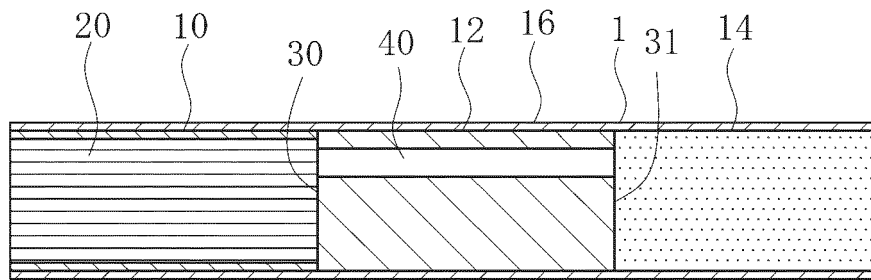


Fig. 1

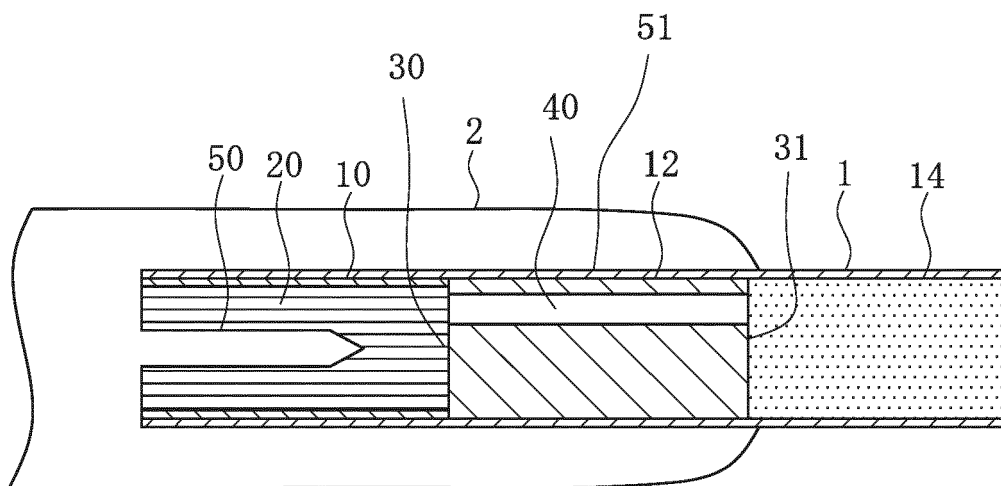
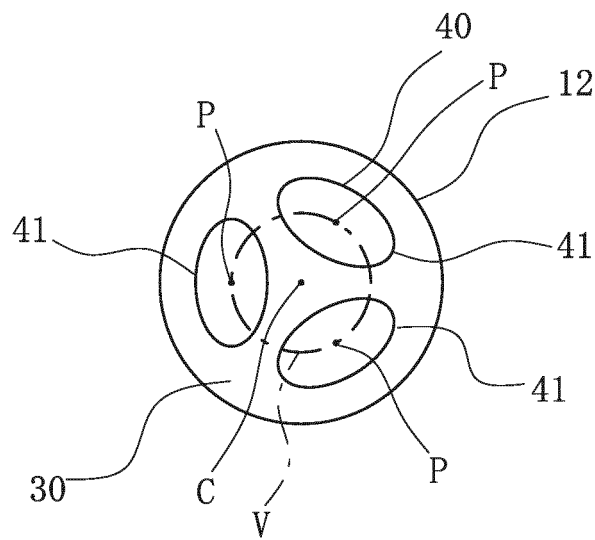
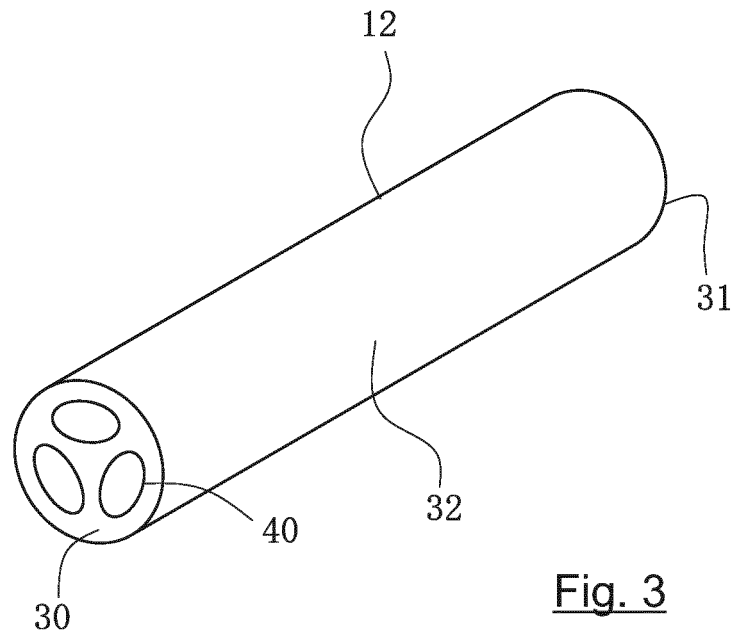


Fig. 2





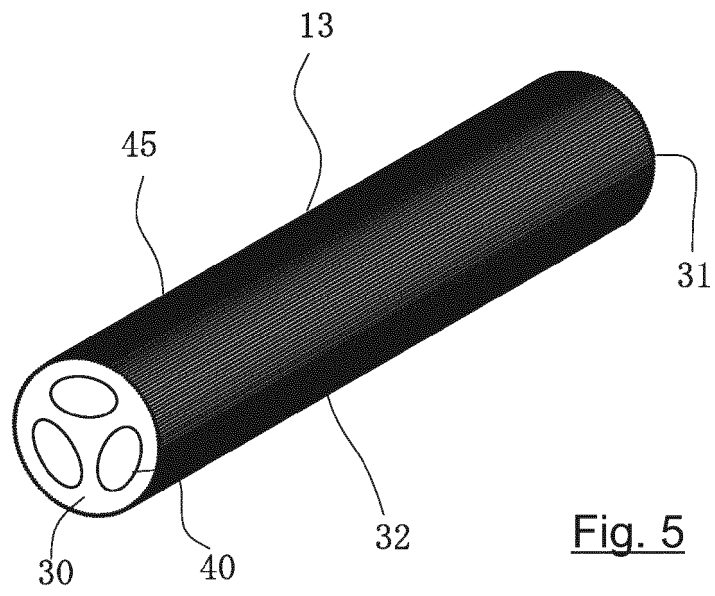


Fig. 5

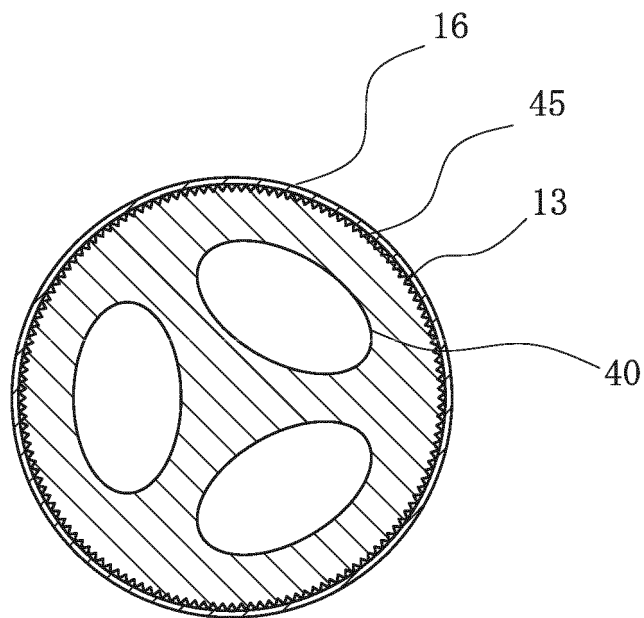


Fig. 6

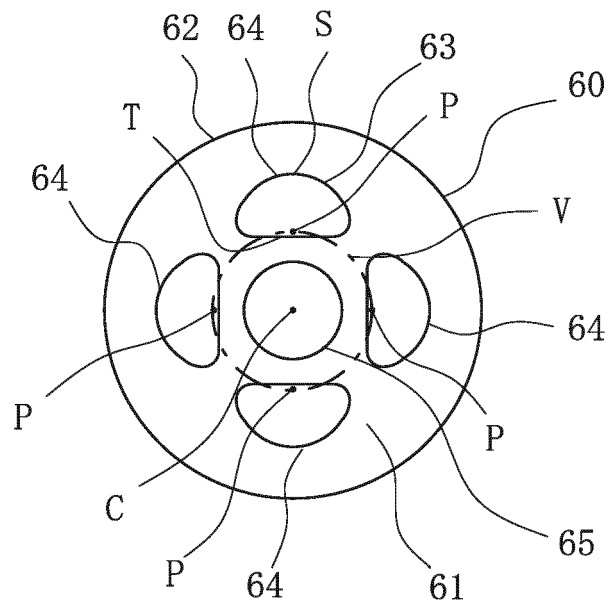


Fig. 7

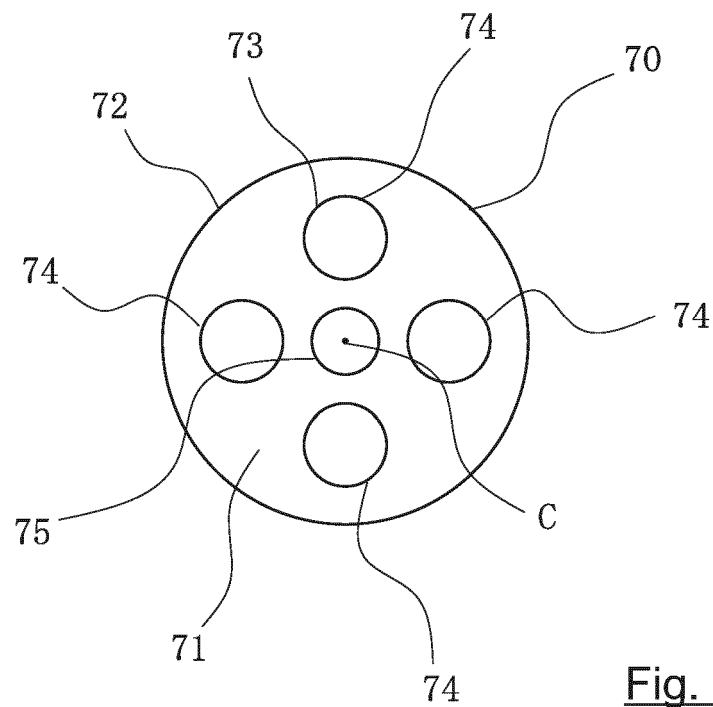


Fig. 8

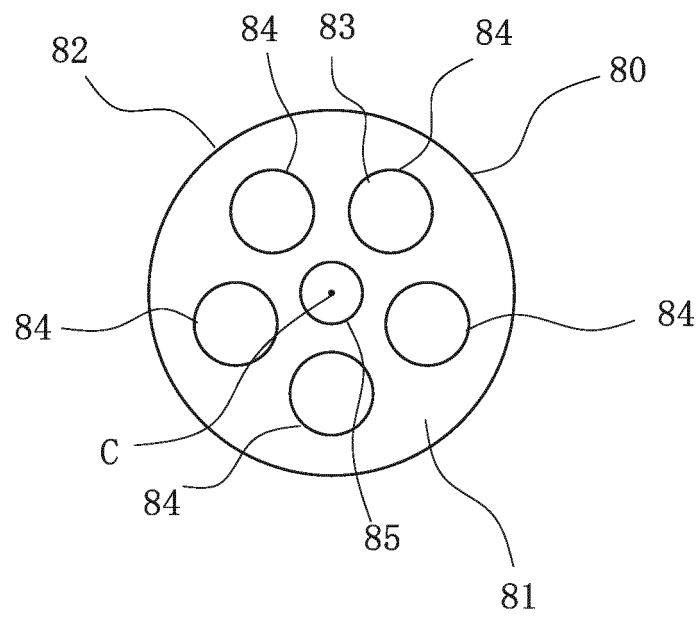


Fig. 9

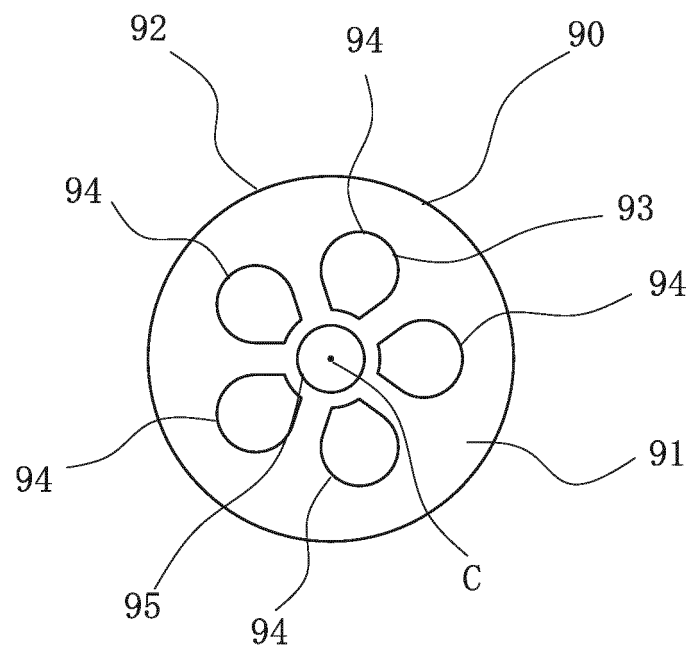


Fig. 10

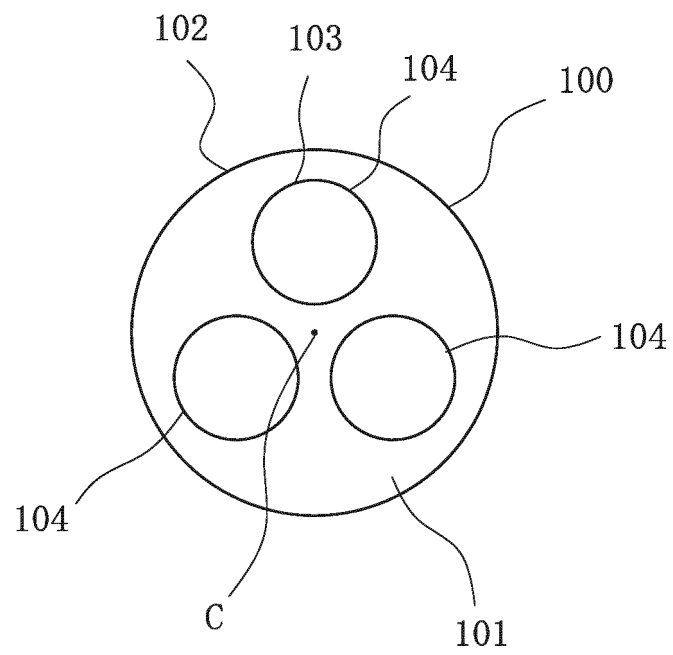


Fig. 11

5

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2019/049122

## A. CLASSIFICATION OF SUBJECT MATTER

Int.Cl. A24D1/20 (2020.01) i, A24D1/04 (2006.01) i

FI: A24F47/00, A24D1/04

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

10

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int.Cl. A24D1/00-3/18, A24F40/00-40/95, A24F47/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan 1922-1996

Published unexamined utility model applications of Japan 1971-2020

Registered utility model specifications of Japan 1996-2020

Published registered utility model applications of Japan 1994-2020

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

20

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                           | Relevant to claim No. |
|-----------|------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| X         | WO 2019/158334 A1 (PHILIP MORRIS PRODUCTS S.A.)                                                                              | 1-2, 5, 8             |
| Y         | 22.08.2019 (2019-08-22), page 8, line 1 to page 9, line 14, fig. 1, 2                                                        | 3-8                   |
| X         | JP 6516907 B1 (TOA INDUSTRY CO., LTD.) 22.05.2019                                                                            | 1-2, 8                |
| Y         | (2019-05-22), paragraphs [0024], [0092], fig. 1,                                                                             | 6-8                   |
| A         | 7(c)                                                                                                                         | 3-5                   |
| Y         | CN 110150736 A (CHINA TOBACCO YUNNAN IND CO., LTD.) 23.08.2019 (2019-08-23), paragraphs [0006], [0007], fig. 1, 6            | 3-8                   |
| Y         | WO 2019/153883 A1 (SHANGHAI JUHUA TECH CO., LTD.) 15.08.2019 (2019-08-15), page 3, line 17 to page 4, line 9, fig. 1-3       | 6-8                   |
| A         | JP 2017-518041 A (BRITISH AMERICAN TOBACCO (INVESTMENTS) LIMITED) 06.07.2017 (2017-07-06), paragraphs [0038], [0039], fig. 1 | 1-8                   |

40



Further documents are listed in the continuation of Box C.



See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"G" document member of the same patent family

45

Date of the actual completion of the international search

16.01.2020

Date of mailing of the international search report

25.02.2020

50

Name and mailing address of the ISA/

Japan Patent Office

3-4-3, Kasumigaseki, Chiyoda-ku,

Tokyo 100-8915, Japan

Authorized officer

Telephone No.

55

Form PCT/ISA/210 (second sheet) (January 2015)

| INTERNATIONAL SEARCH REPORT          |                                             | International application No.                                                                                                                                                                |
|--------------------------------------|---------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Information on patent family members |                                             | PCT/JP2019/049122                                                                                                                                                                            |
| 5                                    | WO 2019/158334 A1 22.08.2019 (Family: none) |                                                                                                                                                                                              |
| 10                                   | JP 6516907 B1 22.05.2019 (Family: none)     |                                                                                                                                                                                              |
|                                      | CN 110150736 A 23.08.2019 (Family: none)    |                                                                                                                                                                                              |
|                                      | WO 2019/153883 A1 15.08.2019 (Family: none) |                                                                                                                                                                                              |
| 15                                   | JP 2017-518041 A 06.07.2017                 | US 2017/0042221 A1<br>paragraphs [0053], [0054], fig. 1<br>US 2019/0320725 A1<br>JP 2019-050807 A<br>WO 2015/166245 A2<br>EP 3136885 A2<br>CN 106255431 A<br>TW 201608200 A<br>RU 2644045 C1 |
| 20                                   |                                             |                                                                                                                                                                                              |
| 25                                   |                                             |                                                                                                                                                                                              |
| 30                                   |                                             |                                                                                                                                                                                              |
| 35                                   |                                             |                                                                                                                                                                                              |
| 40                                   |                                             |                                                                                                                                                                                              |
| 45                                   |                                             |                                                                                                                                                                                              |
| 50                                   |                                             |                                                                                                                                                                                              |
| 55                                   |                                             |                                                                                                                                                                                              |

Form PCT/ISA/210 (patent family annex) (January 2015)

**REFERENCES CITED IN THE DESCRIPTION**

*This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.*

**Patent documents cited in the description**

- JP 3212228 U [0003]