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(54) **FILTER SEGMENT, AEROSOL-GENERATING ARTICLE, AND SYSTEM COMPRISING SAME**

(57) A filter segment may include an outer portion including a filter, and an inner portion disposed inside the outer portion and including an airflow barrier surrounded by the filter and configured to retard or block airflow.

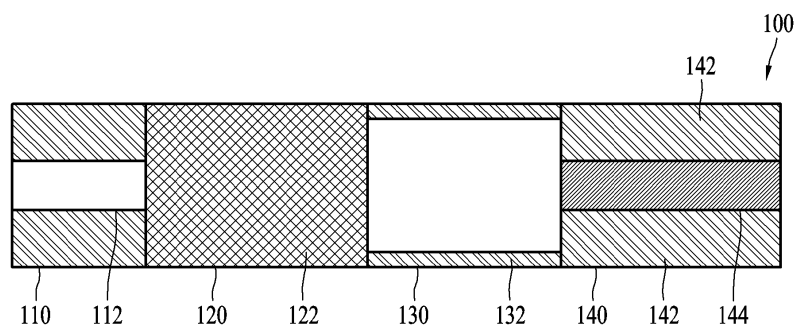


FIG. 2

Description

Technical Field

[0001] The disclosure relates to a filter segment, an aerosol generating article, and a system including the same.

Background Art

[0002] Aerosol generating devices that generate an aerosol in a non-burning manner from an aerosol generating article (e.g., a cigarette) are being developed. For example, Korean Patent Publication No. 10-2019-0119465 discloses an aerosol generating device. The above description is information acquired during the course of conceiving the present disclosure, or already possessed at the time, and is not necessarily art publicly known before the present application was filed.

Disclosure of the Invention

Technical Goals

[0003] One aspect of the disclosure may provide a filter segment that may distribute heat evenly across the filter, and an aerosol generating article.

Technical Solutions

[0004] According to an embodiment, a filter segment for an aerosol generating article includes an outer portion including a filter, and an inner portion disposed inside the outer portion and including an airflow barrier surrounded by the filter and configured to retard or block airflow.

[0005] According to an embodiment, the airflow barrier may be disposed in a central portion of the filter segment.

[0006] According to an embodiment, the airflow barrier may extend in a longitudinal direction of the filter segment.

[0007] According to an embodiment, the airflow barrier may include a solid material.

[0008] According to an embodiment, the solid material may include at least one of paper thread, silicone thread, paper filter, or acetate tow, or a combination thereof.

[0009] According to an embodiment, a diameter of the airflow barrier may be substantially equal to or less than half a diameter of the filter segment.

[0010] According to an embodiment, an aerosol generating article includes a first segment including a medium, and a second segment disposed downstream of the first segment, wherein the second segment may include a filter segment, wherein the filter segment may include an outer portion including a filter, and an inner portion disposed inside the outer portion and including an airflow barrier surrounded by the filter and configured to retard or block airflow.

[0011] According to an embodiment, an aerosol gen-

erating system includes an aerosol generating article including a first segment including a medium and a second segment disposed downstream of the first segment, wherein the second segment may include a filter segment, wherein the filter segment may include an outer portion including a filter and an inner portion disposed inside the outer portion and including an airflow barrier surrounded by the filter and configured to retard or block airflow, and an aerosol generating device including a first housing, a second housing disposed within the first housing and configured to accommodate the aerosol generating article, and a heater disposed around the second housing and configured to heat the first segment.

Effects

[0012] According to an embodiment, the imbalance of airflow in a filter segment may be reduced or prevented. According to an embodiment, a contact area between the airflow and the filter within the filter segment may be increased. The effects of the filter segment and an aerosol generating article according to an embodiment are not limited to the above-mentioned effects, and other unmentioned effects can be clearly understood from the following description by one of ordinary skill in the art.

Brief Description of Drawings

[0013] The foregoing and other aspects, features, and advantages of certain embodiments of the disclosure will become apparent from the following detailed description with reference to the accompanying drawings.

FIG. 1 is a diagram of an aerosol generating system according to an embodiment.

FIG. 2 is a diagram of an aerosol generating article according to an embodiment.

FIG. 3 is a diagram of a filter segment according to an embodiment.

FIG. 4 is a diagram of a filter segment according to an embodiment.

Mode for Carrying Out the Invention

[0014] Hereinafter, examples will be described in detail with reference to the accompanying drawings. However, various alterations and modifications may be made to the examples. Here, the examples are not construed as limited to the disclosure. The examples should be understood to include all changes, equivalents, and replacements within the idea and the technical scope of the disclosure.

[0015] The terminology used herein is for the purpose of describing particular examples only and is not to be limiting of the examples. The singular forms "a", "an", and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms "comprises/compris-

ing" and/or "includes/including" when used herein, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components and/or groups thereof.

[0016] Unless otherwise defined, all terms including technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which examples belong. Terms defined in dictionaries generally used should be construed to have meanings matching with contextual meanings in the related art and are not to be construed as an ideal or excessively formal meaning unless otherwise defined herein.

[0017] When describing the embodiments with reference to the accompanying drawings, like reference numerals refer to like components and a repeated description related thereto will be omitted. In the description of embodiments, detailed description of well-known related structures or functions will be omitted when it is deemed that such description will cause ambiguous interpretation of the present disclosure.

[0018] In addition, terms such as first, second, A, B, (a), (b), and the like may be used to describe components of the embodiments. Each of these terms is not used to define an essence, order or sequence of a corresponding component but used merely to distinguish the corresponding component from other component(s). It should be noted that if one component is described as being "connected", "coupled" or "joined" to another component, the former may be directly "connected", "coupled", and "joined" to the latter or "connected", "coupled", and "joined" to the latter via another component.

[0019] The same name may be used to describe an element included in the embodiments described above and an element having a common function. Unless disclosed to the contrary, the descriptions of any one embodiment may be applied to other embodiments and thus, duplicated descriptions will be omitted.

[0020] The term "aerosol generating material" used herein refers to a material from which an aerosol may be generated. The aerosol may include a volatile compound. The aerosol generating material may be solid or liquid. For example, a solid aerosol generating material may include a solid material that is based on tobacco raw materials, such as reconstituted tobacco sheets, cut tobacco leaves, reconstituted tobacco, and the like, and a liquid aerosol generating material may include a liquid composition that is based on nicotine, tobacco extracts, and/or various flavoring agents. The aerosol generating material may include an aerosol former to stably form visible smoke and/or an aerosol.

[0021] The term "aerosol generating device" used herein refers to a device that generates an aerosol using an aerosol generating article such that the aerosol may be inhaled through the mouth of a user directly to the lungs of the user.

[0022] The term "upstream" or "upstream direction" used herein refers to a direction away from the mouth of a user and the term "downstream" or "downstream direction" refers to a direction toward the mouth of a user. The terms "upstream" and "downstream" may be used to describe relative positions of components of an aerosol generating article.

[0023] The term "puff" used herein refers to inhalation by a user. Inhalation refers to drawing in through the mouth or nose of a user into the oral cavity, nasal cavity, or lungs of the user.

[0024] The "longitudinal direction" used herein refers to a direction corresponding to the longitudinal axis of an aerosol generating article.

[0025] FIG. 1 is a diagram of an aerosol generating system according to an embodiment. FIG. 2 is a diagram of an aerosol generating article according to an embodiment. FIG. 3 is a diagram of a filter segment according to an embodiment. FIG. 4 is a diagram of a filter segment according to an embodiment.

[0026] Referring to FIGS. 1 to 4, an aerosol generating system 10 may include an aerosol generating article 100 including an aerosol generating material, and an aerosol generating device 200 configured to generate an aerosol from the aerosol generating article 100.

[0027] In an embodiment, the aerosol generating article 100 may include a plurality of segments 110, 120, 130, and 140. For example, the aerosol generating article 100 may include, from upstream to downstream, a first segment 110, a second segment 120, a third segment 130, and a fourth segment 140.

[0028] In an embodiment, the first segment 110 may include a filter. In an embodiment, the first segment 110 may include a cellulose acetate tow filter. In an embodiment, the first segment 110 may include a cavity 112. The cavity 112 may be at least partially surrounded by the cellulose acetate tow filter. The cavity 112 may extend in the longitudinal direction of the first segment 110. The cavity 112 may contact the second segment 120. The first segment 110 may have a length of about 7 millimeters (mm).

[0029] In an embodiment, the second segment 120 may include a medium 122. The medium 122 may include aerosol generating materials, fragrance materials, and/or any other material suitable for generating an aerosol. The medium 122 may extend between the first segment 110 and the third segment 130. The medium 122 may at least partially contact the first segment 110 and/or the third segment 130. The second segment 120 may have a length of about 15 mm.

[0030] In an embodiment, the third segment 130 may include a filter. For example, the third segment 130 may include a cellulose acetate filter. In an embodiment, the third segment 130 may include a paper sleeve 132 configured to cool the aerosol and/or airflow. The paper sleeve 132 may be at least partially surrounded by the cellulose acetate tow filter. The paper sleeve 132 may extend between the second segment 120 and the fourth

segment 140. The paper sleeve 132 may contact the second segment 120 and/or the fourth segment 140. The third segment 130 may have a length of about 12 mm.

[0031] In an embodiment, the fourth segment 140 may include a filter 142. For example, the filter 142 may include a cellulose acetate filter. The filter 142 may be disposed on the outer portion (e.g., the outside) of the fourth segment 140. The filter 142 may include a first end portion 142A (e.g., the left end portion in FIG. 3) facing (e.g., contacting) the third segment 130, a second end portion 142B (e.g., the right end portion in FIG. 3) opposite to the first end portion 142A, and a first extension 142C between the first end portion 142A and the second end portion 142B. The fourth segment 140 may have a length of about 14 mm.

[0032] In an embodiment, the fourth segment 140 may include an airflow barrier 144 configured to retard or block airflow passing through the fourth segment 140 from upstream to downstream. The airflow barrier 144 may be at least partially surrounded by the filter 142 and may be disposed on the inner portion (e.g., the interior) of the fourth segment 140. The airflow barrier 144 may be disposed in a central portion of the fourth segment 140.

[0033] In an embodiment, the airflow barrier 144 may extend in the longitudinal direction of the fourth segment 140. In some embodiments, the airflow barrier 144 may include a first end portion 144A disposed on one end portion (e.g., the first end portion 142A) of the fourth segment 140, a second end portion 144B disposed on the other end portion (e.g., the second end portion 142B) of the fourth segment 140, and an extension 144C between the first end portion 144A and the second end portion 144B.

[0034] In an embodiment, the airflow barrier 144 may have a cylindrical shape with a substantially circular or elliptical cross-section. In an embodiment, the airflow barrier 144 may have a substantially constant diameter in the longitudinal direction.

[0035] In some embodiments, the airflow barrier 144 may have a diameter substantially equal to or less than half the diameter of the aerosol generating article 100 (e.g., the diameter of the fourth segment 140). For example, the diameter of the aerosol generating article 100 (e.g., the diameter of the fourth segment 140) may be about 7 mm, and the airflow barrier 144 may have a diameter of about 1 mm to about 3.5 mm. The airflow barrier 144 having the same size as described above may increase the volume in which the airflow contacts the filter 142.

[0036] In an embodiment, the airflow barrier 144 may have a variable diameter in the longitudinal direction. For example, the airflow barrier 144 may have a tapered shape having a first diameter upstream of the fourth segment 140 and a second diameter downstream of the fourth segment 140, wherein the second diameter is less than the first diameter. The tapered shape may have, for example, a linear profile or a non-linear profile (e.g., an exponential profile).

[0037] In an embodiment, the airflow barrier 144 may include a solid material. For example, the solid material may include a paper thread, silicone thread, paper filter, cellulose acetate tow, and/or other solid materials. A thread-based solid material including a paper thread and silicone thread may have a substantially occluded structure that blocks airflow. A filter-based solid material including a paper filter and acetate tow may be designed to have greater draw resistance than the filter 142 and may reduce the movement of airflow through the solid material rather than the filter 142.

[0038] In an embodiment, the airflow barrier 144 may increase a contact area between the airflow and the filter 142 and increase the heat dissipation of the fourth segment 140, to reduce the temperature of the airflow reaching the mouth of a user. The airflow barrier 144 may distribute the imbalanced airflow centering on the airflow barrier 144 between the first end portion 142A and the second end portion 142B of the filter 142 in the radial direction of the airflow barrier 144.

[0039] In an embodiment, the aerosol generating device 200 may include a first housing 210, a second housing 220, a heater 230, and a controller 240.

[0040] In an embodiment, the first housing 210 may form the exterior of the aerosol generating device 200. The second housing 220 may be disposed within the first housing 210 and may be configured to at least partially accommodate the aerosol generating article 100.

[0041] In an embodiment, the heater 230 may be configured to heat the aerosol generating article 100 disposed within the second housing 220. For example, the heater 230 may be configured to heat the first segment 110.

[0042] In an embodiment, the heater 230 may be configured to surround the second housing 220. In an embodiment, the heater 230 may be disposed in an upstream portion (e.g., the first portion) of the second housing 220 as viewed in the direction of the flow stream of air.

[0043] In an embodiment, the heater 230 may include a resistor. For example, the heater 230 may include an electrically insulating substrate (for example, a substrate formed of polyimide), an electrically conductive track, and a heating element that generates heat as current flows through the electrically conductive track.

[0044] In an embodiment, the heater 230 may include a coil. At least a portion of the second housing 220 may include a susceptor material, and the heater 230 may heat the areas within the second housing 220 by being electromagnetically coupled with the susceptor material of the second housing 220.

[0045] In an embodiment, the controller 240 may be configured to control the operation of the heater 230. The controller 240 may control the temperature of the heater 230. The controller 240 may determine the operation start time of the heater 230. The controller 240 may determine the operation end point of the heater 230. The controller 240 may be configured to control the operation of the heater 230 based on a received signal (e.g., a signal of

a sensor).

[0046] In an embodiment, the controller 240 may be implemented by a processor. The controller 240 may be implemented as an array of a plurality of logic gates, or may be implemented as a combination of a microprocessor and a memory in which a program executable by the microprocessor is stored.

[0047] In an embodiment not shown, the aerosol generating device 200 may include a sensor configured to detect various characteristics of the aerosol generating article 100. The sensor may be configured to detect whether the aerosol generating article 100 is disposed in a predetermined position within the second housing 220. The sensor may be configured to detect the amount of aerosol generating material (e.g., nicotine) within the aerosol generating article 100. The sensor may include a puff sensor configured to detect the number of puffs of the user. The sensor may include at least one temperature sensor configured to detect the temperature of the heater 230. The sensor may include at least one temperature sensor configured to detect the temperature of the first segment 110, the temperature of the second segment 120, the temperature of the third segment 130, and/or the temperature of the fourth segment 140.

[0048] Any of the embodiment(s) described herein may be used in combination with any other embodiment(s) described herein.

[0049] While this disclosure includes specific embodiment, it will be apparent to one of ordinary skill in the art that various changes in form and details may be made in these embodiments without departing from the spirit and scope of the claims and their equivalents. The embodiments described herein are to be considered in a descriptive sense only, and not for purposes of limitation. Descriptions of features or aspects in each embodiment are to be considered as being applicable to similar features or aspects in other embodiments. For example, suitable results may be achieved if the described techniques are performed in a different order, and/or if components in a described system, architecture, device, or circuit are combined in a different manner, or replaced or supplemented by other components or their equivalents.

[0050] Therefore, other implementations, other embodiments, and/or equivalents of the claims are within the scope of the following claims.

Claims

1. A filter segment for an aerosol generating article, the filter segment comprising:

an outer portion comprising a filter; and
an inner portion disposed inside the outer portion and comprising an airflow barrier surrounded by the filter and configured to retard or block airflow.

2. The filter segment of claim 1, wherein the airflow barrier is disposed in a central portion of the filter segment.

3. The filter segment of claim 1, wherein the airflow barrier extends in a longitudinal direction of the filter segment.

4. The filter segment of claim 1, wherein the airflow barrier comprises a solid material.

5. The filter segment of claim 4, wherein the solid material comprises at least one of paper thread, silicone thread, paper filter, or acetate tow, or a combination thereof.

6. The filter segment of claim 1, wherein a diameter of the airflow barrier is substantially equal to or less than half a diameter of the filter segment.

7. An aerosol generating article comprising:

a first segment comprising a medium; and
a second segment disposed downstream of the first segment,
wherein the second segment comprises a filter segment,
wherein the filter segment comprises:

an outer portion comprising a filter; and
an inner portion disposed inside the outer portion and comprising an airflow barrier surrounded by the filter and configured to retard or block airflow.

8. An aerosol generating system comprising:

an aerosol generating article comprising a first segment comprising a medium and a second segment disposed downstream of the first segment, wherein the second segment comprises a filter segment, wherein the filter segment comprises an outer portion comprising a filter and an inner portion disposed inside the outer portion and comprising an airflow barrier surrounded by the filter and configured to retard or block airflow; and
an aerosol generating device comprising a first housing, a second housing disposed within the first housing and configured to accommodate the aerosol generating article, and a heater disposed around the second housing and configured to heat the first segment.

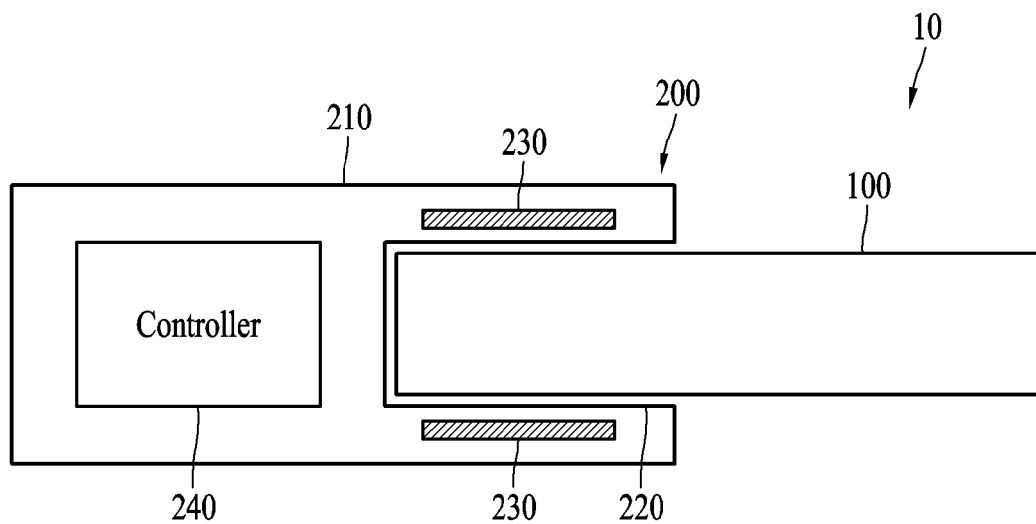


FIG. 1

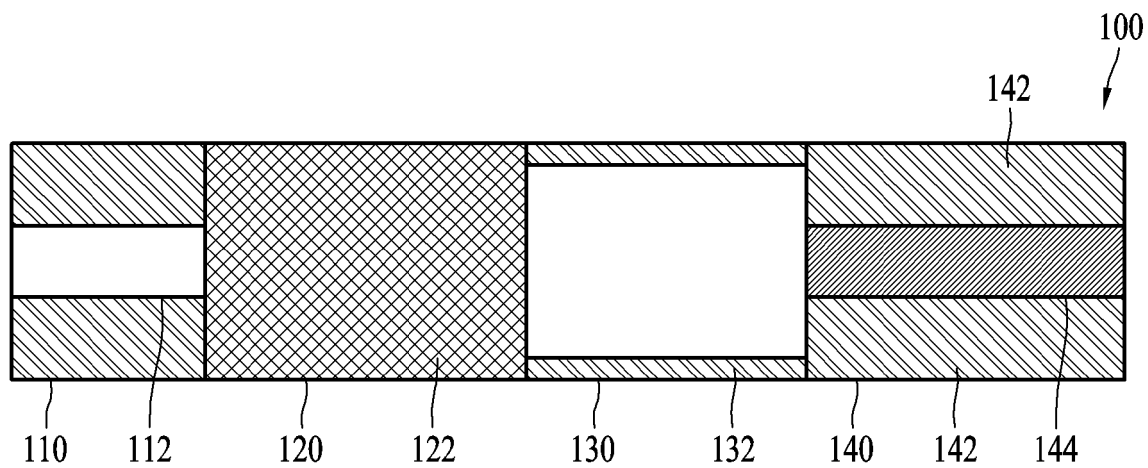


FIG. 2

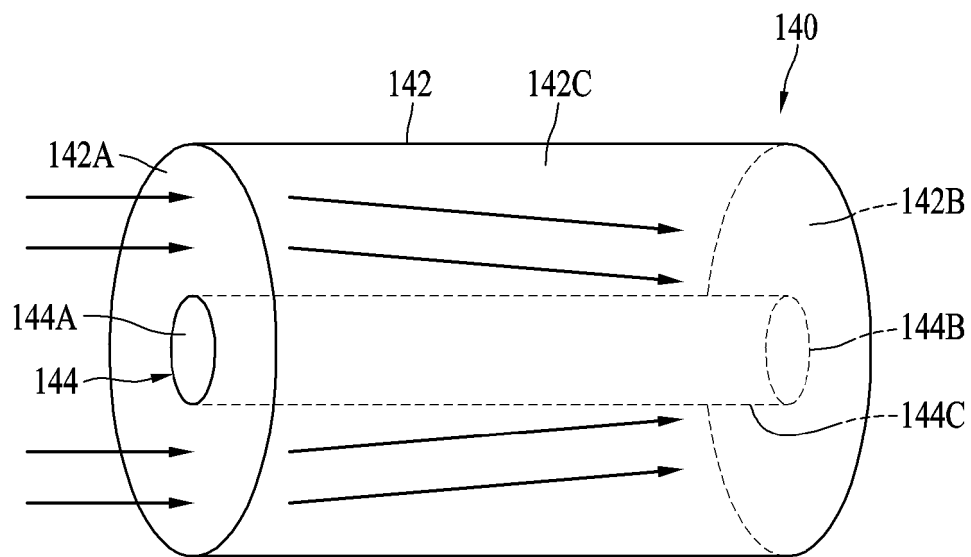


FIG. 3

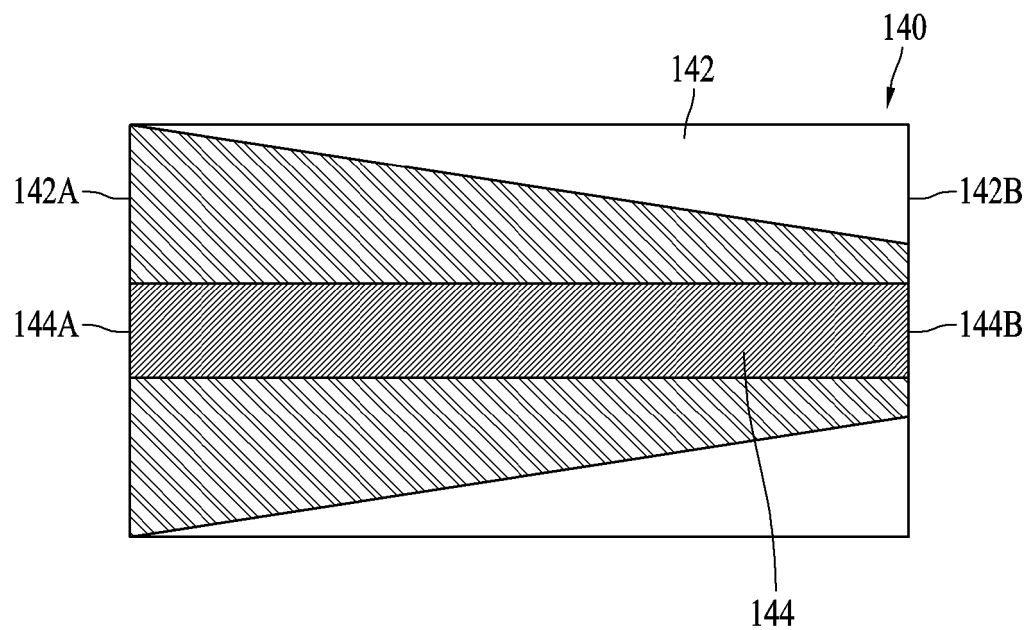


FIG. 4

INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2022/016515

A. CLASSIFICATION OF SUBJECT MATTER

A24D 3/04(2006.01)i; A24D 3/02(2006.01)i; A24D 3/06(2006.01)i; A24D 3/08(2006.01)i; A24D 1/04(2006.01)i;
A24D 3/17(2020.01)i; A24F 40/46(2020.01)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)

A24D 3/04(2006.01); A24C 5/00(2006.01); A24D 1/00(2006.01); A24D 3/06(2006.01); A24F 40/10(2020.01);
A24F 40/40(2020.01); A24F 40/51(2020.01); A24F 40/60(2020.01); A24F 47/00(2006.01)

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

Korean utility models and applications for utility models: IPC as above
Japanese utility models and applications for utility models: IPC as above

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

eKOMPASS (KIPO internal) & keywords: 필터 (filter), 에어로졸 (aerosol), 기류 (air current), 히터 (heater)

C. 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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Y		8
Y	KR 10-2021-0151579 A (KT & G CORPORATION) 14 December 2021 (2021-12-14) See claim 1; and figure 1.	8
A	KR 10-2017-0140191 A (PHILIP MORRIS PRODUCTS S.A.) 20 December 2017 (2017-12-20) See claims 1-3.	1-8
A	KR 10-2021-0114795 A (KT & G CORPORATION) 24 September 2021 (2021-09-24) See entire document.	1-8

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

* Special categories of cited documents:	"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
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"D" document cited by the applicant in the international application	"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
"E" earlier application or patent but published on or after the international filing date	"&" document member of the same patent family
"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	

Date of the actual completion of the international search 31 January 2023	Date of mailing of the international search report 01 February 2023
Name and mailing address of the ISA/KR Korean Intellectual Property Office Government Complex-Daejeon Building 4, 189 Cheongsaro, Seo-gu, Daejeon 35208 Facsimile No. +82-42-481-8578	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 2022)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/KR2022/016515

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C. 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
Information on patent family members

International application No.

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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