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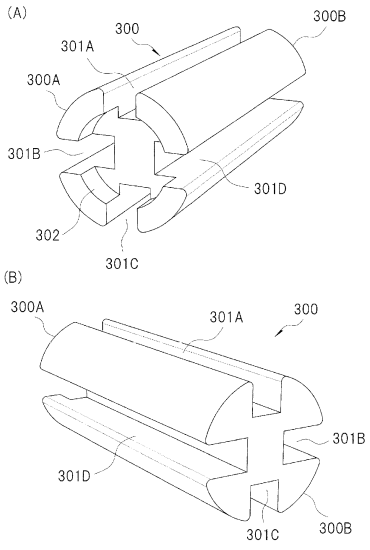
(54) SUPPORT MEMBER FOR AROMA CARTRIDGE, AND AROMA CARTRIDGE PROVIDED WITH SAME

(57) Channels 301 (channels 301A to 301D) for an aerosol stream passing from an inlet edge 300A to an outlet edge 300B is provided to a support member 300 of an aroma cartridge. Moreover, a mixing space 302 for mixing aerosol stream passing to the support member 300 from an aroma-generating source to be heated 110 shown in FIG. 1 and FIG. 2(A) is provided at an inlet edge of the channels 301 of the support member 300. The mixing space 302 uniforms a flow amount and a flow rate of the aerosol passing from the aroma-generating source to be heated 110 to the support member 300, caused by the kind and the charged amount of the base member110A of the aroma-generating source to be heated 110, and allows a user to readily breathe the aroma components released from the aroma-generating source to be heated 110. The utilization of information in an ID chip realizes stabilization of the aerosol stream, stable support of the aroma-generating base substrate to be heated when inserting a heating element, and improvement of easy operation when inserting the cartridge.

FIG. 5



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Description

TECHNICAL FIELD

[0001] The present invention relates to a support member for an aroma cartridge used by being installed in a fragrance article and an aroma cartridge including the same.

BACKGROUND ART

[0002] With the trend of quitting smoking in recent years, fragrance article products have become more widespread for vaporizing tobacco components by heating an aroma cartridge including the tobacco components and for breathing the tobacco components without using a flame (for example, Patent Documents 1 and 2).

[0003] The fragrance article of the Patent Document 1 generates an aerosol including tobacco components by inserting a heating element into a heat aroma-generating source of an aroma cartridge and heating the heat aroma-generating source. The aroma cartridge has a hollow tubular support element for supporting the heat aroma-generating source, and the support element resists the force received by the aroma cartridge when the heating element is inserted into the heat aroma-generating source. The aerosol of the tobacco components released from the heat aroma-generating source upon heating passes through the hollow portion of the support element, is transported to a mouthpiece located downstream, and is breathed by a user.

[0004] Patent Document 2 discloses a device for heating a smoking material and an aerosol-cooling member used therein. The aerosol-cooling member described in Patent Document 2 is a monolithic rod having first and second edge portions, for example, and has a plurality of through holes extending between the first and second edge portions.

[0005] Note that the aforementioned "aerosol-forming base member" is referred to as an "aroma-generating base member to be heated" in the present invention because it volatilizes an aerosol former for generating an aerosol as well as aroma components of an aroma source material and an aromatic when inserted into a heating element and heated and then the smoke of the aerosol and the fragrance of the aroma source material and the aromatic are enjoyed through smoking. On the basis of this definition, an "aerosol-forming member" charged with an aerosol-forming base member is referred to as an "aroma-generating source to be heated", an "electrically interchangeable tobacco cartridge" and a "cartridge" are referred to as an "aroma cartridge", and "electrical tobacco" is referred to as a "fragrance article".

CITATION LIST

PATENT LITERATURE

[0006]

Patent Document 1: Japanese Patent No. 6000451
Patent Document 2: Japanese Patent Application Publication No. 2017-518041

SUMMARY OF THE INVENTION

PROBLEMS TO BE SOLVED BY THE INVENTION

[0007] The fragrance article of the Patent Document 1 has a problem in that it is difficult for a user to breathe the aroma components due to non-uniformity and the like depending on the filling state of a filler which is a base material in the heating aroma-generating source. For example, when the aerosol of the tobacco components released upon heating moves to the support element, the flow quantity and the flow rate of the aerosol successively vary due to the non-uniformity of the filling state of the filler in a longitudinal direction and in a cross section perpendicular thereto. Accordingly, not only does the successive non-uniformity or time-depending fluctuation occur, but also the flow quantity and the flow rate increase in only the through hole region compared with other portions. On the other hand, it is difficult to breathe the aroma components with uniform flow quantity and flow rate because of the regional non-uniformity and positional fluctuation that the flow quantity and the flow rate from the other regions are extremely low.

[0008] Similarly, the aerosol-cooling member described in the Patent Document 2 also has a problem in that the flow of the aerosol in the aerosol-cooling member readily becomes unstable because a plurality of through holes with the same diameter linearly extends between the first and second edge portions of the monolithic rod. It is difficult to breathe the aroma components in a stable state not only because there is a similar time-depending fluctuation in every channel of each of the plurality of through holes (channel) but also because there are positional differences between the channels.

[0009] Moreover, in the fragrance article of Patent Document 1, there is a problem in that an excessive load is applied

to the inside of the heating aroma-generating source when the heating element is inserted into the non-heating aroma-generating source in addition to the difficulty in breathing. In this case, the excessive load not only makes the insertion difficult but also leads to folding of the cartridge or destroys the heating element itself when inserted.

[0010] On the other hand, there are many variations with respect to the heating aroma-generating source of the aroma cartridge. Furthermore, the components differ depending on the manufacturer. In addition, the aroma components may vary when breathing depending on the ambient environment such as the ambient temperature and humidity.

[0011] However, it is difficult to breathe the aroma components at a more stable state because the heating is not controlled according to the kind of the heating aroma-generating source and the ambient environments in the Patent Document 1 and Patent Document 2.

[0012] This invention has been motivated in order to solve the aforementioned problems of the prior art, and the purpose thereof is to provide a support member for an aroma cartridge capable of stabilizing the flow of an aerosol in an aroma cartridge.

[0013] Furthermore, another purpose of the present invention is to provide a support member capable of stably supporting a heating aroma-generating source when a heating element is inserted while securing a channel through which an aerosol is transported in an aroma cartridge and capable of preventing any defects in the aroma cartridge when the heating element is inserted, thereby preventing any problem for a main body of the fragrance article.

[0014] Moreover, yet another purpose of the present invention is to facilitate insertion of the aroma cartridge and improve operability when the fragrance article is used.

[0015] In addition, a purpose of the present invention is to perform appropriate heat control according to the kind of heating aroma-generating sources of the aroma cartridge, ambient environments, and the like, thereby placing the aroma components in an appropriate state when the aroma components are breathed.

[0016] A support member for an aroma cartridge according to the first aspect of the present invention is arranged between an aroma-generating source to be heated and a filter member in the aroma cartridge and includes: a channel of an aerosol stream passing from an edge surface on a side of the aroma-generating source to be heated to the other edge surface on a side of the filter member; and a mixing space provided to at least one place among an inlet edge of the channel, an outlet edge of the channel, and an intermediate portion therebetween and mixing the aerosol stream.

[0017] In the first aspect, the support member for an aroma cartridge according to the second aspect of the present invention has an inlet-edge positional difference between an outer circumference edge on a side of the edge surface of the support member and the inlet edge of the channel of the first aspect, where the mixing space may include an inlet-edge space formed by the inlet-edge positional difference.

[0018] In the second aspect, the inlet-edge positional difference of the support member for an aroma cartridge according to the third aspect of the present invention may be formed by a step or a slope between the outer circumference edge on the side of the edge surface of the support member and the inlet edge of the channel.

[0019] In any of the first to third aspects, the support member for an aroma cartridge according to the fourth aspect of the present invention has an outlet-edge positional difference between the outer circumference edge on the side of the other edge surface of the support member and the outlet edge of the channel of any of the first to third aspects, where the mixing space may include an outlet-edge space formed by the outlet-edge positional difference.

[0020] In the fourth aspect, the outlet-edge positional difference of the support member for an aroma cartridge according to the fifth aspect of the present invention may be formed by a step or a slope between the outer circumference edge on the side of the other edge surface of the support member and the outlet edge of the channel.

[0021] In any of the first to fifth aspects, there is an intermediate space continuing to the channel and having a larger cross-sectional area than the channel in the intermediate portion of the channel of the support member for an aroma cartridge according to the sixth aspect of the present invention, where the mixing space may include the intermediate space.

[0022] In any of the first to sixth aspects, the channel of the support member for an aroma cartridge according to the seventh aspect of the present inventio may include a plurality of channels having different cross-sectional areas from one another.

[0023] The aroma cartridge according to the eighth aspect of the present invention includes an outer circumference member structuring an outer circumference of the support member in any of the first to seventh aspects, where the channel and the mixing space may be formed by a hollow portion in which no composition material of the support member exists in the outer circumference member

[0024] In the eighth aspect, the outer circumference member of the support member for an aroma cartridge according to the ninth aspect of the present invention may be integrally formed.

[0025] In any of the first to seventh aspects, the channel of the support member for an aroma cartridge according to the tenth aspect of the present invention may be a hollow through hole formed in the support member.

[0026] A support member for an aroma cartridge according to the eleventh aspect of the present invention is arranged between an aroma-generating source to be heated and a filter member and has a support surface for directly or indirectly supporting the aerosol-forming base member and a channel for an aerosol stream passing from an edge surface on a

side of the aroma-generating source to be heated to the other edge surface on a side of the filter member, where the support surface may have a first support surface and a second support surface downstream of the first support surface.

[0027] In the eleventh aspect, the second support surface of the support member for an aroma cartridge according to the twelfth aspect of the present invention may continue to and be in contact with the first support surface.

[0028] In the eleventh or twelfth aspect, the support member for an aroma cartridge according to the thirteenth aspect of the present invention, the second support surface may be formed through a step.

[0029] In any of the eleventh to thirteenth aspects, the first support surface or the second support surface of the support member for an aroma cartridge according to the fourteenth aspect of the present invention may be symmetrical about a center axis in a longitudinal direction of the aroma-generating source to be heated.

[0030] In any of the eleventh to fourteenth aspects, an area ratio of the second support surface to the first support surface of the support member for an aroma cartridge according to the fifteenth aspect of the present invention may be equal to or more than 0.25 times and equal to or less than 4.0 times.

[0031] A support member for an aroma cartridge according to the sixteenth aspect of the present invention is arranged between a heating aroma-generating source and a filter member in the aroma cartridge and has a support surface directly or indirectly supporting the aroma-generating source to be heated and a channel for an aerosol stream passing from an edge surface on a side of the aroma-generating source to be heated to the other edge surface on a side of the filter member, where the support surface has a sloped surface with respect to a perpendicular plane to a center axis in a longitudinal direction of the heating aroma-generating source.

[0032] In the sixteenth aspect, the channel of the support member for an aroma cartridge according to the seventeenth aspect of the present invention may include a hollow through hole formed in the support member.

[0033] In the fifteenth or seventeenth aspect, the channel of the support member for an aroma cartridge according to the eighteenth aspect of the present invention may include a channel formed in a peripheral portion of the support member.

[0034] The support member for an aroma cartridge according to the nineteenth aspect of the present invention may have the channel on a downstream side with respect to the sloped surface in any of the eleventh to eighteenth aspects.

[0035] In any of the sixteenth to nineteenth aspects, the sloped surface of the support member for an aroma cartridge according to the twentieth aspect of the present invention may be symmetrical about the center axis.

[0036] In any of the sixteenth to twentieth aspects, a slope angle of the sloped surface of the support member for an aroma cartridge according to the twenty-first aspect with respect to the perpendicular plane may be equal to or more than 4 °.

[0037] In any of the sixteenth to twenty-first aspects, the sloped surface of the support member for an aroma cartridge according to the twenty-second aspect may include a sloped surface with respect to an inserting direction of a heating element when the heating element is inserted into the aroma-generating source to be heated.

[0038] The support member for an aroma cartridge described in any of claims 1 to 22 according to the twenty-third aspect of the present invention may have an ID portion to be detected from which ID information which can distinguish an aroma cartridge from another aroma cartridge different in kind can be detected.

[0039] An aroma cartridge according to the twenty-fourth aspect of the present invention includes the aroma-generating source to be heated, the filter member, and the support member for an aroma cartridge according to any of the first to twenty-third aspects.

[0040] The aroma cartridge according to the twenty-fifth aspect of the present invention may include a limiting member limiting a passage region of an aerosol from the aroma-generating source to be heated in the twenty-third aspect.

[0041] In the twenty-fourth aspect, the limiting member of the aroma cartridge according to the twenty-sixth aspect of the present invention may have an opening with a size which allows the aerosol to pass therethrough and limits passage of the aroma-generating source to be heated.

[0042] The support member for an aroma cartridge according to the twenty-seventh aspect of the present invention includes an ID portion to be detected from which ID information which can distinguish the aroma cartridge from another aroma cartridge different in kind can be detected.

[0043] The ID portion to be detected of the support member for an aroma cartridge according to the twenty-eighth aspect of the present invention includes an ID-memorizing means memorizing the ID information.

[0044] The ID portion to be detected of the support member for an aroma cartridge described in any of claims 26 to 29 according to the twenty-ninth aspect of the present invention includes an ID-displaying means for displaying the ID information.

[0045] An aroma cartridge according to the thirtieth aspect of the present invention includes an aroma-generating source to be heated, a filter member, and a support member for an aroma cartridge.

[0046] The aroma cartridge described in claim 30 according to thirty-first aspect of the present invention further includes a limiting member limiting a passage region of an aerosol from the aroma-generating source to be heated.

[0047] The limiting member of the aroma cartridge according to claim 31 of the thirty-second aspect of the present invention has an opening with a size which allows passage of the aerosol and limits passage of the aroma-generating source to be heated.

[0048] A thirty-third fragrance article of the present invention includes the aroma cartridge described in any of claims 30 to 32, an ID detection portion for detecting the ID information, a heating portion for providing heat to the aroma-generating source to be heated, and a controlling portion for controlling the ID detection portion and the heating portion.

[0049] The ID portion to be detected of the thirty-fourth fragrance article is arranged around a peripheral of an installing portion of the aroma cartridge, where the controlling portion has a distance-detecting function detectable a distance on the basis of the ID detection information from the ID portion to be detected. The controlling portion further obtains the ID information on the basis of the ID detection information and understands the installing state of the aroma cartridge from a distance between each portion on the periphery of the installing portion and the ID portion to be detected.

[0050] According to the thirty-fifth aspect of the present invention, the ID detection portion has a plurality of ID sub-detecting portions around the periphery of the installing portion, and the ID portion to be detected has a plurality of ID portions to be detected corresponding to the plurality of ID sub-detecting portions.

[0051] According to the thirty-sixth fragrance article, it is a fragrance article including a support member for an aroma cartridge arranged between the aroma-generating source to be heated and a filter member in the aroma cartridge, where the support member for the aroma cartridge has an ID portion to be detected capable of detecting ID information which can distinguish the aroma cartridge from another aroma cartridge different in kind.

EFFECTS OF THE INVENTION

[0052] According to the support member for an aroma cartridge of the present invention, it is possible to stabilize the aerosol stream in the aroma cartridge and to obtain an effect that a user can readily breathe the aroma components in the aerosol.

[0053] Moreover, in the case where the mixing space is provided at the inlet edge of the channel of the support member, an effect can be obtained that an excessive load applied to the inside of the aroma-generating source to be heated by the heating element can be decreased when the heating element provided in the main body of the fragrance article is inserted into the aroma-generating source to be heated.

[0054] According to the support member for an aroma cartridge of the present invention, it is possible to provide a supporting member which stably supports the aerosol-forming base member when inserting the heating element while securing a channel for transporting the aerosol released from the aerosol-forming base member and which does not cause any deficiency on the aroma cartridge when inserting the heating element.

[0055] According to the support member for an aroma cartridge of the present invention, it is possible to facilitate insertion of the aroma cartridge and to improve operability when the fragrance article is used.

[0056] Moreover, according to the fragrance article of the present invention, the insertion state of the cartridge (detection of a distance to the final insertion position, a displacement between the center axis of the cartridge and the center axis of the insertion portion, inclination, or the like) is detected by arranging a plurality of sensors at a periphery and determining a distance from each sensor to an ID chip, thereby facilitating the insertion operation to the canter position. Therefore, it is possible to detect the IDs of the support member and the cartridge, and the effects such as stabilization of the aerosol streams, stable support of the aroma-generating source to be heated when inserting the heating element, and improvement of ease of operability when inserting the cartridge can be obtained.

[0057] Furthermore. according to the support member for an aroma cartridge and the aroma cartridge of the present invention, it is possible to inform information regarding the aroma-generating source to be heated of the aroma cartridge because the ID chip is included. In addition, since the ID chip is included, it is possible to prohibit the use of the aroma cartridge when an aroma cartridge different in kind (e.g., different manufacturer) is read from the information memorized in the ID chip.

BRIEF DESCRIPTION OF THE DRAWINGS

[0058]

FIG. 1 is a cross-sectional view showing a usage mode of an aroma cartridge;
FIG. 2 includes cross-sectional views each showing an example of a structure of an aroma cartridge;
FIG. 3 is a drawing showing an example of a base material manufactured as an aroma-generating source to be heated;
FIG. 4 is a drawing showing an example of a manufacturing method of an aroma cartridge;
FIG. 5 includes drawings explaining a support member for an aroma cartridge according to the First Embodiment;
FIG. 6 includes drawings explaining a support member for an aroma cartridge according to the First Embodiment;
FIG. 7 includes drawings explaining a support member for an aroma cartridge according to the First Embodiment;
FIG. 8 includes drawings explaining a support member for an aroma cartridge according to the Second Embodiment;
FIG. 9 includes drawings explaining a support member for an aroma cartridge according to the Second Embodiment;
FIG. 10 is a drawing explaining a support member for an aroma cartridge according to the Second Embodiment;

FIG. 11 includes drawings explaining a support member for an aroma cartridge according to the Third Embodiment;
FIG. 12 is a drawing explaining a support member for an aroma cartridge according to the Third Embodiment;
FIG. 13 includes drawings explaining a support member for an aroma cartridge according to the Third Embodiment;
FIG. 14 includes drawings explaining a support member for an aroma cartridge according to the Third Embodiment;
FIG. 15 includes drawings explaining a support member for an aroma cartridge according to the Third Embodiment;
FIG. 16 is a drawing explaining a support member for an aroma cartridge according to the Fourth Embodiment;
FIG. 17 includes drawings explaining a support member for an aroma cartridge according to the Fourth Embodiment;
FIG. 18 is a drawing explaining a support member for an aroma cartridge according to the Fourth Embodiment;
FIG. 19 includes drawings explaining a support member for an aroma cartridge according to the Fourth Embodiment;
FIG. 20 is a drawing explaining a support member for an aroma cartridge according to the Fourth Embodiment;
FIG. 21 is a drawing explaining a support member for an aroma cartridge according to the Fourth Embodiment;
FIG. 22 is a drawing explaining a support member for an aroma cartridge according to the Fourth Embodiment;
FIG. 23 is a drawing explaining a support member for an aroma cartridge according to the Fourth Embodiment;
FIG. 24 is a drawing explaining a support member for an aroma cartridge according to the Fourth Embodiment;
FIG. 25 is a drawing explaining a support member for an aroma cartridge according to the Fourth Embodiment;
FIG. 26 is a drawing explaining a support member for an aroma cartridge according to the Fourth Embodiment;
FIG. 27 is a drawing explaining a support member for an aroma cartridge according to the Fourth Embodiment;
FIG. 28 is a drawing explaining a support member for an aroma cartridge according to the Fourth Embodiment;
FIG. 29 is a drawing explaining a support member for an aroma cartridge according to the Fourth Embodiment;
FIG. 30 is a drawing explaining a support member for an aroma cartridge according to the Fourth Embodiment;
FIG. 31 is a drawing explaining a support member for an aroma cartridge according to the Fourth Embodiment;
FIG. 32 is a drawing explaining a support member for an aroma cartridge according to the Fourth Embodiment;
FIG. 33 is a drawing explaining a support member for an aroma cartridge according to the Fourth Embodiment;
FIG. 34 is a cross-sectional view of an aroma tool according to the Fifth Embodiment;
FIG. 35 is a perspective view of a case where an ID chip 313 is installed in a support member 300 in FIG. 5(B);
FIG. 36 includes are perspective views of the cases where an ID chip 313 is installed in support members 400 and 500;
FIG. 37 includes cross-sectional views showing other examples of a use mode of an aroma cartridge similar to FIG. 34;
FIG. 38 is a drawing of a connection structure of a controlling portion and each sensor and the like of the Fifth Embodiment;
FIG. 39 is a flow chart (1/2) explaining treatments of the CPU 90 on the basis of a program in the memory 91 of the controlling portion 9;
FIG. 40 is a flow chart (2/2) explaining treatments of the CPU 90 on the basis of a program in the memory 91 of the controlling portion 9;
FIG. 41 includes cross-sectional views of examples of a specific method to determine a distance (insertion distance); and
FIG. 42 includes explanatory drawings of an insertion-angle calculation treatment.

DESCRIPTION OF EMBODIMENTS

[0059] Hereinafter, preferred embodiments of the present invention are explained while referring to the drawings. Note that, a region necessary for the explanation to achieve the purpose of the present invention will be schematically shown, a region necessary for explaining the corresponding portions of the present invention will be mainly explained, and the known technology is applied to a portion in which an explanation is omitted.

[0060] FIG 1 shows a usage mode of the aroma cartridge according to the present embodiment. The aroma cartridge 100 is installed in the fragrance article 200 when used by a user. An entry 210 for inserting the aroma cartridge 100 is provided to the fragrance article 200.

[0061] A heating element 211 is disposed in the fragrance article 200. The heating element 211 has a pin-shaped or blade-shaped member with a sharp tip and is inserted into the aroma-generating source to be heated 110 of the aroma cartridge 100 to heat the aroma-generating source to be heated 110. More specifically, the heating element 211 pierces approximately at a center portion of the aroma-generating source to be heated when the aroma cartridge 100 is inserted into the entry 210 of the fragrance article 200. Although there is one pin-shaped or blade-shaped member with a sharp tip of the heating element 211 in the illustrated example, a plurality of pin-shaped or blade-shaped members may be used.

[0062] The heating element 211 directly or indirectly generates heat by the power source supplied from a battery (not illustrated) installed in the fragrance article 200. The heat generated by this heating element 211 warms the aroma-generating source to be heated, thereby generating an aerosol including aroma components.

[0063] The generated aerosol is transported to a filter member 130 also serving as a mouthpiece through a support member 300 and a transporting member 120, and the aroma components reach the mouth of a user when the user breathes from a side of the filter member 130.

[0064] FIG 2(A) shows an example of a structure of the aroma cartridge 100 depicted in FIG. 1. In the aroma cartridge 100, the aroma-generating source to be heated 110, the support member 300, and the transporting member 120 and 130 are arranged in this order from the side to which the heating element 211 (FIG. 1) is inserted.

[0065] The support member 300 arranged to be adjacent to the aroma-generating source to be heated 110 is a member supporting the aroma-generating source to be heated 110, and a side portion thereof is in contact with an outer circumference member 140 disposed on an outer circumference of the aroma cartridge 100. The outer circumference member 140 is a member wrapping the aroma cartridge 100 and is integrally formed to cover the outer circumference of the aroma cartridge 100.

[0066] The supporting member 300 may be preferably formed using silicone, but is not limited to silicone, and another material excellent in heat resistivity may be used.

[0067] The transporting member 120 is a member having a function to cool the aerosol transported from the support member 300 to the filter member 130.

[0068] As shown in FIG. 2(B), the filter member 130 may be elongated instead of omitting the transporting member 120 to allow the filter member 130 to have an aerosol-cooling function. With this structure, not only can the breathability be improved to facilitate breathing the aroma components in the aerosol but also the number of components of the aroma cartridge 100 can be reduced.

[0069] In addition, a partitioning member 100 may be placed between the aroma-generating source to be heated 110 and the support member 300 as shown in FIG. 2(C), by which it is possible to avoid the deficiency whereby vibration during transportation or the like moves the aroma-generating source to be heated 110 in the aroma cartridge 100. As a material of the partitioning member 170, a material such as paper, a filter, or the like with high breathability, which is readily destroyed when the heating element 211 (FIG. 1) is inserted to the aroma-generating source to be heated 110, is represented.

[0070] Furthermore, a cap 180 may be disposed on a side of the aroma-generating source to be heated 110 to which the heating element 211 (FIG. 1) is inserted as shown in FIG. 2(D). With this structure, it is possible to suppress scattering of the aroma components in the aroma-generating source to be heated 110 and to avoid a deficiency whereby the aroma-generating source to be heated 110 drops out of the aroma cartridge 100 due to the vibration or the like during transportation. As a material of the cap 180, paper, a filter, a sponge, and the like are represented. Note that one or a plurality of cutoffs or circular or polygonal guide holes may be provided to a portion of the cap 180, by which the heating element 211 (FIG. 1) can be readily inserted into the aroma-generating source to be heated 110.

[0071] Moreover, the support member 300 in the structure of FIG. 2(B) may be elongated to allow the support member 300 to have an aerosol-cooling function as shown in FIG. 2(E).

[0072] As demonstrated in FIG. 3, a member formed into a rod shape or a stripe form and charged along a longitudinal direction of the aroma-generating source to be heated 110 is preferred as a base member 110A structuring the aroma-generating source to be heated 110 so that the aerosol stream can be stabilized and a user can readily breathe the aroma components.

[0073] FIG. 4 shows a state in which a rod is formed by wrapping side portions (outer circumference portions) of the aroma-generating source to be heated 110, the support member 300, the transport member 120, and the filter member 130 shown in FIG. 2(A) with the outer circumference member 140 such as tobacco paper. The outer circumference member 140 is fixed to each of the side portions of the aroma-generating source to be heated 110, the support member 300, the transport member 120, and the filter member 130 with an adhesive, for example.

[0074] Furthermore, the following non-tobacco plants exemplified below may be used as the base material 110A structuring the aroma-generating source to be heated 110.

[0075] There is no particular limitation to the non-tobacco plants serving as the base material 110A as long as they are nicotine-free plants other than tobacco. The usable parts of the plants include, for example, a variety of parts such as roots (including scale roots (scales), tubers (potatoes), bulbs, etc.), stems, tubers, bark (including stem bark, bark, etc.), leaves, flowers (including petals, pistils, stamens, etc.), tree trunks, and branches.

[0076] Onions, cluster amaryllises, tulips, hyacinths, garlic, shallots, and lilies are represented as scales, crocus, gradiolas, freesia, iris, taros, and konnyaku are represented as bulbs, konnyaku, cyclamen, anemone, begonia, chologi, potatoes, and apios (apios fortuneis) are represented as tubers, cannas, lotuses (lotus roots), and ginger are represented as rhizomes, dahlias, sweet potato, and cassavas are represented as tubers, dioscorea (yam genus such as Yamanoimo, natural yam, and yam) is represented as rootstocks, and cubs, yams, carrots, radishes, and Japanese arrowroots are represented as another example. Asparaguses, bamboo shoots, udos, radishes, and yacons are represented as stems.

[0077] Carbohydrate is included in the aforementioned potatoes and the plants described below and is preferably used as at least a part of the material of the base member 110A. For example, cornstarch (corn), potato starch (potato), sugarcane starch (sweet potato), tapioca starch (tapioca), and the like are represented as starch, and there are examples to be used as a thickener, a stabilizer, and the like. With respect to these starches, acid resistance, heat resistance, share resistance, and the like can be improved by cross-linking, storage stability can be improved and gelatinization can be promoted by esterification or etherification, and transparency, film properties, storage stability, and the like can be

improved by oxidation.

[0078] It is possible to obtain tamarind seed gum, guar gum, and locust bean gum from plant seeds, Arabic gum and karaya gum from sap, pectin from fruits, and cellulose, konjac mannan containing agarose as a main component, and soybean polysaccharides from other plants. They can be modified and used like cationized guar gum.

[0079] Carrageenan, agar, and alginic acid, which are classified into three types including kappa carrageenan, iota carrageenan, and lambda carrageenan, can be obtained from seaweed and are also used as salts such as carrageenan metal salt, sodium alginate, and the like.

[0080] To give specific examples, plants used as herbs and spices include cumin pepper, cumin leaves, Japanese gingers, mugworts, wasabi, ajowan seeds, anis, alfalfas, echinacea, echalote, estragon, everlasting flowers, elder, all spice, Orris roots, oregano, orange peel, orange flowers, orange leaves, cayenne chili pepper (cayenne chili pepper), chamomile German, chamomile Roman, Cardamon, curry leaves, garlics, catnips, caraway, caraway seeds, fragrant olives, cumin, cumin seeds, cloves, green cardamon, green pepper, cornflowers, saffron, cedars, cinnamon, jasmine, juniper berries, jolokia, gingers, star anis, spare mints, smacks, sages, savories, celeries, celery seeds, turmeric (cumin), thymes, tamarinds, tarragons, chervils (cellife), chives, dill, dill seeds, tomato (dried tomato), tonka beans, dried coriander, nutmegs, hibiscuses, habaneros, jalapenos, bird's eyes, basils, vanillas, chervils (corianders), parsleys, paprikas, hyssops, piments d'espelette, pink pepper, fenugreek seeds, fennel, brown mustards, black cardamon, black cumin, black pepper, vetivers, penny royal, peppermint, horse radishes, white pepper, white mustards, poppy seeds, porcinis, marjoram, mustard seeds, maniguette, marigolds, malva flowers, maces, yarrow flowers, eucalyptus, lavenders, licorice, lindens, red clovers, red pepper, lemon grass, lemon verbenas, lemon balms, lemon peel, rose, rose buds (purple), rose hips, rose petals, rosemary, rose red, laurel (laurier), long pepper, sesame (raw sesame, roasted sesame), golden chili pepper, hua iiao, Mitaka, sansho, chili pepper, and yuzu, and the like. In addition, mixed spices (for example, five-spice powder, Garam masala, ras el hanout, barigoule, chicken curry masala, tandoori masala, cattle epis, herbes d'Provence) and a mixture of various plants used as potpourri and the like can be used.

[0081] Moreover, edible fruits and seeds (a sarcocarp portion) such as peaches, blueberries, lemons, oranges, apples, bananas, pineapples, mangoes, grapes, kumquats, melons, plums, almonds, cacao, coffee beans, peanuts, sunflowers, olives, walnuts, and other edible nuts can be used, for example.

[0082] Moreover, tea can be used. Tea becomes another tea not only in the case where the plants for the tea are different but also in the case where the processing methods are different even if the same plant are used. Specifically, Japanese tea, black tea, tomorrow's leaf tea, sweet tea, gynostemma pentaphyllum tea, aloe tea, ginkgo leaf tea, oolong tea, turmeric tea, Quercus salicina tea, eleuthero tea, plantain tea, kakiodoshi tea, persimmon leaf tea, chamomile tea, chamomile tea, Kawahara Ketumei tea, karin tea, chrysanthemum tea, gymnema tea, guava tea, wolfberry tea, mulberry leaf tea, black soybean tea, gennoshoko tea, brown rice tea, gobo tea, comfrey tea, kelp tea, cherry blossom tea, saffron tea, shiitake tea, perilla tea, jasmine tea, ginger tea, forsetail tea, Japanese seet flag tea, Japanese green gentian tea, buckwheat tea, Aralia elata tea, dandelion tea, sweet tea, Houttuynia cordata tea, tochu tea, natamame tea, elderberry tea, nezumimochi tea, adlay tea, herbal tea, biwa leaf tea, pu-erh tea, red flower tea, pine needle tea, yerba mate tea, wheat tea, megusurinoki tea, mugwort tea, eucalyptus tea, luo han guo tea, rooibos tea, bitter gourd tea and the like are represented. With respect to these teas, used tea leaves after drinking the tea may be used. Expensive teas or the like can be reused and effectively utilized when the used tea leaves are used.

[0083] Kelp has been represented above as a specific example of a usable plant, and sea lettuce, green laver, red sea bream, Asakusa nori, arame, iwanori (rock seaweed), egonori, ogonori, gagomekonbu, kajime, ganashi, kubirezuta, kurome, kelp, susabinori, darus, chishimakuronori, tsuruarame, agar, tangle flakes, nekoashikonbu, nori (seaweed), habanori, hijiki, hitoegusa, hirome, funori, bow green laver, macombus, mechab, mozuku, and wakame can also be used as other plants, of course.

[0084] Brown rice has been represented above as a specific example of a usable plant, and Indica species (Indian, continental, and long grain species), Glaberrima species (African rice), Sativa species (Asian rice), Javanica species (Java, tropical island, and large grain species), Japonica species (Japan, temperate island, and long grain species), and Nerica (interspecific hybrid species of Asian and African rice) can also be used as other kinds of rice, of course. These species can also be used as powder or bran.

[0085] Furthermore, wheat has been represented as a specific example of usable plants, and millet, oats (cultivated varieties of crow wheat, also called oats wheat), barley (barley), Avena Sativa, millet, and codora. (Cordon barnyard), wheat (wheat), finger millet, tef, pearl millet, barley (variant of barley), adray (fruit, not seed), barnyard, fonio, wild rice, pearl barley (glutinous variant of barley), Indian millet (sorghum, kaoliang, sorghum), corn and rye (barley) can also be used as other examples of wheat, of course.

[0086] Furthermore, black beans have been represented as a specific example of usable plants, and azuki, carob, kidney bean, green pea cluster bean grass pea (English: Lathyrus sativus), Vigna mungo, cowpeas, winged beans, geocarpa grand beans, fava beans, soy, rice beans, Jack beans, tamarind, tepary beans, sword beans, Mucuna beans (English: Mucuna pruriens), Bambara beans, chickpea, hyacinth beans, runner beans, horse gram (English; Macrotyloma uniflorum), moth beans, lima beans, peanuts, mung beans, lupin, lentil, and lentil (hento) can also be used as other

examples of soybeans (legume), of course.

[0087] Furthermore, buckwheat has been represented as a specific example of usable plants, and amaranth (amaranthus, Senninkoku), quinoa, and tartary buckwheat can also be used as examples of other plants, of course.

[0088] Furthermore, shiitake mushrooms have been represented as specific examples of usable plants, and matsutake mushrooms, shiitake mushrooms, hatsudake mushrooms, shimeji mushrooms, truffle mushrooms, mushrooms, and agaric mushrooms are represented as mushrooms.

[0089] Furthermore, trunks and branches of fragrant trees such as sugarcane (may be squeezed residue of molasses), sugar beet (beet), cypress, pine, cedar, cypress, camellia, and ebony as well as their bark, leaves, roots, and the like can also be used. Bracken, moss, and the like can also be used as the non-tobacco plants. As a plant, for example, byproducts and pomace (sake lees, grape pomace (consisting of grape skins, seeds, fruit stems, etc.)) and the like formed when producing fermented beverages such as Japanese sake and wine can also be used. In addition, the various plants described above may be mixed and used. Of course, plants other than those listed here can also be used.

[0090] Further, what is known as a Chinese herbal medicine is also preferably used. For example, the following are represented: Aizen, Akanekon, Akamegashiwa, Asenyaku, Ansokukou, Ireisen, Inchinkou, Uiko, Turmeric), Ubai, Uyaku, Urajirogashi, Uwaurushi, Agetsu, Engosaku, Enmeisou, Ougi, Ogon, Huangsei (Ousei), Huangbaku, Huangren, Ouhi, Otogirisou, Onji, Kaika, Gaihaku, Kagosou, Lycium chinense (Kashi), Kashu, Gajutsu, Lycium chinense, Lycium chinense, Turmeric, Turmeric, Karonin, Kankyo, Kanzo , Kantouka, Gaiyou, Kikyo, Kigushi, Kikoku, Kijitsu, Kikuka, Kippi, Kyokatsu, Kyonin, Kinkan, Kinginka, Kinsensou, Kukoshi, Lycium chinense, Kujin, Walnut, Klenpi , Black letters (Kuromoji), Ginger (Kubaku), Schizonepeta (Keigai), Katsura bark (Keihi), Ketsumeishi (Ketsumeishi), Kengoshi (Kengoshi), Genjin (Genjin), Ginger candy (Kouika), Red flower (Kouka) Skin, wolfberry, wolfberry, wolfberry, scented ginseng, wolfberry, wolfberry, turmeric, turmeric, turmeric), Gokahi, Goshitsu, Goshuyu, Gojokon, Goboushi, Gomiko, Psycho, Saishin, Saffron, Sankirai, Sanzashi, Sanshishi, Sanshuyu, Sanzukon, Sansounin, Sansho, Sanryo, Sanyaku (Sanryo) Sanyaku, Jiou, Zion, Jikoppi, Shikon, Shisoshi, Shisoyo, Shitsurishi, Shitei, Jifushi, Shakuyaku, Jashoushi, Shajin, Shazenshi, Shazensou, Shukusha , Juyaku, Ginger, Houttuynia cordata, Houttuynia cordata, Shouma, Wheat (Ginger), Shobukon, Shini, Sadako (Joteishi), Qinpi, Shinkiku, Jingyo, Juuishi, Houttuynia cordata, Seihi, Sekishokon, Ishibuki real skin (Sekiryujitsuhi), Ishibuki (Sekoku), Kawayumi (Senkyu), Maehu (Zenko), Riverbone (Senkotsu), Sempukuka, Osteopathic tree (Sekotsuboku), Grass fruit (Soka), Sou Kakushi), Mulberry parasite (Sokisei), Sojishi, Soujutsu, Sokuhakuyo, Zokudan, Souhakuhi, Soboku, Soyo , Soukyo, Daiou, Taisou, Daifukuhi, Takusha, Tanjin, Chikujo, Chikusetsu carrot, Bamboo Leaves (Chikuyo), Chimo (Chimo), Jiyu (Chiyu), Chome (Choudge), Houttuynia cordata (Choutoukou), Chenpi (Chinpi), Tennansho (Tennansho), Tenma (Tenma), Tenmon Fuyu (Tenma) Tenmontou), Fuyugashi, Toki, Tougoma, Tojin, Toshinsou, Tounin, Tohi, Toshishi, Tochinomi, Tochu, Dokkatsu, Dokakon, Nikujuyo, Nikuzuku, Nindou, Carrot, Baimo, Bakuga), Kashiwako Hitoshi (Hakushinin), Hakuhenzu, Hakumon Fuyu (Bakumontou), Houttuynia cordata (Hakoshi), Light load (Hacka), Ginger (Banka), Half-summer (Hange), Anti-nose (Hambi) , Banrankon, Hanshiren, Yurine, Byakushi, Shirahana Jazetsusou, Hyakubukon, Byakujutsu, Houttuynia cordata (Binrouji), Houttuynia cordata (Houttuynia cordata), Kayane (Boukon), Windbreak (Boufu), Ginger (Houttuynia cordata), Ginger root (Houttuynia cordata), Peony bark (Buttonpi), Maou (Maou), Asakojin (Mashinin), Ginger Mankeishi, Matsuyani, Mokutsu, Mokka, Mokko, Motsuyaku, Mokuzoku, Yakan, Yakuchi, Night Koto (Yako) Uto, Luo Han Guo, Lansou, Longannik, Ryutan, Ryokyo, Reishi, Renkyo, Rensensou, Lotus Meat (rennik), and lychee (locon).

[0091] Moreover, extracted components of non-tobacco plants exemplified above, which are so-called extracts, can also be used. A morphology of the extracted components may be liquid, starch syrup, powder, granules, or a solution or the like.

[0092] Hereinafter, the detailed structure of the support member 300 of the aroma cartridge 100 shown in FIG. 1 and FIG. 2(A) to FIG. 2(E) will be explained. Note that, in the following embodiments, an example is explained in which the aroma cartridge 100 has the structure shown in FIG. 2(A). However, the structure of the support member 300 can be applied to the cases where the aroma cartridge 100 has the structures shown in FIG. 2(B) to FIG. 2(E).

<First Embodiment>

[0093] The support member 300 of the present embodiment has the following characteristics as shown in FIG. 5. The support member 300 includes a center portion located along a center axis in a longitudinal direction and a plurality of side portions outwardly extending from the center portion and in contact with the outer circumference member 140 located at the outer circumference of the support member 300 and further has an inlet edge 300A (see FIG. 5(A)) located on a side of the aroma-generating source to be heated 100 shown in FIG. 1 and FIG. 2(A) and an outlet edge 300B (see FIG. 5(B)) on a side of the transporting member 120.

[0094] Channels 301 (channel 301A to channel 301D) for the aerosol streams passing from the inlet edge 300A to the outlet edge 300B are provided to the cylindrical side portions (outer circumference portions) of the support member 300. The number of channels 301 is four in the illustrated example and may be three or less or five or more.

[0095] Four channels 301A to 301D are structured by plural kinds of channels with different cross-sectional areas. In

the illustrated example, the cross-sectional areas of the channel 301A and the channel 301C are smaller than the cross-sectional areas of the channel 301B and the channel 301D.

[0096] A mixing space 302 is formed at the inlet edge 300A of the channel 301 of the support member 300 for mixing the aerosol streams flowing to the support member 300 from the aroma-generating source to be heated 110 shown in FIG. 1 and FIG. 2(A). Specifically, a step (an inlet-edge positional difference) is provided between the inlet edge 300A of the support member 300 and an inlet edge of the channel 301 (see FIG. 5(A)), and the mixing space 302 is formed by an inlet-edge space formed by this step. On the other hand, there is a continuous flat surface without any step (an outlet-edge positional difference) between the outlet edge 300B of the support member 300 and an outlet edge of the channel 301 (FIG. 5(B)).

[0097] The channels 301 and the mixing space 302 are formed by space portions in which there is no component of the support member 300 within the outer circumference member 140 of the aroma cartridge 100 (see FIG. 2(A)). Note that the outer circumference portion structuring only the outer circumference of the support member 300 may be integrally formed with the support member 300.

[0098] Formation of the mixing space 302 for mixing the aerosol streams at the inlet edge 300A of the channels 301 of the support member 300 in this manner allows the aerosol flowing from the aroma-generating source to be heated 110 to the support member 300 to stay once in the mixing space 302 in terms of time and space and then to flow to the channels 301A to 301D.

[0099] With this structure, even if a difference in time or place, which causes the non-uniformity of the flow quantity and flow rate of the aerosol flowing from the aroma-generating source to be heated 110 to the support member 300 is generated due to the kind and the charged amount of the base member 110A of the aroma-generating source to be heated 110, it is possible to obtain the effects that the streams of the aerosol passing through the support member 300 are stabilized and that a user can readily breathe the aroma components from the aroma-generating source to be heated 110 because the aerosol is uniformized in the mixing space 302.

[0100] In addition, since the cross-sectional areas of the channel 301A to the channel 301D are different in the present embodiment as described above, the flow quantity and the flow rate vary between the channel 301A to the channel 301D. Hence, it is possible to obtain an effect that the streams of the aerosol proceeding to the transporting portion 120 through the support member 300 are further stabilized.

[0101] Moreover, when the mixing space 302 is formed at the inlet edge of the channel of the support member 300, an effect can also be obtained whereby an excessive load applied to the aroma-generating source to be heated 110 by the heating element 211 can be decreased when the heating element 211 installed in the fragrance article 200 shown in FIG. 1 is inserted into the aroma-generating source to be heated 110.

[0102] In the present embodiment, the mixing space 302 is formed by the inlet-edge space formed by the step between the inlet edge 300A of the support member 300 and the inlet edge of the channel 301. However, a step may be provided between the outlet edge 300B of the support member 300 and the outlet edge of the channel 301, and the mixing space 302 may be formed by an outlet-edge space caused by this step. Furthermore, the mixing space 302 may be provided on both sides of the inlet edge 300A and the outlet edge 300B of the support member 300.

[0103] FIG. 6 shows an example in which a limiting member 150 for limiting the passage region of the aerosol flowing from the supporting member 300 to the transporting member 120 (see FIG. 1 and FIG. 2(A)) is provided at the inlet edge 300A of the support member 300.

[0104] The limiting member 150 is composed of a thin plate in which a number of openings 151 with a minute size allowing the passage of the aerosol and is engaged in the mixing space 302 of the support member 300. When the limiting member 150 is engaged in the mixing space 302, one or a plurality of protrusions 303 is formed on the side of the inlet edge 300A of the support member 300 to support the limiting member 150 so that the mixing space 302 is created between the limiting member 150 and the inlet edge of the channel 301.

[0105] It is possible to prevent the deficiencies that a part of the base member 110A of the aroma-generating source to be heated 110 leaks toward the side of the support member 300 and that the user breathes this part by providing the limiting member 150.

[0106] Moreover, this limiting member 150 may be provided so as to exist in the same plane as the inlet edge 300A. However, the limiting member 150 may be provided at an intermediate position in a depth direction of the mixing space 302 by adjusting the heights of the plurality of protrusions 303. In this case, a slight protrusion (protuberance) of the base member 110A of the base member aroma-generating source 110 to be heated caused when pierced with the heating element 211 is readily permitted so as not to provide an excessive load.

[0107] Although the limiting member 150 may be placed on the side of the outlet edge 300B of the support member 300, the limiting member 150 is preferably placed in the mixing space 302 in view of the ease of attachment.

[0108] Although the inlet-edge space formed by the step (inlet-edge positional difference) between the inlet edge 300A of the support member 300 and the inlet edge of the channel 301 is utilized as the mixing space 302 in the example shown in FIG. 5, slopes may be provided between the inlet edge 300A of the support member 300 and the inlet edges of the channels 301 to utilize an inlet-edge space formed by these slopes as the mixing space 302 as shown in FIG. 7.

[0109] FIG. 7(A) is an example in which the slopes are formed from the outermost circumference portion of the inlet edge 300A of the support member 300 in the direction toward the center, while FIG. 7(B) is an example in which the outermost circumference portion of the inlet edge 300A is formed as a flat plane and the slopes are formed from the inside thereof in the direction toward the center. In each case, the effects the same as those of the example shown in FIG. 5 can be obtained. Note that, although illustration is omitted, the limiting member 150 limiting the passage region of the aerosol may be disposed at the inlet edge 300A of the support member 300 in the mode depicted in FIG. 7 similar to the mode shown in FIG. 6. In this case, since the slopes are utilized similar to the cases described below in FIG. 17 and FIG. 19, the mixing space 302 can be created between the limiting member 150 and the channel 301 even if the protrusions 303 in FIG. 6 or the like are not provided. In addition, the limiting member 150 can be placed not only on the same plane of the inlet edge 300A but also at an intermediate position in the depth direction of the mixing space 302 since the slopes are utilized.

[0110] An example of the size of the support member 300 shown in FIG. 5 is shown in Table. 1. The size of the support member 300 shown in Table 1 is an example of an appropriate size and may be variously modified according to the kind and amount of the base member 110A of the aroma-generating source to be heated 110 practically. Here, the material of the support member 300 consists of silicone and has a diameter of 6.93 mm. Moreover, diameters of the channels 301B and 301D are each 2.50 mm, whereas diameters of the channels 301A and 301C are each 2.20 mm.

Table 1 (Unit: mm)

	Diameter of support member	Radius of support member	Cross-sectional area of inlet edge of support member
	6.93	3.47	37.70
	Diameter of channel	Radius of channel	Cross-sectional area of channel
Channel 301A	2.2	1.10	3.8
Channel 301B	2.5	1.25	4.91
Channel 301C	2.2	1.10	3.8
Channel 301D	2.5	1.25	4.91
Summation of diameters of channels			17.41
Ratio of cross-sectional area of inlet edge of support member to summation of cross-sectional areas of channels			46.18 (Unit: %)

<Second Embodiment>

[0111] A support member 400 of the present embodiment has the following characteristics as shown in FIG. 8. The support member 400 has an inlet edge 400A located on a side of the aroma-generating source to be heated 110 shown in FIG. 1 and FIG. 2(A) (see FIG. 8(A)) and an outlet edge 400 located on a side of the transporting member 120 (see FIG. 8(B)).

[0112] Channels 401 (channel 401A to channel 401D) for the aerosol streams passing from the inlet edge 400A to the outlet edge 400B are provided in the support member 400. Although the number of channels 401 passing through the inside of the support member 400 is four in the illustrated example, the number may be three or less or five or more.

[0113] Four channels 401A to 401D are composed of plural kinds of channels with cross-sectional areas different from one another. In the illustrated example, the cross-sectional areas of the channel 401A and the channel 401C are each smaller than the cross-sectional areas of the channel 401B and the channel 401D.

[0114] A mixing space 402 is provided at the inlet edge of the channel 401 of the support member 400 for mixing the aerosol streams flowing from the aroma-generating source to be heated 110 shown in FIG 1 and FIG. 2(A) to the support member 400. Specifically, a step (an inlet-edge positional difference) (see FIG. 8(A)) is formed between the inlet edge 400A of the support member 400 and the inlet edge of the channel 401, and the mixing space 402 is formed by an inlet-edge space formed by this step. On the other hand, there is a continuous flat surface between the outlet edge 400B of the support member 400 and the outlet edge of the channel 401 without any step (outlet-edge positional difference) (see FIG. 8(B)).

[0115] Formation of the mixing space 402 for mixing the aerosol streams at the inlet edge of the channel 401 of the

support member 400 in this manner stabilizes the aerosol streams passing through the support member 400 and realizes the effect whereby a user can readily breathe the aroma components released from the aroma-generating source to be heated 110.

[0116] Although the mixing space 402 is formed by the inlet-edge space formed by the step between the inlet edge 400A of the support member 400 and the inlet edges of the channels 401 in the present embodiment, a step may be provided between the outlet edge 400B of the support member 400 and the outlet edges of the channels 401, and the mixing space 402 may be formed by the outlet-edge space created by this step. Moreover, the mixing spaces 402 may be formed on both of the inlet-edge 400A side and the outlet-edge 400B side of the support member 400.

[0117] FIG. 9 shows an example in which a limiting member 160 is provided at the inlet edge 400A of the support member 400 for limiting the passage region of the aerosol flowing from the support member 400 to the transporting member 120 (see FIG. 1 and FIG. 2(A)).

[0118] The limiting member 160 is composed of a thin plate provided with a number of minute size openings 161 allowing the aerosol to pass therethrough and is engaged in the mixing space 402 of the support member 400. When the limiting member 160 is engaged in the mixing space 402, one or a plurality of protrusions 403 (FIG. 9(B)) supporting the limiting member 160 is formed on the side of the inlet edge 400A of the support member 400 so that the mixing space 402 is created between the limiting member 160 and the inlet edge of the channel 401. It is possible to prevent the deficiency whereby a part of the base member 110A of the aroma-generating source to be heated 110 leaks toward the side of the support member 300 by providing the limiting member 160.

[0119] Moreover, similar to the limiting member 150, the limiting member 160 may be provided so as to exist in the same plane as the inlet edge 400A or may be placed at an intermediate position in the depth direction of the mixing space 402, by which not only can the base member 110A be prevented from dropping or moving but also a slight protrusion (protuberance) of the base member 110A can be readily permitted when pierced with the heating element 211.

[0120] The limiting member 160 may be provided on the side of the outlet edge 400B of the support member 400, that is, on the side without the mixing space 402. However, it is preferred to place the limiting member 160 in the mixing space 402 in view of the facility in attachment.

[0121] Although the inlet-edge space formed by the step (inlet-edge positional difference) between the inlet edge 400A of the support member 400 and the inlet edges of the channels 401 is utilized as the mixing space 402 in the example shown in FIG. 8, a slope may be formed between the inlet edge 400A of the support member 400 and the inlet edges of the channels 401 to utilize the inlet-edge space formed by this slope as the mixing space 402 as shown in FIG. 10.

[0122] Note that, although illustration is omitted, the limiting member 160 may be placed at the inlet edge 400A or the outlet edge 400B of the support member 400 in the mode shown in FIG. 10, similar to the mode shown in FIG. 9. Since the slope is also utilized in this case, the mixing space 402 can be created between the limiting member 160 and the inlet edge of the channel 401 even if the protrusions 403 or the like of FIG. 9 are not provided. In addition, the limiting member 160 can be placed not only on the same plane of the inlet edge 400A but also at an intermediate position in the depth direction of the mixing space 402 since the slope is utilized.

<Third Embodiment>

[0123] As shown in FIG. 11, a support member 500 of the present embodiment has an inlet edge 500A located on the side of the aroma-generating source to be heated 110 shown in FIG. 1 and FIG. 2(A) and an outlet edge 500B located on the side of the transporting member 120. Furthermore, channels 501 for the aerosol streams passing from the inlet edge 500A to the outlet edge 500B are formed in the support member 500.

[0124] As shown in FIG. 11(A), a mixing space 502 for limiting the passage region of the aerosol is formed at intermediate portions of the channels 501 of the support member 500. Specifically, a step is provided at the intermediate portion of the channel 501, and the mixing space 502 is formed by an intermediate space formed by this space.

[0125] Formation of the mixing space 502 for mixing the aerosol streams at the intermediate portions of the channels 501 of the support member 500 stabilizes the aerosol streams passing through the support member 500 and realizes the effect whereby a user can readily breathe the aroma components released from the aroma-generating source to be heated 110.

[0126] As shown in FIG. 11(B), it is also possible to prevent the deficiency whereby a part of the base member 110A leaks toward the side of the support member 500 by providing the limiting member 160 having a number of openings 161 in the mixing space 501 within the support member 500, similar to the First and Second Embodiments. The limiting member 160 may be disposed on the inlet edge 500A side of the support member 500 so as to be adjacent to the aroma-generating source to be heated 110 (see FIG. 1 and FIG. 2).

[0127] Although the space formed by the steps at the intermediate portions of the channels 501 is utilized as the mixing space 502 in the examples shown in FIG. 11, a space formed by slopes of the intermediate portions of the channels may be utilized as the mixing space 302 as shown in FIG. 12.

[0128] Although the outer circumference side of the inlet edge 300A of the support member 300 protrudes on the side

of the aroma-generating source to be heated 110 more than the center side thereof in the case of the mode shown in FIG. 5 of the First Embodiment, a structure may be employed in which the center side of the inlet edge 300A of the support member 300 protrudes toward the side of the aroma-generating source to be heated 110 more than the outer circumference side thereof as shown in FIG. 13A.

[0129] Similarly, although the outer circumference side of the inlet edge 300A of the support member 300 protrudes toward the side of the aroma-generating source to be heated 110 more than the center side thereof in the case of the mode shown in FIG. 7, a structure may be employed in which the center side of the inlet edge 300A of the support member 300 protrudes toward the aroma-generating source to be heated 110 more than the outer circumference side thereof as shown in FIG. 13.

[0130] The shapes of the support members 300, 400, and 500 are not limited to those of the aforementioned examples, and a variety of design modifications may be carried out. For example, the outer circumference of the inlet edge 300A of the support member 300 may have a sphere shape as shown in FIG. 14 and FIG. 15. The support member 300 shown in FIG. 14 is a mode where the outer circumference side of the inlet edge 300A protrudes toward the aroma-generating source to be heated 110 more than the center side thereof, while the support member 300 shown in FIG. 15 is a mode where the center side of the inlet edge 300A protrudes toward the aroma-generating source to be heated 110 more than the outer circumference side thereof.

<Fourth Embodiment>

[0131] In the First to Third Embodiments, the modes are explained in which four channels are provided in the support members. In the present embodiment, a mode is explained in which one or two channels are formed in the support member, and the mixing space is provided at the inlet edge of the support member. In all of the drawings for explaining the following modes, the same reference numeral is provided to the components having the same function, and a duplicating explanation thereof is omitted.

[0132] In FIG. 16, a perspective view, a front view, a side view, and a bottom view of a mode of a support member 600 are illustrated. FIG. 16 is a mode in which a channel 601 is provided at a center portion of the columnar shape support member 600, a slope is formed between an inlet edge of the support member 600 and an inlet edge of the channel 601, and an inlet-edge space formed by this slope is utilized as the mixing space 602.

[0133] FIG. 17 demonstrates a mode in which a limiting member 190 for limiting the aerosol flowing from the support member 600 to the transporting member 120 (see FIG. 1 and FIG. 2(A)) is disposed at the inlet edge of the support member 600 shown in FIG. 16. FIG. 17(A) shows an example where the limiting member 190 is provided at the outermost circumference portion of the inlet edge of the support member 600, while FIG. 17(B) shows an example where the limiting member 190 is provided at a location closer to the center portion (channel 601) than the outermost circumference portion of the inlet edge of the support member 600.

[0134] The limiting member 190 may be a thin plate (FIG. 17(C)) provided with a number of minute size openings 191 allowing the aerosol to pass therethrough or may have a matrix shape frame portion 192 (FIG. 17(D)). Although the function to limit the passage region of the aerosol flowing from the aroma-generating source to be heated 110 to the support member 600 may be low in the case of the limiting member 190 shown in FIG. 17(D), it is possible to obtain an effect that an excessive load applied to the aroma-generating source to be heated 110 by the heating element 211 can be reduced when the heating element 211 installed in the fragrance article 200 shown in FIG. 1 is inserted to the aroma-generating source to be heated 110.

[0135] In FIG. 18, a perspective view, a front view, a side view, and a bottom view of a mode of the support member 600 are illustrated. FIG. 18 is a mode in which an outermost circumference portion of the inlet edge of the columnar shape support member 600 is a flat surface, a slope is provided from the inside thereof toward the center direction, and an inlet-edge space formed by this slope is utilized as the mixing space 602.

[0136] FIG. 19 demonstrates a mode in which the limiting member 190 is disposed at the inlet edge of the support member 600 shown in FIG. 18. FIG. 19(A) shows an example where the limiting member 190 is provided at the outermost circumference portion of the inlet edge of the support member 600, while FIG. 19(B) shows an example where the limiting member 190 is provided at a location closer to the center portion (channel 601) than the outermost circumference portion of the inlet edge of the support member 600.

[0137] The limiting member 190 may be a thin plate provided with a number of minute size openings 191 allowing the aerosol to pass therethrough as shown in FIG. 19(C) or may have a matrix shape frame portion 192 as shown in FIG. 19(D).

[0138] In FIG. 20, a front view, a side view, and a bottom view of a mode of the support member 600 are illustrated. FIG. 20 is a mode in which a slope inclining to the channel 601 in two directions is provided at the inlet edge of the columnar shape support member 600 and an inlet-edge space formed by this slope is utilized as the mixing space 602.

[0139] In FIG. 21, a front view, a side view, and a bottom view of a mode of the support member 600 are illustrated. FIG. 21 is a mode in which a slope inclining toward the channel 601 in one direction is provided at the inlet edge of the columnar shape support member 600 and an inlet-edge space formed by this slope is utilized as the mixing space 602.

[0140] In FIG. 22, a perspective view, a front view, a side view, and a bottom view of a mode of the support member 600 are illustrated. FIG. 22 is a mode in which slopes inclining toward the channel 601 in two directions and having a center portion side protruding toward the side of the aroma-generating source to be heated 110 (FIG. 1 and FIG. 2(A)) more than an outer circumference portion side are provided at the inlet edge of the columnar shape support member 600 and an inlet-edge space formed by these slopes is utilized as the mixing space 602.

[0141] In FIG. 23, a front view, a side view, a top view, and a bottom view of a mode of the support member 600 are illustrated. FIG. 23 is a mode in which two channels 601 are formed in the columnar shape support member 600 and the inlet edge of the support member 600 is diagonally cut to form an inlet-edge space utilized as the mixing space 602.

[0142] In FIG. 24, a perspective view, a front view, a side view, and a bottom view of a mode of the support member 600 are illustrated. FIG. 24 is a mode in which two channels 601 are formed in the columnar shape support member 600, slopes inclining to the channels 601 in two directions are formed, and an inlet-edge space formed by these slopes is utilized as the mixing space 602.

[0143] In FIG. 25, a perspective view, a front view, a side view, and a bottom view of a mode of the support member 600 are illustrated. FIG. 25 is a mode in which two channels 601 are formed in the columnar shape support member 600, a slope inclining to the channels 601 in one direction is formed at a part of the inlet edge of the support member 600, and an inlet-edge space formed by the slope is utilized as the mixing space 602.

[0144] In FIG. 26, a perspective view, a front view, a side view, a top view, and a bottom view of a mode of the support member 600 are illustrated. FIG. 26 is a mode in which two channels 601 are formed in the columnar shape support member 600, conical slopes inclining to the channels 601 in two directions are formed at the inlet edge of the support member 600, and an inlet-edge space formed by these slopes is utilized as the mixing space 602.

[0145] In FIG. 27, a front view, a side view, a top view, and a bottom view of a mode of the support member 600 are illustrated. FIG. 27 is a mode in which two channels 601 are formed in the columnar shape support member 600, slopes with a center portion side protruding toward the side of the aroma-generating source to be heated 110 (FIG. 1 and FIG. 2(A)) more than an outer circumference side are provided in two directions at the inlet edge of the columnar shape support member 600, and an inlet-edge space formed by these slopes is utilized as the mixing space 602.

[0146] In FIG. 28, a perspective view, a front view, a side view, a top view, and a bottom view of a mode of the support member 600 are illustrated. FIG. 28 is a mode in which two channels 601 are formed in the columnar shape support member 600, a conical slope with a center portion side protruding toward the side of the aroma-generating source to be heated 110 (FIG. 1 and FIG. 2(A)) more than an outer circumference side is provided at the inlet edge of the columnar shape support member 600, and an inlet-edge space formed by this slope is utilized as the mixing space 602.

[0147] In FIG. 29, a front view, a side view, a top view, and a bottom view of a mode of the support member 600 are illustrated. FIG. 29 is a mode in which the channel 601 is formed at the center portion of the columnar shape support member 600, slopes inclining toward the channel 601 in two directions are provided at the inlet edge of the columnar shape support member 600, and an inlet-edge space formed by these slopes is utilized as the mixing space 602.

[0148] In FIG. 30, a perspective view, a front view, a side view, and a bottom view of a mode of the support member 600 are illustrated. FIG. 30 is a mode in which the channel 601 is formed at the center portion of the columnar shape support member 600, a conical slope with an outer circumference portion side protruding toward the side of the aroma-generating source to be heated 110 (FIG. 1 and FIG. 2(A)) more than a center side portion is provided at the inlet edge of the columnar shape support member 600, and an inlet-edge space formed by this slope is utilized as the mixing space 602. Moreover, the outermost circumference portion at the inlet edge of the support member 600 is a conical slope with the center portion side protruding toward the side of the aroma-generating source to be heated 110 more than the outer circumference portion side.

[0149] In FIG. 31, a perspective view, a front view, a side view, and a bottom view of a mode of the support member 600 are illustrated. FIG. 31 is a mode in which the channel 601 is formed at the center portion of the columnar shape support member 600, a conical slope with a center portion side protruding toward the side of the aroma-generating source to be heated 110 (FIG. 1 and FIG. 2(A) more than an outer circumference portion side is provided at the inlet edge of the columnar shape support member 600, and an inlet-edge space formed by this slope is utilized as the mixing space 602.

[0150] In FIG. 32, a partly broken perspective view of a mode of the support member 600 is illustrated. FIG. 32 is a mode in which one channel 601 is formed at the center portion of the columnar shape support member 600, a columnar shape central member 193 is inserted in the channel 601, and the mixing space 602 is formed by an inlet-edge space formed by a step between the inlet edge of the support member 600 and an edge portion of the central member 193.

[0151] The central member 193 is fixed to the inside of the channel 601 with a fixing portion 194 integrally formed with the central member 193, and a gap between an inner surface of the support member 600 and the central member 193 forms the channel 601.

[0152] Although the inlet edge of the support member 600 protrudes toward the side of the aroma-generating source to be heated 110 (FIG. 1 and FIG. 2(A)) more than an edge portion of the central member 193 in the mode shown in FIG. 32, the edge portion of the central member 193 may protrude toward the side of the aroma-generating source to

be heated 110 more than the inlet edge of the support member 600 as demonstrated by the mode shown in FIG. 33.

[0153] In the present embodiment, the formation of the mixing space 602 for mixing the aerosol streams at the inlet edge of the channel 601 of the support member 600 allows the aerosol flowing from the aroma-generating source to be heated 110 to the support member 300 to stay once in the mixing space 302 in terms of time and space and then to flow to the channel 601.

[0154] With this mechanism, the traditional time-depending non-uniformity, time difference, or regional non-uniformity caused by the successive fluctuation of the flow quantity and flow rate of the aerosol resulting from the non-uniformity of the filling state of the filler which is the base member in the heating aroma-generating source is uniformed by the mixing space 602. Hence, it is possible to obtain the effects whereby the aerosol streams passing through the support member 600 are stabilized and a user can readily breathe the aroma components released from the aroma-generating source to be heated 110.

[0155] In addition, with respect to the traditional problems in that it is difficult to breathe and an excessive load is applied to the heating aroma-generating source when the heating element is inserted to the heating aroma-generating source, it is possible to obtain the effects whereby the insertion of the heating element is facilitated and operability can be improved by stably supporting the aerosol-forming base member to avoid the excessive load when the heating element is inserted, while securing the channel through which the aerosol is transported in the aroma cartridge of the fragrance article.

<Fifth Embodiment>

[0156] Next, a fragrance article having a member with a reader (hereinafter, referred to as an ID-detecting portion) reading information of an ID chip is explained where the aroma cartridges 1 according to the variety of aforementioned modes each have the ID chip (also referred to as an IC chip).

[0157] The ID-detecting portion of the fragrance article of the present Fifth Embodiment provided to the member reads the information of the ID chip disposed to the aroma cartridge 1, and a controlling portion described below performs appropriate heat control on the basis of this information (e.g., the kind of aroma-generating source to be heated in the cartridge, ambient environments, and the like) to realize an appropriate state of the aroma components in breathing.

[0158] FIG. 34 is a cross-sectional view of the aroma tool of the Fifth Embodiment. Note that explanations for the items with the same reference numerals in the aforementioned drawings are omitted. In the fragrance article of the embodiment, the aroma cartridge 1 having the ID chip is referred to as an aroma cartridge 700 equipped with an ID chip, and the member having the ID-detecting portion is referred to as a member 800 equipped with an ID-detecting portion. Furthermore, the fragrance article composed of the aroma cartridge 700 equipped with an ID chip, the member 800 equipped with an ID-detecting portion, and the like is referred to as a fragrance article 900 with an ID-detecting function.

[0159] The fragrance article 900 with an ID-detecting function of FIG. 34 is an example for a usage mode of the aroma cartridge shown by the support member 301B2 which represents the support members of the variety of aforementioned modes and corresponds to FIG. 1.

[0160] The aroma cartridge 1 shown here has the ID chip 313 as an ID portion to be detected on a peripheral portion of the support member. The support member having the ID chip 313 is referred to as a support member 313B2 equipped with an ID chip in the embodiment.

[0161] In addition, the fragrance article 900 with an ID-detecting function has a sensor 906 as the ID-detecting portion for detecting the ID information memorized in the ID chip 313 at a position corresponding to the ID chip 313 on an outer wall portion of the member 800 equipped with an ID-detecting portion to which this aroma cartridge 1 is installed (inserted).

[0162] In this case, various kinds of information can be transmitted and received between the ID chip 313 and the sensor 906 through the NFC (near field communication). Here, the ID information of the support member 301B2 and the aroma cartridge 100, e.g., the kind, the manufacturer, the manufacturing number, the manufacturing time, and the like, is memorized on the ID chip 313 side and is detected on the sensor 906 side. Note that, in the case of such simple information, an ID tag or the like showing a predetermined pattern or the like may serve as the side of the ID portion 313 to be detected, an RFID (radio frequency identifier) or the like may be used to utilize the near field communication through electromagnetic waves or electric waves, or the pattern or the like shown by the ID tag may be detected with a transmitting-type or reflective-type photosensor or the like which serves as the ID-detecting portion 906 side.

[0163] The state (for example, rotation) of the aroma cartridge 700 equipped with an ID chip when inserted to the member 800 equipped with an ID-detecting portion cannot be predicted. Therefore, a plurality of ID chips 313 is peripherally arranged around the support member 303B2 equipped with an ID chip (for example, in silicone). Alternatively, the sensors 906 (ID-detecting portions) are continuously and peripherally arranged (or continuously and peripherally arranged at a predetermined gap) around the member 800 equipped with an ID-detecting portion, and the ID chips 313 of the aroma cartridge 700 equipped with an ID chip are peripherally arranged at predetermined positions when the sensor 906 (ID-detecting portion) is extremely small similar to the ID chip 313.

[0164] FIG. 34 is an example in which the plurality of ID chips 313 is peripherally arranged around the locations of the

predetermined positions of the support member 301B2 equipped with an ID chip of the aroma cartridge 700 equipped with an ID chip, and the sensors (ID-detecting portions) are continuously and peripherally arranged around the member 800 equipped with an ID-detecting portion (preferably on the inner wall side). For example, the sensors 906 (ID-detecting portions) are peripherally arranged at each of the positions with a gap of 5 mm, 10 mm, or 30 mm. Note that a connection line of the sensors 906 (ID-detecting portions) to the controlling portion described below is not illustrated.

[0165] Note that, when the location of the predetermined position of the support member 301B2 equipped with an ID chip is one, it is arranged on the side of the aroma-generating source to be heated 110.

[0166] Note that FIG. 34 is an example in which peripheral arrangement is carried out on the side of the filter member 130 of the support member 301B2 equipped with an ID chip in order to detect the insertion angle of the aroma cartridge 700 equipped with an ID chip. In the case where it is not necessary to obtain the insertion angle, the side of the filter member 130 is not required.

[0167] The ID chips 313 of the support member 301B2 equipped with an ID chip on the side of the aroma-generating source to be heated 110 are each located on a line parallel to a center axis (not illustrated) of the cartridge 700 equipped with an ID chip.

[0168] Namely, the fragrance article 900 with an ID-detecting function makes it possible to calculate the insertion position, distance, angle, or the like of the aroma cartridge 700 equipped with an ID-chip in the member 800 equipped with an ID-detecting portion and also makes it possible to read the ID information (for example, the kind, manufacturer, manufacturing number, manufacturing time, and the like). Note that the connection line with the controlling portion described below is not illustrated. Note that a specific calculation treatment of the insertion position, distance, angle, or the like will be explained using flow charts when the controlling portion is explained.

[0169] FIG. 34 is explained in further detail. A shape of the support member 301B2 equipped with an ID chip serving as a structural member of the aroma cartridge 700 equipped with an ID chip may use the shapes of FIG. 5 to FIG. 33 explained above.

[0170] Among these drawings, the drawings of the cases using the support member 300 of FIG. 5(B), the support member 400 of FIG. 10, and the support member 500 in FIG. 11 are shown below.

[0171] FIG. 35 is a perspective view of the case where the ID chips 313 are provided to the support member 300 of FIG. 5(B). Although the ID chips 313 are disposed on each of members 302A, 302B, 302C, and 302D, an example is illustrated in FIG. 35 where the ID chip 313 is disposed only on the member 302A. Moreover, the ID chips 313 may be provided on the inlet edge 300A side and the outlet edge 300B side.

[0172] FIG. 36(A) is a perspective view of the case where the ID chips 313 are provided to the support member 400 of FIG. 10. Note that the ID chip 313 disposed at the outlet edge 400B is not illustrated in FIG. 36(A).

[0173] FIG. 36(B) is a perspective view of the case where the ID chips 313 are provided to the support member 500 of FIG. 11. Note that FIG. 36(B) is a perspective view of a cross section at a predetermined position on the inlet side from the center of the support member 500 of FIG. 10.

[0174] The ID chip 313 disposed at the outlet edge 400B is not illustrated. However, FIG. 36(A) and FIG. 36(B) show only two upper and lower ID chips 313.

[0175] That is, since the plurality of ID chips 313 is peripherally arranged on the periphery, any one of the ID chips 313 faces the ID-detecting portion 53 even if inserted into the member 800 equipped with an ID-detecting portion regardless of the rotation thereof, by which the ID information can be always detected.

[0176] Furthermore, cross-sectional views of the cases in which the ID chips 313 are provided to the support members 300 in the aroma cartridges 100 of the aforementioned FIG. 2(A) to FIG. 2(E) and the sensors 906 (ID-detecting portions) are disposed to the fragrance article 200 are respectively shown in FIG. 37(A) to FIG. 37(E).

[0177] That is, FIG. 37(A) to FIG. 37(E) show other examples of the usage mode of the aroma cartridge similar to those of FIG. 34. Here, the plurality of ID chips 313 is included on the peripheral portion of the support member 300. Moreover, the fragrance article 200 and the aroma tool 5 have the ID-detecting portions (hereinafter, referred to as sensors 906) at the plurality of positions corresponding to the plurality of ID chips 313.

[0178] Hence, it is possible to cool the aerosol transported from the support member 300 to the filter member 130, to detect the insertion position, the distance, the angle, and the like, to detect the ID information (e.g., the kind, the manufacturer, the manufacturing number, the manufacturing time, and the like), and to facilitate appropriate operation for optimal overheat-control and breathing as shown in FIG. 37(A).

[0179] The filter member 130 is elongated instead of omitting the transporting member 120 to allow the filter member 130 to have an aerosol-cooling function as shown in FIG. 37(B), by which not only can breathability in the aroma cartridge 100 be improved to facilitate breathing of the aroma components in the aerosol, but also the number of components of the aroma cartridge 100 can be reduced. In addition, the insertion position, the distance, the angle, and the like can be detected, and the ID information (e.g., the kind, the manufacturer, the manufacturing number, the manufacturing time, and the like) can be detected so that the optimal overheat-control operation and optimal breathing operation are facilitated.

[0180] In addition, partitioning member 170 is interposed between the aroma-generating source to be heated 110 and the support member 300 as shown in FIG. 37(C), by which not only can the deficiency whereby the aroma-generating

source to be heated 110 moves in the aroma cartridge 100 due to vibration when being transported or the like be avoided, but also the insertion position, the distance, the angle, and the like can be detected. Moreover, the ID information (e.g., the kind, the manufacturer, the manufacturing number, the manufacturing time, and the like) can be detected, and the optimal operation for overheat-control and optimal breathing operation are facilitated.

[0181] Moreover, it is possible not only to suppress scattering of the aroma components in the aroma-generating source to be heated 110, but also to avoid the deficiency whereby the aroma-generating source to be heated 110 drops outside the aroma cartridge 100 due to vibration when being transported or the like as shown in FIG. 37(D). Furthermore, the heating element 211 (FIG. 1) can be readily inserted into the aroma-generating source to be heated 110, and the insertion position, the distance, the angle, and the like can be detected. Moreover, the optimal overheat-control and optimal breathing control are facilitated by detecting the ID information (e.g., the kind, the manufacturer, the manufacturing number, the manufacturing time, and the like).

[0182] Moreover, the support member 300 in the structure of FIG. 37(B) may be elongated to allow the support member 300 to have an aerosol-cooling function as shown in FIG. 37(E).

[0183] Next, the connection structure of the controlling portion and each sensor or the like is explained using FIG. 38. Note that the controlling portion is frequently disposed on the lower side of the fragrance article.

[0184] As shown in FIG. 38, the controlling portion 9 is configured to include a CPU 900A serving as a central controlling portion, a memory 901 composed of a ROM, a RAM, a SD, an HDD, and the like, a power source 902, a heat-control portion 903 for controlling a heater or the like, a detection-controlling portion 904 controlling each of the sensors to detect various information, a system bus 99 for transmitting and receiving data or the like therebetween, and the like. In addition, a LED group or a display portion for promoting an operator of the fragrance article 900 with an ID-detecting function to perform appropriate control is connected. The LED group and the display portion are collectively called a user-guiding portion 905 in the present embodiment.

[0185] The heat-controlling portion 903 controls the heating element 211 referring to the detected information or the like from a sensor (sensor Z) 94z detecting the amount of heat generation, the heating temperature, and the like of the heating element 211. Furthermore, the detection-control portion 904 transmits and receives control information to the heat-control portion 903 through the system bus 99 or the like on the basis of the detected information from the aforementioned sensor 94z in association with the CPU 900A.

[0186] Furthermore, the detection-control portion 904 obtains various detected information from a power-control sensor (sensor A) 94a for detecting a state of the power source 902 such as an output voltage, an output current, and remaining battery level, a sensor (sensor B) 94b detecting the environment temperature, the environment humidity, and the like, and a sensor (sensor C) 94c performing various sensing and outputs signals to control each sensor in association with the CPU 900A.

[0187] In addition to these pieces of information, the detection-control portion 904 obtains various information including the ID information from the ID chips 313 of the aroma cartridge 1 through the sensors (ID-detecting portions 906) and outputs signals for controlling guiding regarding the operation of the aroma cartridge, such as user guiding including the switching of the LED, which shows a variety of states and is not illustrated in the drawing, on and off.

[0188] Here, the plurality of ID chips 313 is arranged on the peripheral portion of the support member. In addition, the fragrance article 200 has the ID-detecting portions 906 (hereinafter, referred to as sensors 906) at the plurality of positions corresponding to the plurality of ID chips. In the sensors 906 of this case, the distance from each ID chip 313 to the corresponding sensor 906 in addition to the ID information described above are detected. It can be realized by a variety of sensors configured to detect a minute distance or the like (a proximity sensor, a displacement sensor, a length-measuring sensor detectable in a μm order). It is possible to obtain the information of the aroma cartridge 1 in the inserted state from the distance between each ID chip 313 and the sensor 906. This treatment will be explained in detail in the section of the flow charts of the control portion 9.

[0189] For example, it is possible to obtain the distance to the final insertion position according to the value of the distance and to detect the tilt of the insertion or the like through a difference value between the center axis of the aroma cartridge 1 and a center axis of the insertion portion obtained by a difference in sensor value. A variety of user guides can be carried out by showing these detection results using the LED, the display panel, or the like which is not illustrated. Furthermore, it is possible not only to determine the kind of the aroma cartridge and the like but also to facilitate the insertion operation to the center position, thereby obtaining operability according to the purpose such as "stabilization of the aerosol flow", "stable support of the heating aroma-generating source when inserting the heating element", and "improvement of the easy operability when inserting the cartridge".

[0190] Note that although the plurality of ID chips 313 and the plurality of sensors 906 are used in the aforementioned examples, it is also possible to obtain the distances from the plurality of sensors to one ID chip.

[0191] In addition, the sensors 906 may not be divided, but may have a continuing shape. Furthermore, the ID portion to be detected can be realized by another means such as processing of the specific position on the side of the aroma cartridge 1 to form a specific shape without providing a specific part such as the ID chip and ID tag described above.

[0192] Next, the treatments by the CPU 900 and the memory 901, which provide the predetermined instructions to

the aforementioned detection-control portion 904 and the heat-control portion 903, are explained using the flow charts.

[0193] FIG. 39 and FIG. 40 are flow charts explaining the treatments by the CPU 900A based on a program of the memory 901 of the control portion 9. A number is allocated to the ID-detecting portion 906.

[0194] Note that the ID information memorized in the ID chip 313 preferably includes, in addition to the kind of the material, the manufacturer, the manufacturing number, the manufacturing time, and the like, the optimal heating temperature for the kind of the material.

[0195] Upon pushing a power-source ON button (not illustrated), the CPU 900A performs the following processes on the basis of the program of the memory 901.

[0196] Upon turning on the power source, an instruction (command) to start up all of the sensors is output to the detection-controlling portion 904 (S10). With this step, the detection-controlling portion 904 becomes able to obtain various sensor information. At this time, an instruction to switch the LED group (user-guiding portion 905) on and off is output in order to promote the aroma cartridge to be inserted into the member 800 equipped with an ID-detecting portion. Alternatively, an instruction to display a message on the display portion (user-guiding portion 905) is output. With this step, an operator of the fragrance article 900 with an ID-detecting function inserts the aroma cartridge 700 equipped with an ID chip into the chamber 800 equipped with an ID-detecting portion.

[0197] Next, it is judged whether there is any output of the ID-detection information (the kind of material, the manufacturer, the manufacturing number, the manufacturing time, the optimal heating temperature, the number of the sensor (906)) from the sensor 906 (ID-detecting portion) (S20).

[0198] In the case where it is judged as the ID-detection information in the step S20, this ID-detection information is memorized in the memory 901 (S30).

[0199] Furthermore, the number of the sensor (906) included in the ID-detection information is read, and the distance (insertion distance) from the aroma-generating source to be heated 110 (S40) is calculated using the number. This calculation is feasible because the sensor number is coupled to the distance value to a bottom portion of the member 800 equipped with an ID-detection portion in the memory 901.

[0200] An example of a specific method is explained using FIG. 41(A) and FIG. 41(B). FIG. 41(A) is a cross-sectional view of a state in which the aroma cartridge 700 equipped with an ID chip of the fragrance article 900 with an ID-detecting function of FIG. 34 is inserted slightly before the heating portion 211. FIG. 41(B) is a cross-sectional view of a state in which the aroma cartridge 700 equipped with an ID chip is completely inserted into the heating portion 211.

[0201] Since the sensors 906 are peripherally arranged with a predetermined distance at a periphery of the inner wall of the member 800 equipped with an ID-detecting portion in a region from a slightly close side toward the entry with respect to the heating portion 211 to a little inner side from the entry , the ID chips 313 disposed on the support member 301B2 equipped with an ID chip face any of the sensors 906 when being inserted. That is, the sensors 909 detect the ID-detection information one by one from the sensor located near the entry while being inserted. The numbers are allocated to each of the sensors, and the control portion 9 reads, on the basis of the numbers of the sensors 906, the distance to the bottom portion of the member 800 equipped with an ID-detecting portion coupled to these numbers so that the calculation can be carried out.

[0202] Furthermore, in the state of FIG. 41(B) in which the aroma-generating source to be heated 110 of the aroma cartridge 700 equipped with an ID chip is completely inserted to the heating portion 211, the ID chip 313 on the side of the aroma-generating source to be heated 110 of the support member 1000 equipped with an ID chip opposes the sensor 909 farthest from the entrance. When this sensor 906 detects the ID-detection information, it is judged to be the optimal insertion position.

[0203] Furthermore, it is judged whether the insertion distance is optimal or not (S50). For example, when the insertion distance is from several micrometers or less (e.g., 5 μm) to several millimeters (e.g., 1 mm), it is judged to be the optimal insertion distance.

[0204] When it is judged not to be the optimal distance in step S50, the LED group of the user-guiding portion 95 flashes on and off (e.g., red and blue), and the process is returned to the step S40 (S60).

[0205] Moreover, when it is judged to be the optimal insertion distance in step 50, the LED group (e.g., blue and blue) informing completion of the insertion flashes on and off, and control data for informing the completion of the optimal insertion is output to the detection-controlling portion 94 (S70). Then, availability-judging processes are carried out (S80 and S90). (Availability-judging process)

[0206] In the availability-judging processes S80 and S90, the ID-detection information (the kind of the material, the manufacturer, the manufacturing number, the manufacturing time, the optimal heating temperature, the number of the sensor (906) and the like) memorized in the step S30 is compared with usage-permission information (the kind of the material, the manufacturer, the manufacturing number, and the manufacturing time) memorized in the memory in advance to judge whether available or not (S80 and S90). Note that the ID-detection information may not include the kind of the material, the manufacturer, the manufacturing number, the manufacturing time, the optimal heating temperature, and the heating time. In this case, an ID number is simply employed, and the ID number is memorized and is coupled with the kind of the material, the manufacturer, the manufacturing number, the manufacturing time, the optimal heating

temperature, and the heating time in the memory 901. It may be judged to be an allowance to use in the case where there are the kind of the material, the manufacturer, the manufacturing number, and the manufacturing time coupled to the ID number from the memory 901 when the ID-detection information (simply referred to as an ID number) is received.

[0207] When the ID-detection information (the kind of the material, the manufacturer, the manufacturing number, the manufacturing time, the optimal heating temperature, and the number of the sensor (906)) matches the usage-permission information (the kind of the material, the manufacturer, the manufacturing number, and the manufacturing time), it is judged to be an allowance to use.

[0208] In the case where it is judged to be an allowance to use, the control data for flashing the LED group informing the permission of usage on and off (e.g., yellow and blue) or for displaying a message is output to the detection-control portion 904 (S110).

[0209] Then, the heat-control treatment is performed in accordance with the kind of the material as shown in FIG. 40 (S120).

<Heat-Control Process S120)>

[0210] In the heat-control process S120, the optimal heating temperature and the heating time included in the ID-detection information (the kind of the material, the manufacturer, the manufacturing number, the manufacturing time, the optimal heating temperature, and the heating time) are read, and the control data based on this information is output to the heat-control portion 903 for heating. The heat-control portion 903 supplies a heating power source to the heating portion 211, while monitoring the output of the sensor Z (94z). At this time, the control data for flashes the LED group informing the start of the heating on and off (e.g., yellow and red) or for performing display of a message is output to the detection-control portion 904.

[0211] Note that the kind of the material, the manufacturer, the manufacturing number, the manufacturing time, the optimal heating temperature, and the heating time may not be included in the ID-detection information. In this case, the ID number is simply employed, and the ID number is memorized and coupled with the kind of the material, the manufacturer, the manufacturing number, the manufacturing time, the optimal heating temperature, and the heating time in the memory 901. The heating process may be performed at the optimal heating temperature for the optimal heating time coupled to the ID number from the memory 901 when the ID-detection information (simply referred to as the ID number) is received.

[0212] Then, it is judged whether the overheating is completed or not (S130), and the process is returned to the step S120 to perform heating if the heating is not completed.

[0213] On the other hand, if it is judged not to be available, the controlling data for flashing the LED group informing unavailability on and off (e.g., red and red) or for performing display of a message is output to the detection-control portion 904 (S100).

[0214] In addition, the heat-control process S120 outputs the outside temperature and the humidity from the sensor B (94b) with the detection-control portion 904. Then, the overheating temperature and the overheating time are controlled in accordance with parameters memorized in the memory 901 in advance when the outside temperature and the humidity are lower than the standard values. Hence, it is possible to allow for breathing with the optimal taste without any influence by the outside temperature and the humidity.

<Other Embodiment 1>

[0215] Although the insertion distance is obtained with the sensor number of the step 40 in FIG. 39, the process to obtain the insertion angle may be carried out before this process. That is, the aforementioned process (insertion angle calculation process) where "the distance from each ID chip 313 to the corresponding sensor 906 is detected, which can be realized with a variety of sensors configured to detect a minute distance or the like (a proximity sensor, a displacement sensor, a length-measuring sensor detectable in a μm order), and it is possible to obtain the information of the aroma cartridge 1 in the inserted state (insertion angle) from the distance between each ID chip 313 and the sensor 906" is performed.

[0216] FIG. 42(A) is an explanatory drawing for explaining that the insertion angle can be calculated. FIG. 42(B) is a distance di (d1, d2, ...) between the ID chips 313 when inserted and the sensors 906, which is memorized in the memory 901.

<Insertion Angle Calculation Process>

[0217] In the insertion angle calculation process, a receiving signal intensity of the ID-detection information transmitted from the detection-control portion 904 and detected by the sensor 906 is read. Then, a table (not illustrated) of a receiving signal intensity and a distance value from the ID chip 313, which is memorized in the memory 901 in advance, is referred

to in order to obtain the distance di in accordance with the receiving signal intensity.

[0218] Then, every time the distance di is obtained, the distance di is coupled to the number of the sensor 906 which outputs the ID-detection information (see FIG. 42(B)). Generally, the insertion angle θi at the vicinity of the entrance can be calculated when a distance value between two points is obtained. When the insertion angle θi exceeds the angle set in advance, the LED group flashes on and off or a message is displayed to inform that the insertion angle is shifted.

<Other Embodiment 2>

[0219] Although it is explained that the mixing space is provided to the support member 301B2 equipped with an ID chip according to the aforementioned embodiment, the ID chip may be provided to a general support member without the mixing space as described above.

[0220] The aforementioned ID tag or the like detects the ID utilizing the transmitting or reflective light detection. Note that the ID tag receives an electric wave from a reader/writer for a certain period, converts the electric wave to electric power to operate the IC chip, and returns information to the reader/writer. Generally, since electric power is received as an electric wave, a battery is not necessary. A non-contact distance may be selected from 1 cm to 200 cm in accordance with usage. A reader/writer is a device in which a signal process portion and a RF module required for communication with an ID tag are integrated, transmits an electric wave from an antenna to the ID tag, and receives data transmitted by the ID tag. It is also possible to write data to the ID. The reader/writer outputs an electric wave for a certain period and receives the data of the ID tag for a certain period. It is possible to connect the reader/writer to a RS232C, a USB, or the like with a personal computer so as to perform control and process or execute the data.

[0221] As described above, the inventions made by the inventor are explained according to the embodiments thereof. However, needless to say, the present inventions are not limited to the aforementioned embodiments and may be variously modified within the concept thereof.

EXPLANATION OF REFERENCE NUMERAL

[0222]

100:	Aroma cartridge
110:	Aroma-generating source to be heated
110A:	Base member
120:	Transport member
130:	Filter member
140:	Outer circumference member
150:	Limiting member
151:	Openings
160:	Limiting member
161:	Opening
170:	Partitioning member
180:	Cap
190:	Limiting member
191:	Opening
192:	Frame portion
193:	Central member
194:	Fixing portion
200:	Fragrance article
210:	Entry
211:	Heating element
300:	Support member
300A:	Inlet edge
300B:	Outlet edge
301:	Channel
301A:	Channel
301B:	Channel
301C:	Channel
301D:	Channel
302:	Mixing space
303:	Protrusions

303B2: Support member 303B2 equipped with an ID chip
313: ID chip
400: Support member
400A: Inlet edge
400B: Outlet edge
401: Channel
401A: Channel
401B: Channel
401C: Channel
401D: Channel
402: Mixing space
403: Protrusions
500: Support member
500A: Inlet edge
500B: Outlet edge
501: Channel
600: Support member
601: Channel
602: Mixing space
700: Aroma cartridge equipped with an ID chip
800: Member equipped with an ID-detecting portion
900: Fragrance article with an ID-detecting function
9: Controlling portion
900A: CPU
901: Memory
902: Power source
903: Heat-control portion
904: Detection-controlling portion
94a: Sensor A
94b: Sensor B
94c: Sensor C
94z: Sensor Z
905: User-guiding portion
906: Sensor

Claims

1. A support member for an aroma cartridge arranged between an aroma-generating source to be heated and a filter member in an aroma cartridge, the support member comprising:

a channel for an aerosol stream passing from one edge surface on a side of the aroma source to be heated to the other edge surface on a side of the filter member; and
a mixing space provided to at least one of an inlet edge, an outlet edge, and an intermediate portion and mixing the aerosol stream.

2. The support member for an aroma cartridge according to claim 1,

wherein there is an inlet-edge positional difference between an outer circumference edge on the side of the one edge surface of the support member and the inlet edge of the channel, and
wherein the mixing space includes an inlet-edge space formed by the inlet-edge positional difference.

3. The support member for an aroma cartridge according to claim 2,
wherein the inlet-edge positional difference is formed by a step or a slope between the outer circumference edge on the side of the one edge surface of the support member and the inlet edge of the channel.

4. The support member for an aroma cartridge according to any of claims 1 to 3,

wherein there is an outlet-edge positional difference between the outer circumference edge on the side of the other edge surface and the outlet edge of the channel, and
wherein the mixing space includes an outlet-edge space formed by the outlet-edge positional difference.

5. The support member for an aroma cartridge according to claim 4,
wherein the outlet-edge positional difference is formed by a step or a slope between the outer circumference edge on the side of the other edge surface of the support member and the outlet edge of the channel.

6. The support member for an aroma cartridge according to any of claims 1 to 5,

wherein there is an intermediate space in an intermediate portion of the channel, the intermediate space continuing to the channel and having a wider cross-sectional area than the channel, and
wherein the mixing space includes the intermediate space.

7. The support member for an aroma cartridge according to any of claims 1 to 6,
wherein the channel includes a plurality of channels having cross-sectional areas different from one another.

8. The support member for an aroma cartridge according to any of claims 1 to 7, further comprising an outer circumference member structuring an outer circumference of the support member,
wherein the channel and the mixing space are formed by a hollow portion in which no composition material of the support member exists in the outer circumference member.

9. The support member for an aroma cartridge according to claim 8, wherein the outer circumference member is integrally formed.

10. The support member for an aroma cartridge according to any of claims 1 to 7,
wherein the channel is a hollow through hole formed in the support member.

11. A support member for an aroma cartridge arranged between an aroma-generating source to be heated and a filter member in an aroma cartridge, the support member comprising:

a support surface directly or indirectly supporting the aerosol-forming base member; and
a channel for an aerosol stream passing from one edge surface on a side of the aroma-generating source to be heated to the other edge surface on a side of the filter member,
wherein the support surface includes:

a first support surface; and
a second support surface on a downstream side of the first support surface.

12. The support member for an aroma cartridge according to claim 11,
wherein the second support surface continues to and is in contact with the first support surface.

13. The support member for an aroma cartridge according to claim 11 or 12,
wherein the second support surface is formed through a step.

14. The support member for an aroma cartridge according to any of claims 11 to 13,
wherein the first support surface or the second support surface is symmetrical with respect to a center axis in a longitudinal direction of the heating aroma-generating source.

15. The support member for an aroma cartridge according to any of claims 11 to 14,
wherein an area ratio of the second support surface to the first support surface is equal to or more than 0.25 times and equal to or less than 4.0 times.

16. A support member for an aroma cartridge arranged between an aroma-generating source to be heated and a filter member in an aroma cartridge, the support member comprising:

a support surface directly or indirectly supporting the heating aroma source; and
a channel for an aerosol stream passing from one edge surface on a side of the aroma-generating source to

be heated to the other edge surface on a side of the filter member,
wherein the support surface has a sloped surface with respect to a surface perpendicular to a center axis in a longitudinal direction of the heating aroma-generating source.

17. The support member for an aroma cartridge according to claim 16,
wherein the channel includes a hollow through hole formed in the support member.

18. The support member for an aroma cartridge according to claim 16 or 17,
wherein the channel includes a channel formed at an outer circumference portion of the support element.

19. The support member for an aroma cartridge according to any of claims 16 to 18, comprising the channel on a downstream side of the sloped surface.

20. The support member for an aroma cartridge according to any of claims 16 to 19,
wherein the sloped surface is symmetrical with respect to the center axis.

21. The support member for an aroma cartridge according to any of claims 16 to 20,
wherein a slope angle of the sloped surface with respect to the perpendicular surface is 4 ° or more.

22. The support member for an aroma cartridge according to any of claims 16 to 21,
wherein the sloped surface includes a sloped surface with respect to an insertion direction of a heating element when a heating element is inserted to the aerosol-generating base material and perform heating.

23. The support member for an aroma cartridge according to any one of claims 1 to 22, further comprising an ID portion to be detected capable of detecting ID information which can distinguish an aroma cartridge from another aroma cartridge difference in kind.

24. An aroma cartridge comprising:

the aroma-generating source to be heated;
the filter element; and
the support member for an aroma cartridge according to any one of claims 1 to 22.

25. The aroma cartridge according to claim 24, further comprising a limiting member limiting a passage region of the aerosol from the aroma-generating source to be heated.

26. The aroma cartridge according to claim 25,
wherein the limiting member has an opening with a size allowing the aerosol to pass therethrough and limiting the aroma-generating source to be heated to pass therethrough.

27. A support member for an aroma cartridge, comprising an ID portion to be detected from which ID information which can distinguish an aroma cartridge from another aroma cartridge different in kind can be detected.

28. The support member for an aroma cartridge according to any one of claims 1 to 22, comprising an ID portion to be detected from which ID information which can distinguish an aroma cartridge from another aroma cartridge different in kind can be detected.

29. The support member for an aroma cartridge according to claim 27 or 28,
wherein the ID portion to be detected includes an ID-memorizing means memorizing the ID information.

30. The support member for an aroma cartridge according to claim 27 or 28,
wherein the ID portion to be detected presents the ID information.

31. An aroma cartridge comprising:

an aroma-generating source to be heated;
a filter member; and
a supporting member for an aroma cartridge according to any of claims 26 to 29.

32. The aroma cartridge according to claim 32, further comprising a limiting member for limiting a passage region of an aerosol from the aroma-generating source to be heated.

33. The aroma cartridge according to claim 32,
wherein the limiting member has an opening with a size which allows the aerosol to pass therethrough and limits passage of the aroma-generating source to be heated

34. A fragrance article comprising:

an ID-detecting portion for detecting the ID information;
a heating portion for providing heat to the aroma-generating source to be heated; and
a control portion for controlling the ID-detecting portion and the heating portion.

35. The aroma tool according to claim 34,

wherein the ID-detecting portion is arranged around a periphery of an installing portion of the aroma cartridge, and the control portion has a distance-detecting function capable of detecting a distance on the basis of ID-detection information from the ID portion to be detected, and
wherein the control portion further obtains the ID information on the basis of the ID-detection information and understands an installing state of the aroma cartridge from a distance between each portion on the periphery of the installing portion and the ID portion to be detected.

36. The aroma tool according to claim 35,

wherein the ID-detecting portion includes a plurality of ID sub-detecting portions around the installing portion, and
wherein the ID sub-detecting portions includes a plurality of ID portions to be detected corresponding to the plurality of ID sub-detecting portions.

37. A fragrance article including a support member for an aroma cartridge arranged between an aroma-generating source to be heated and a filter member in the aroma cartridge,
wherein the support member for an aroma cartridge comprises:
an ID portion to be detected from which ID information which can distinguish an aroma cartridge from another aroma cartridge different in kind can be detected.

FIG. 1

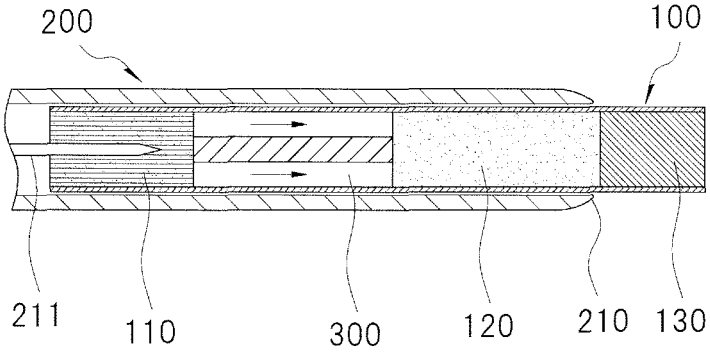
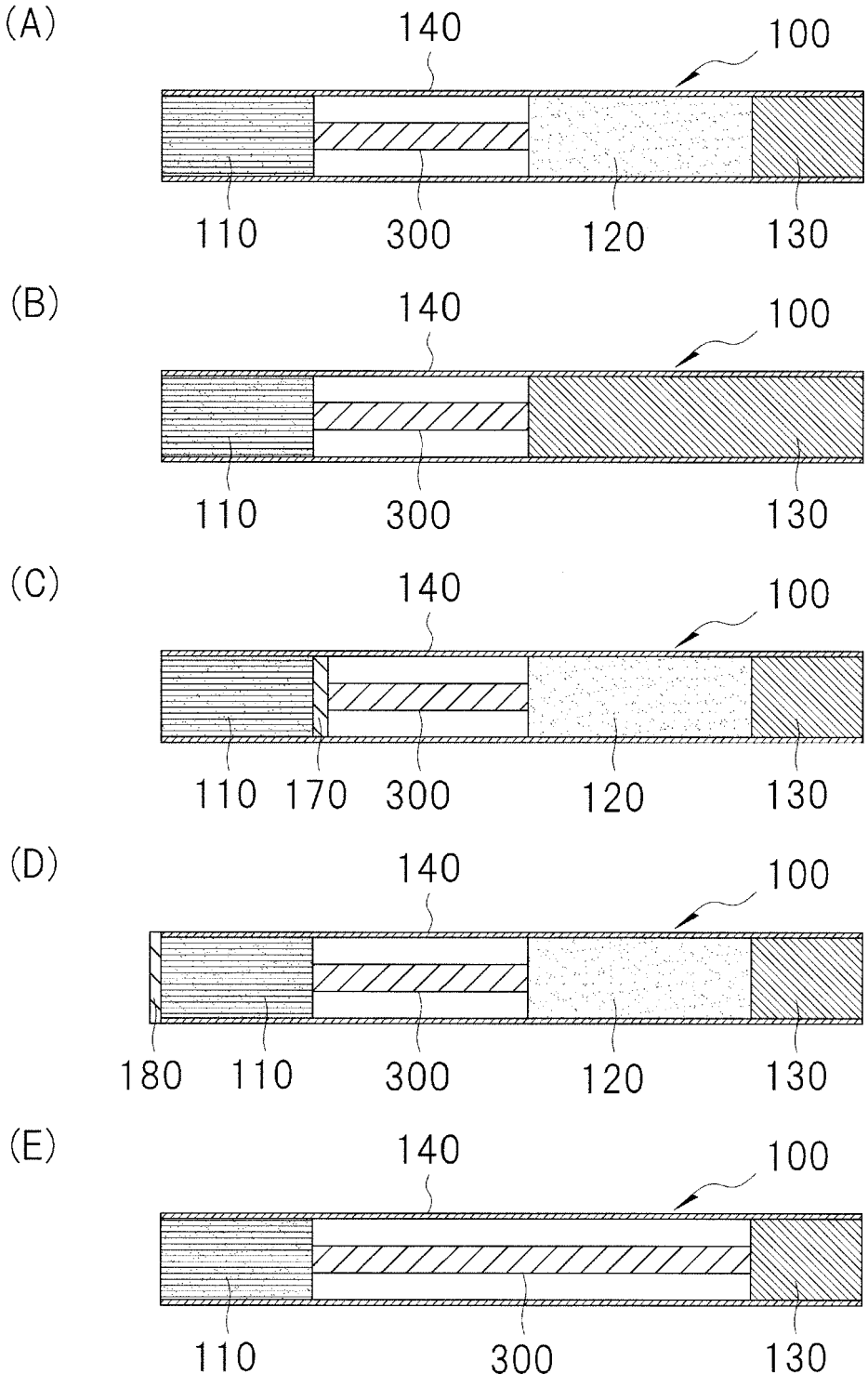


FIG. 2


(A)
140
100
110
300
120
130
(B)
140
100
110
300
130
(C)
140
100
110
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130
(E)
140
100
110
300
130

FIG. 3

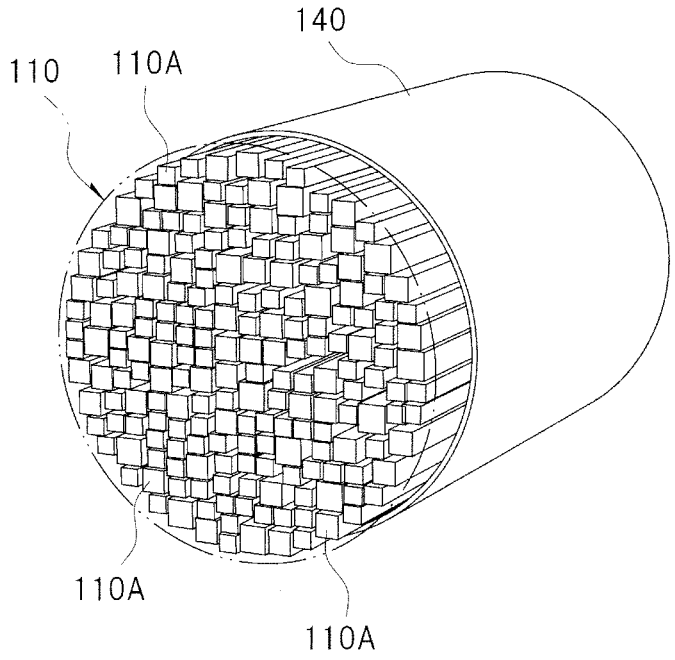


FIG. 4

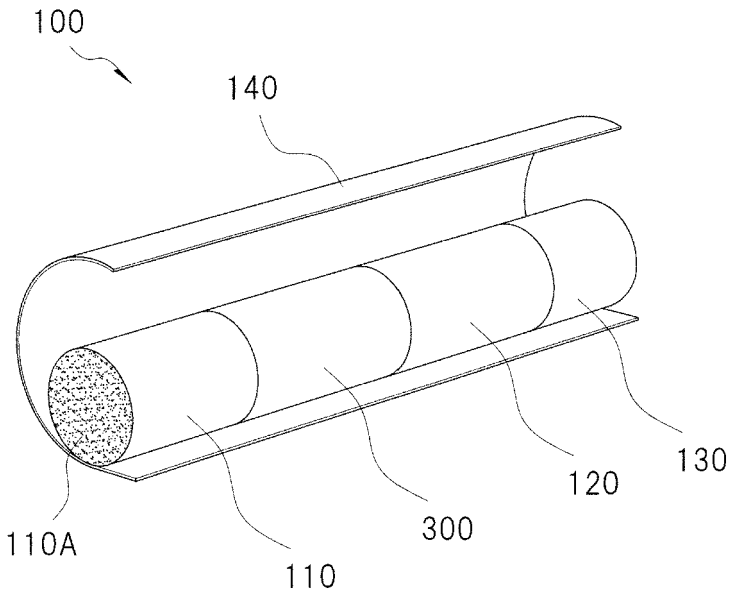


FIG. 5

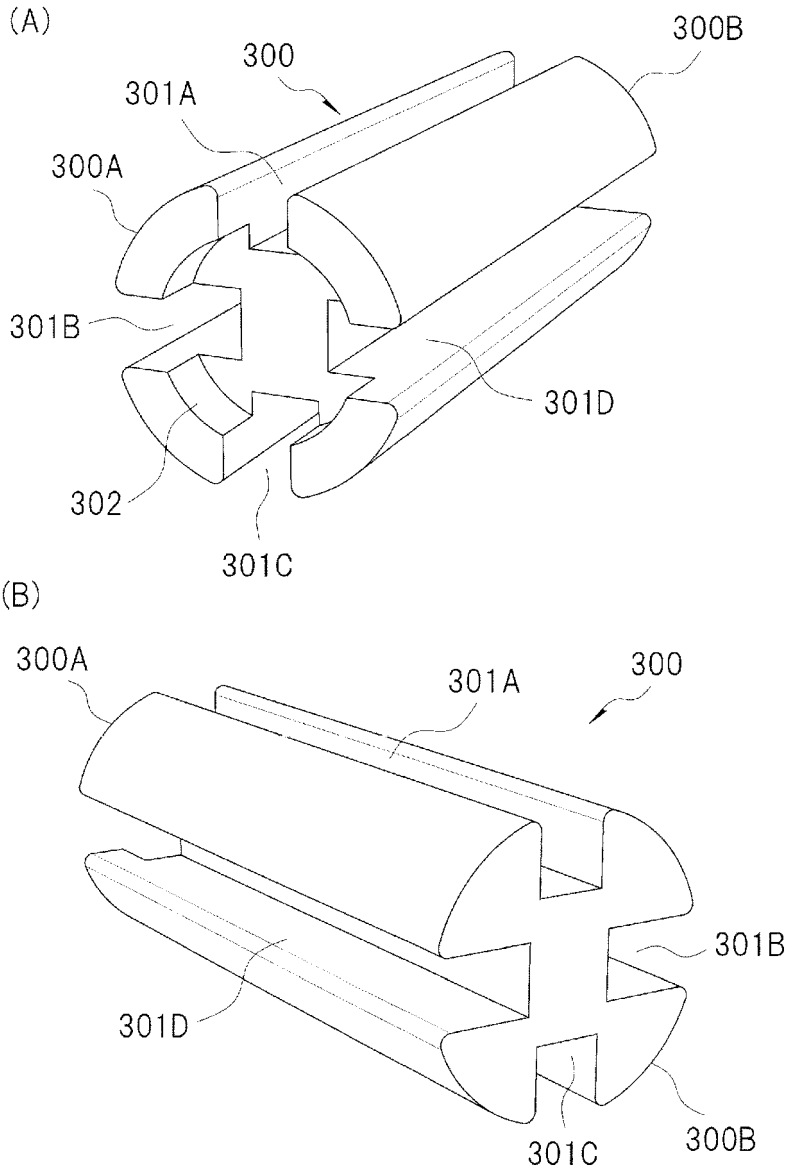
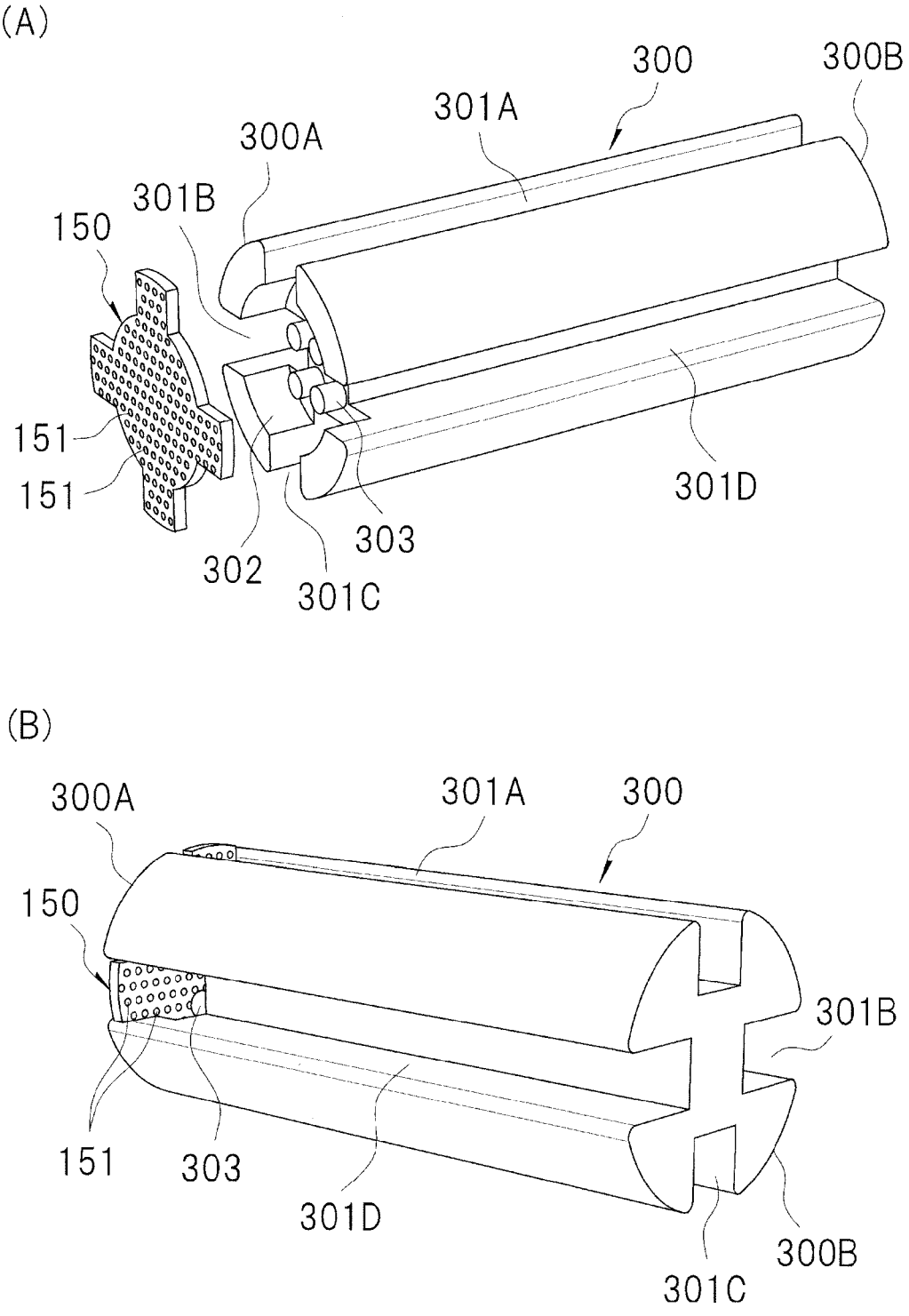

(A)
300B
300
301A
300A
301B
301D
302
301C
(B)
300A
301A
300
301B
301D
301C
300B

FIG. 6


(A)
300
300B
301A
300A
301B
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151
151
302
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301D
(B)
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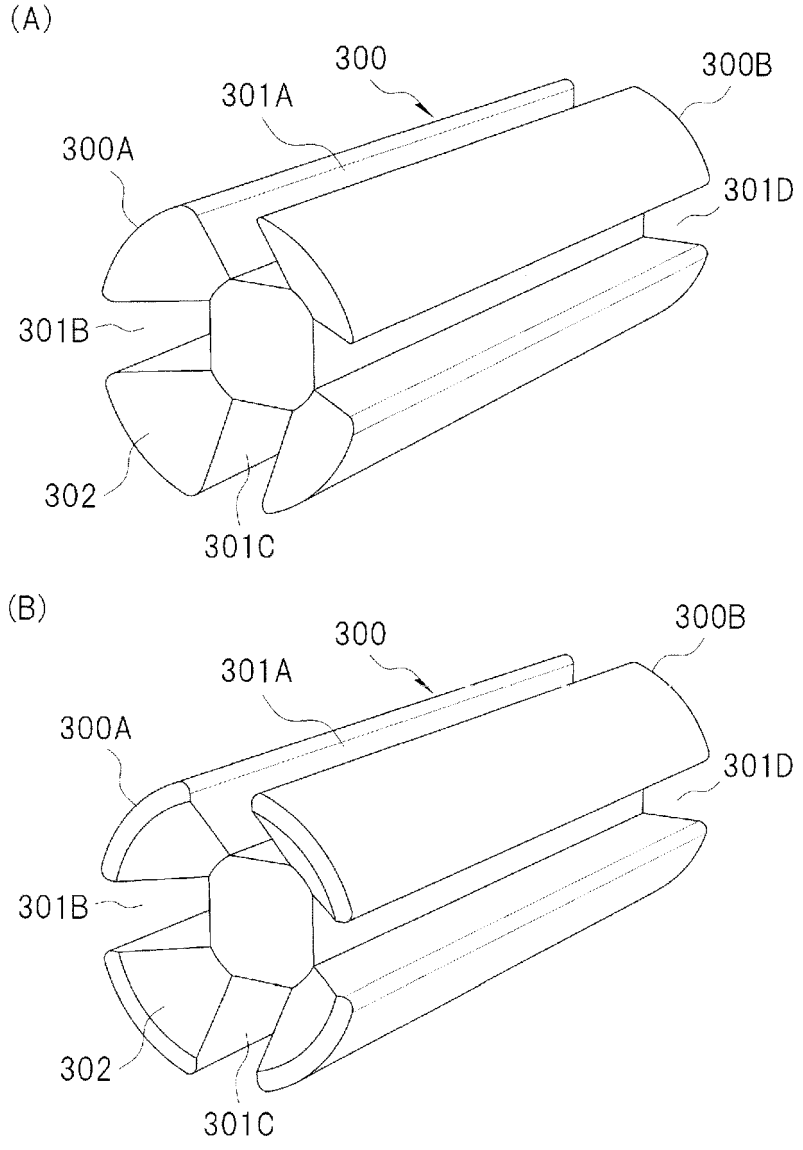
301B
151
303
301D
300B
301C

FIG. 7


(A)
300
300B
301A
300A
301D
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302
301C
(B)
300
300B
301A
300A
301D
301B
302
301C

FIG. 8

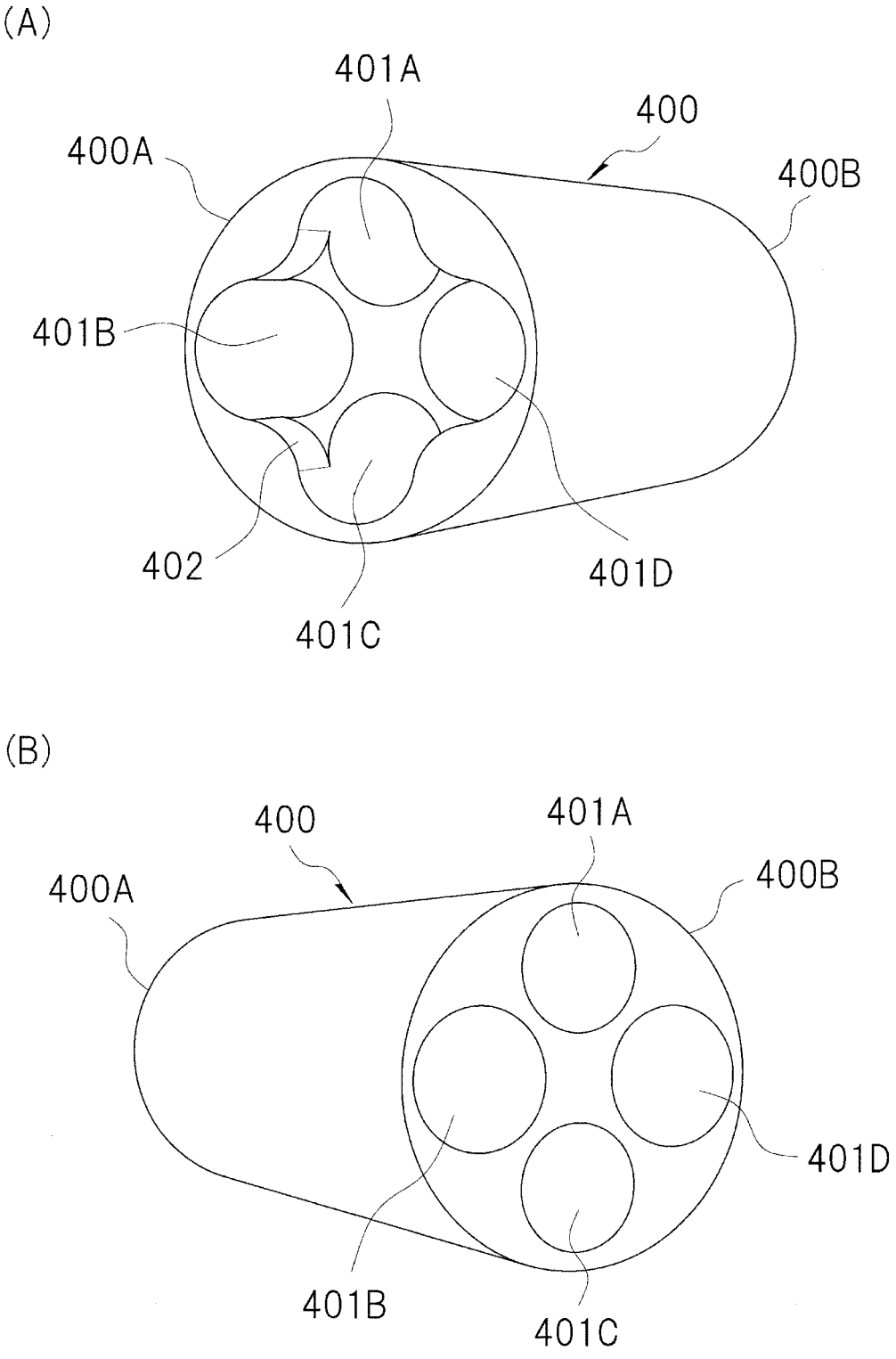
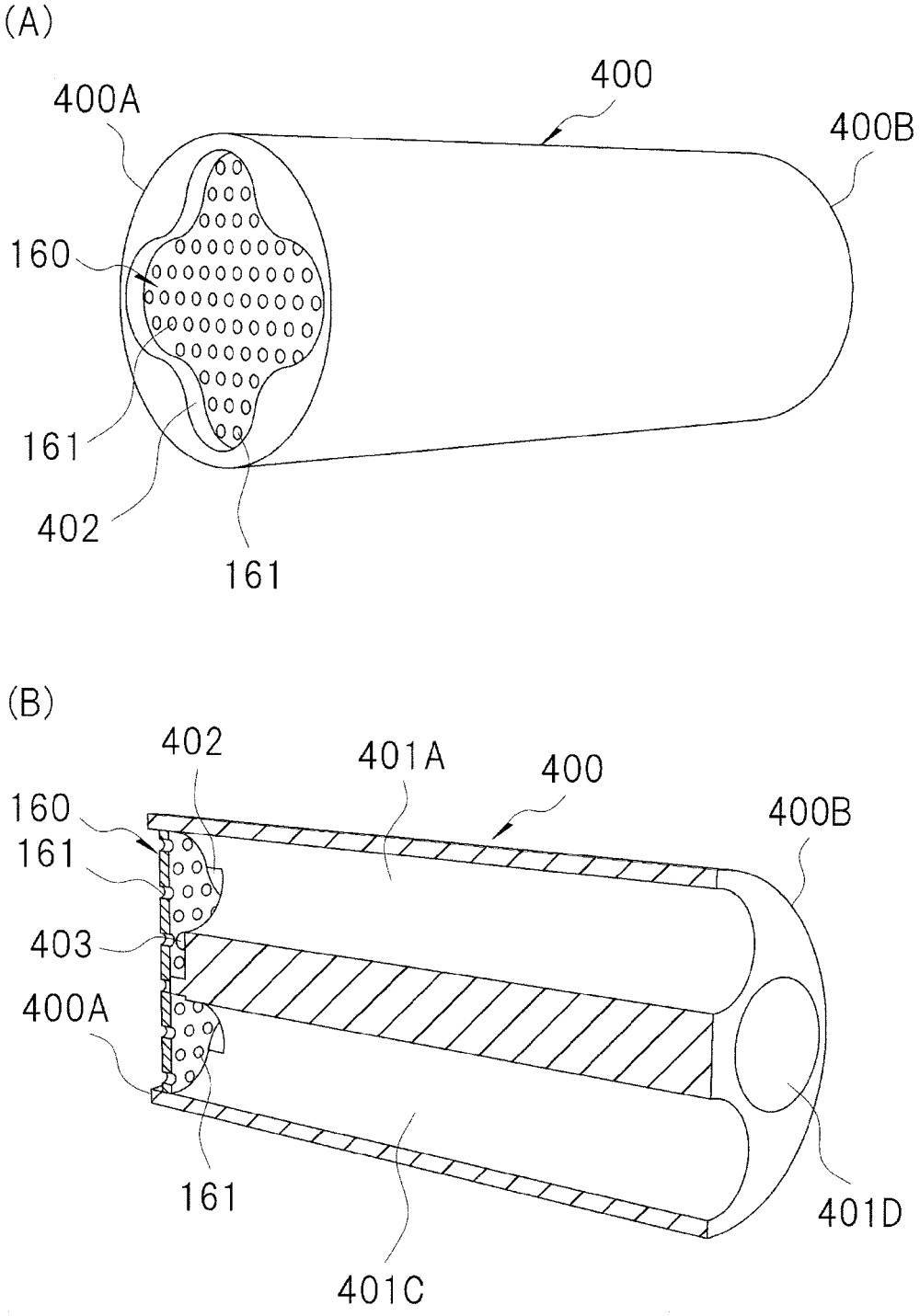

(A)
401A
400
400A
400B
401B
402
401D
401C
(B)
400
401A
400A
400B
401D
401B
401C

FIG. 9


(A)
400A
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400B
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(B)
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401A
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400B
161
403
400A
161
401D
401C

FIG. 10

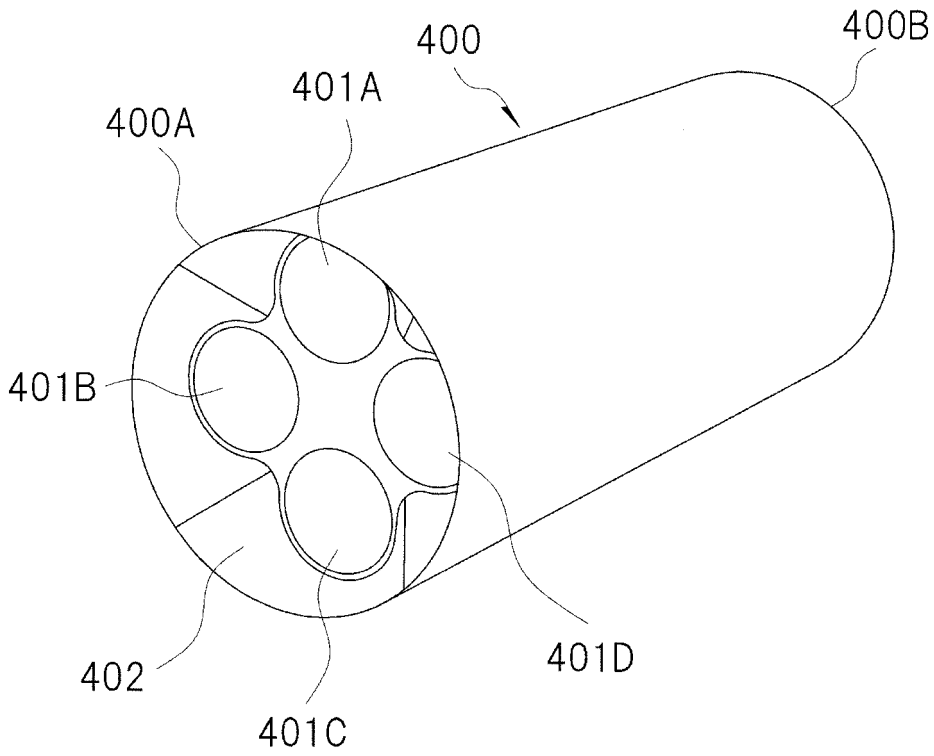


FIG. 11

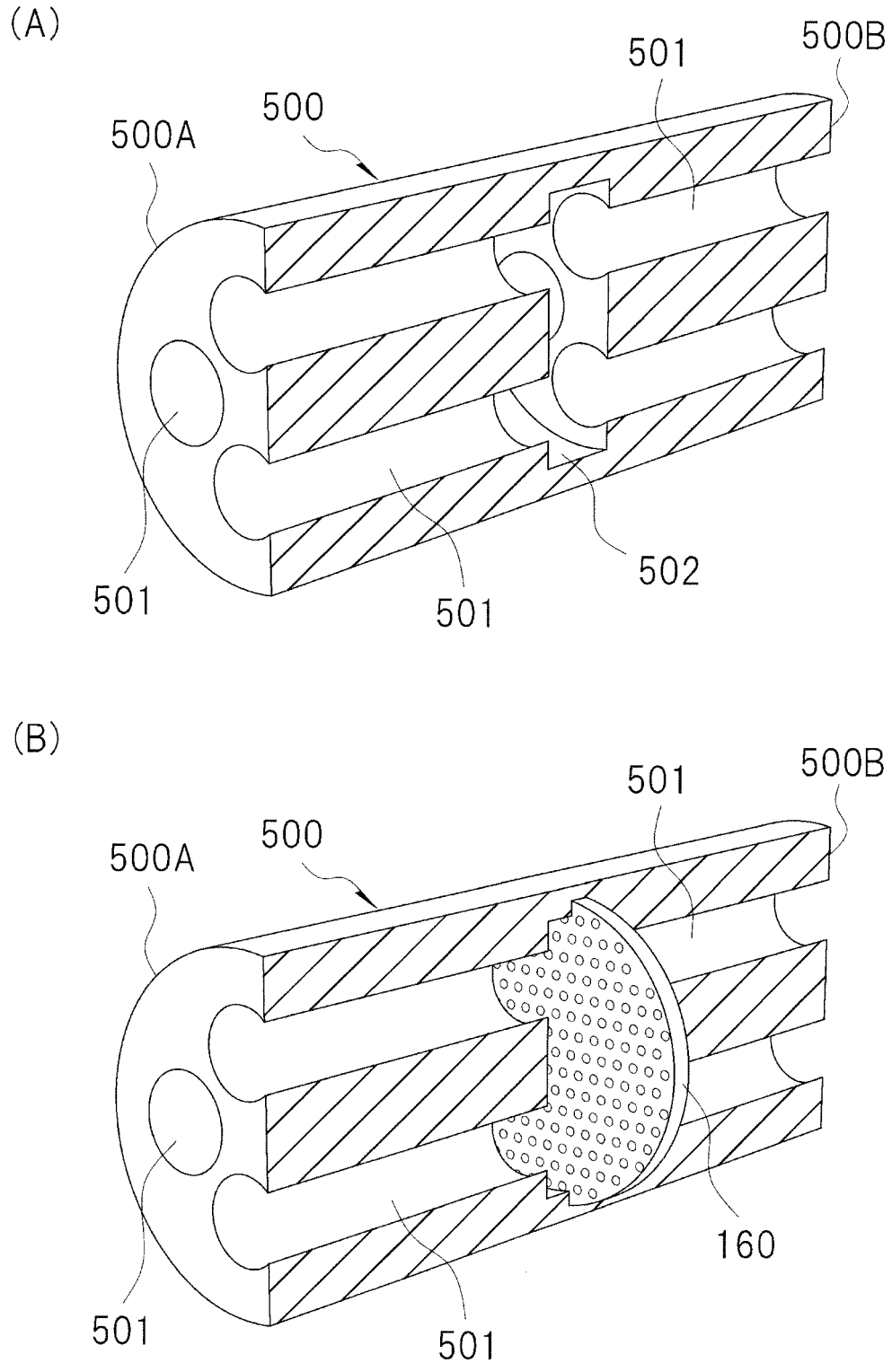


FIG. 12

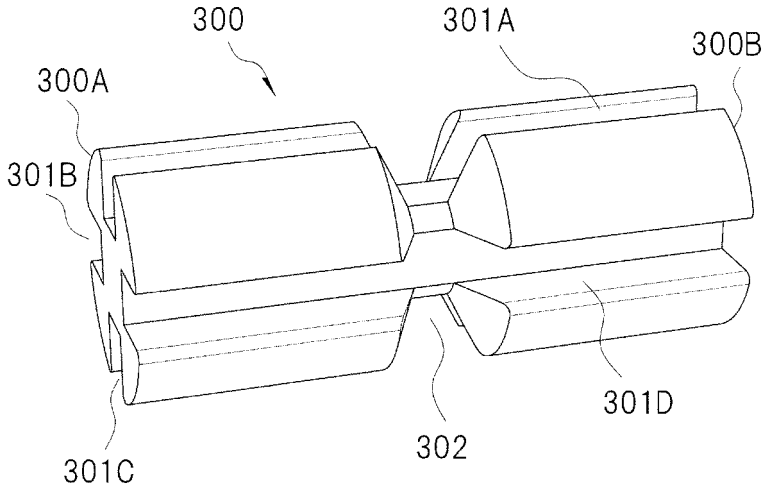


FIG. 13

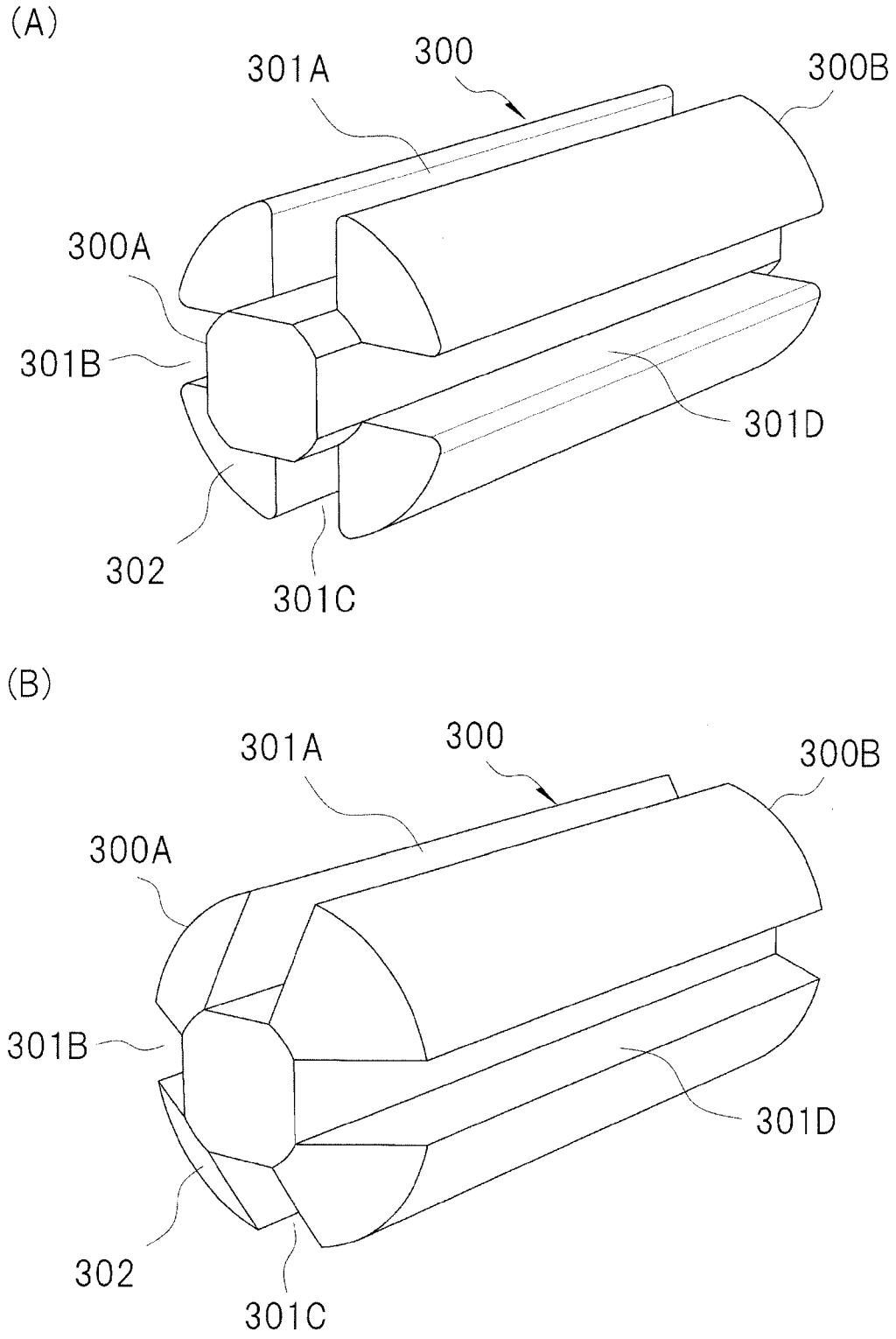
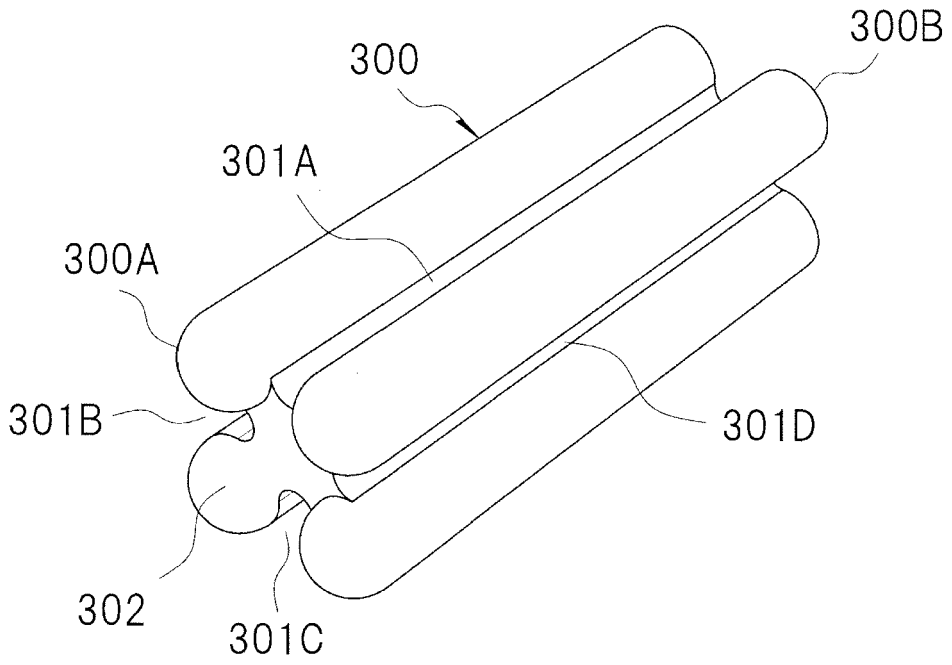

(A)
301A
300
300B
300A
301B
301D
302
301C
(B)
301A
300
300B
300A
301B
301D
302
301C

FIG. 14

(A)


300B
300
301A
300A
301B
301D
302
301C

(B)

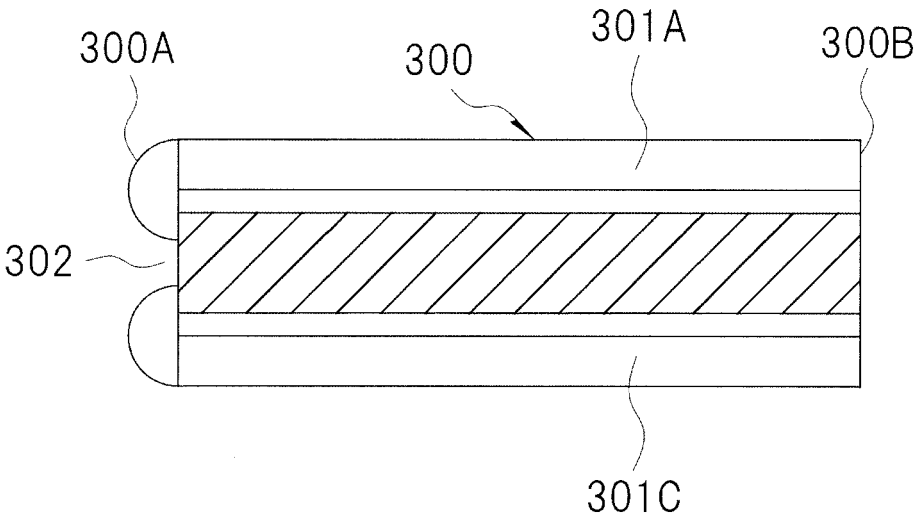
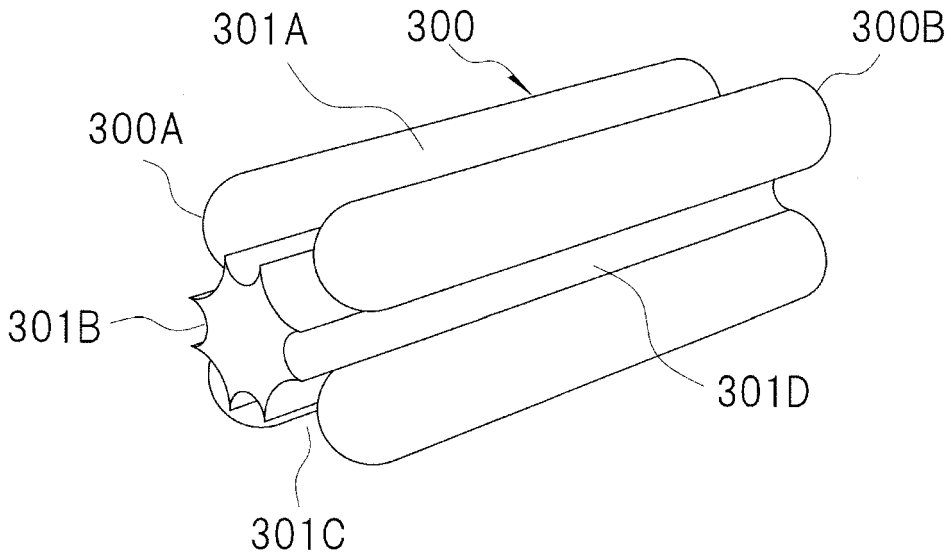

300A
300
301A
300B
302
301C

FIG. 15

(A)



(B)

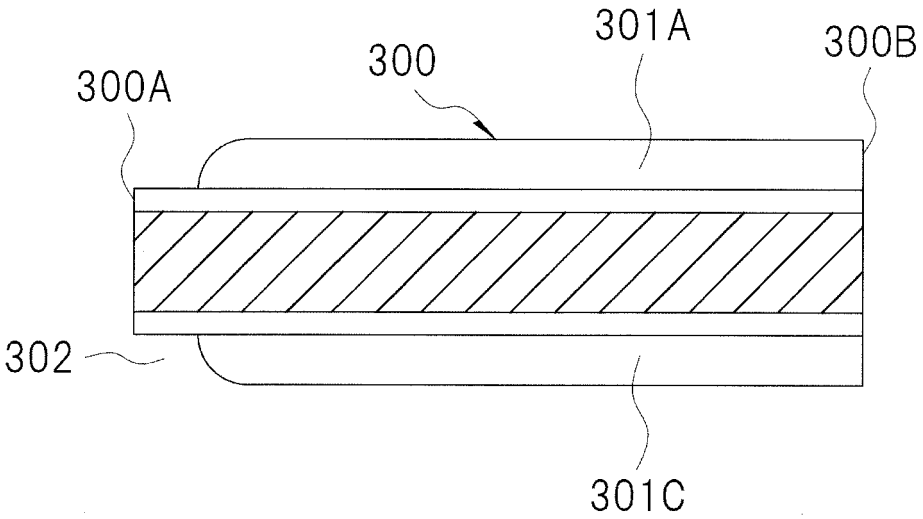


FIG. 16

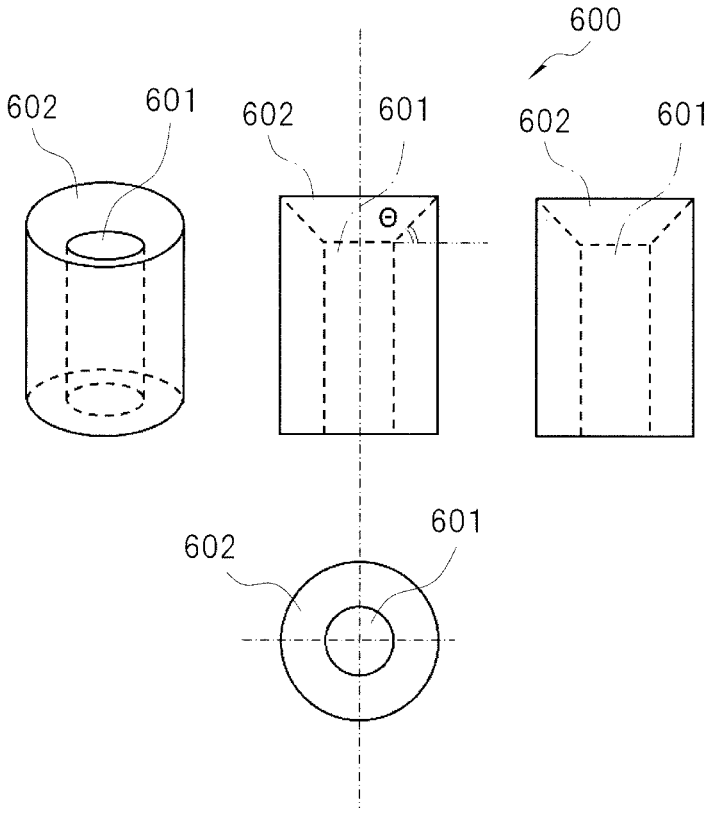


FIG. 17

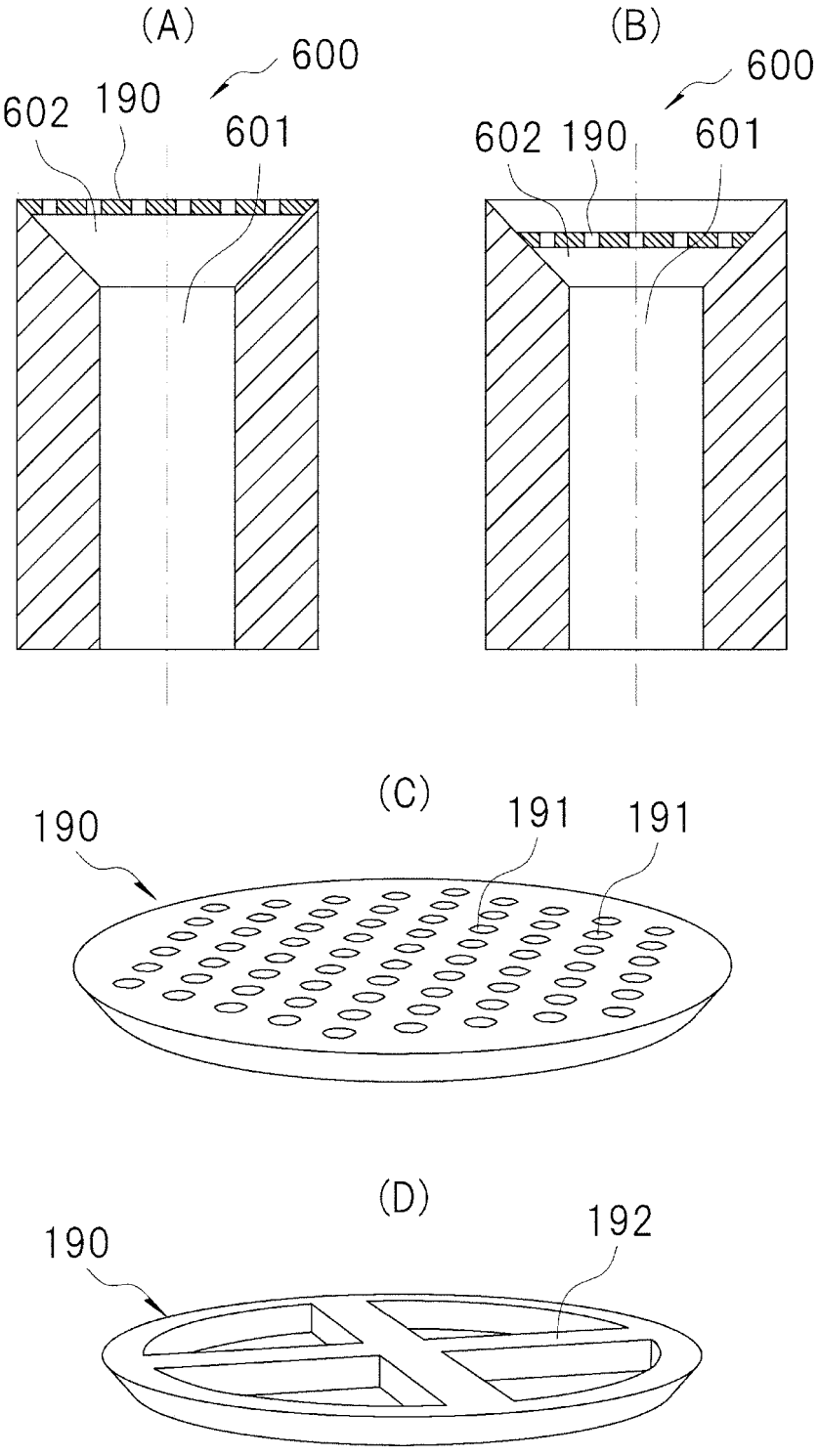


FIG. 18

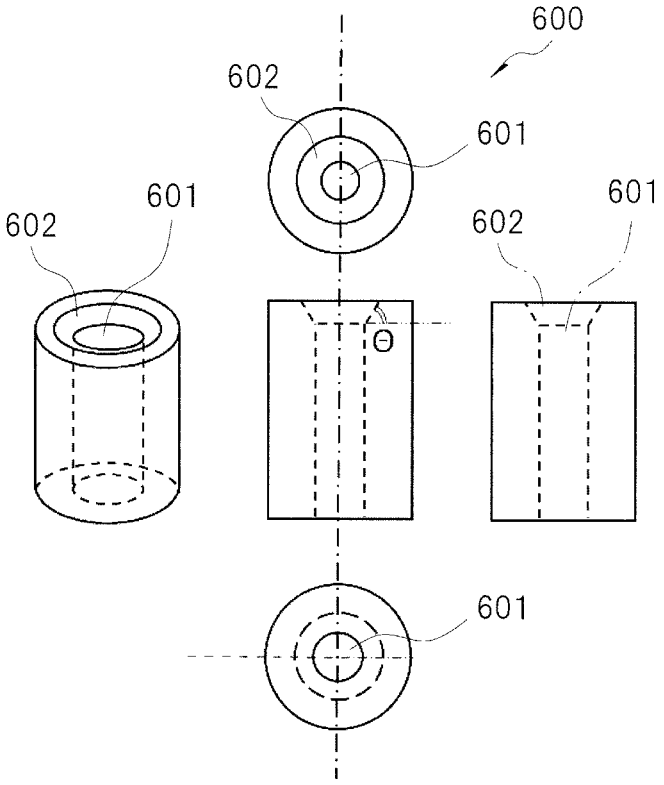


FIG. 19

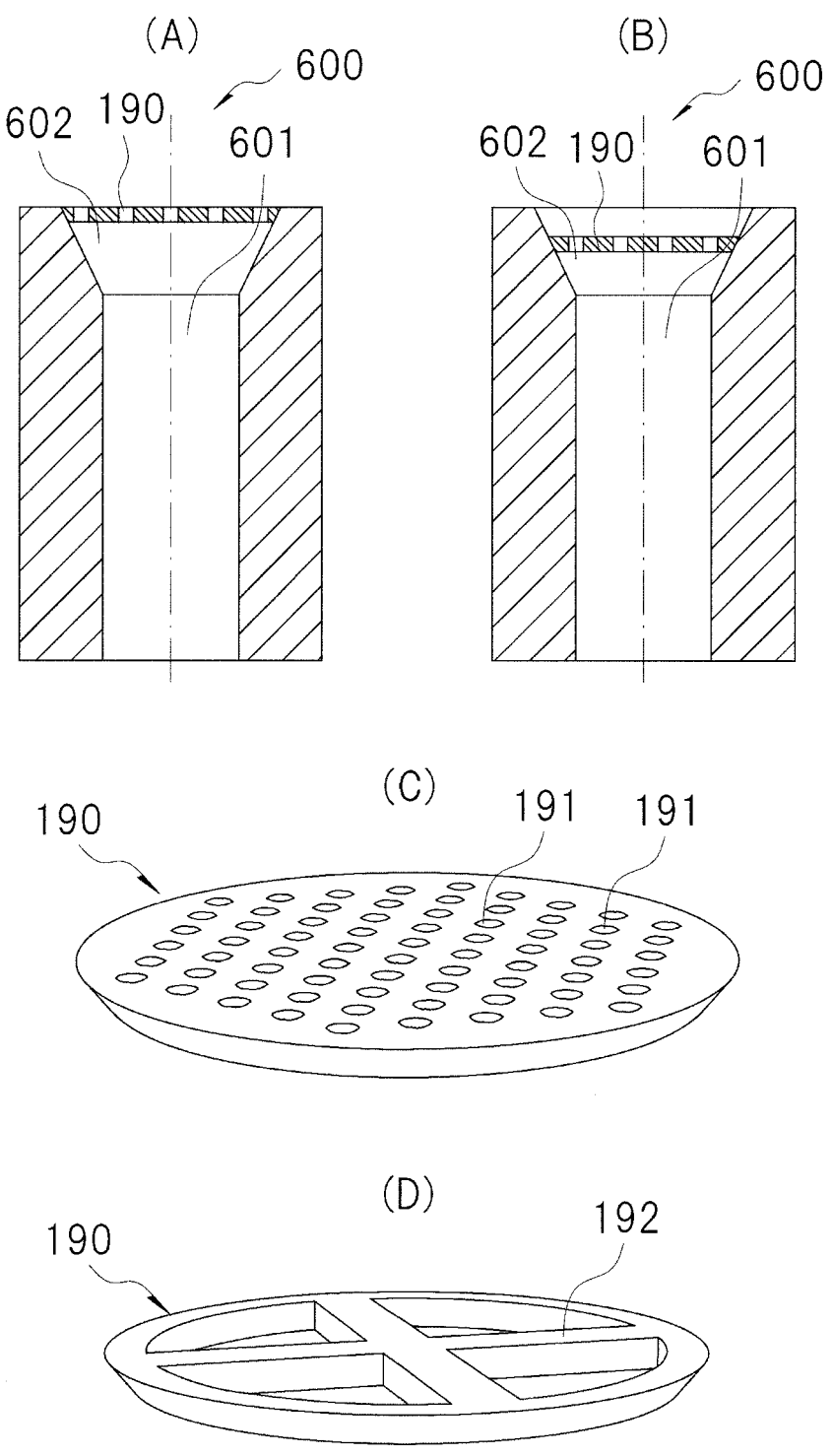


FIG. 20

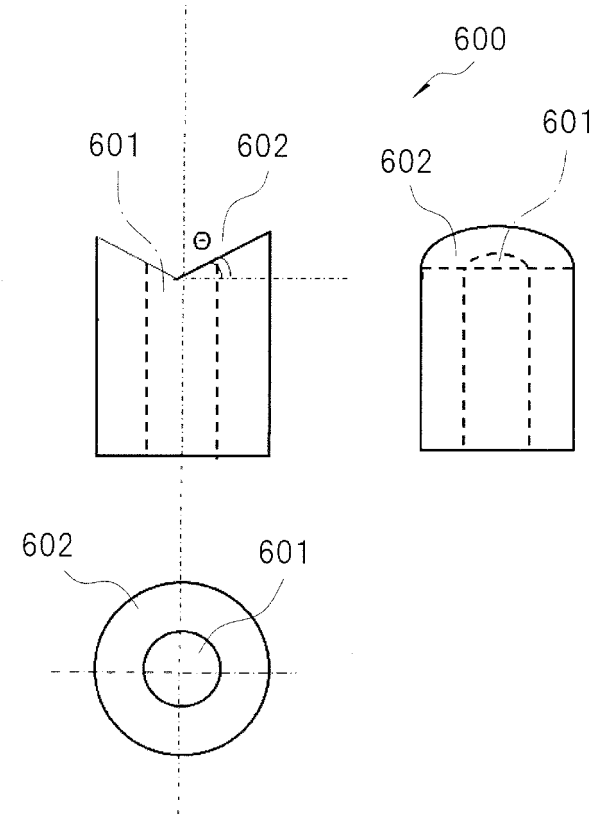


FIG. 21

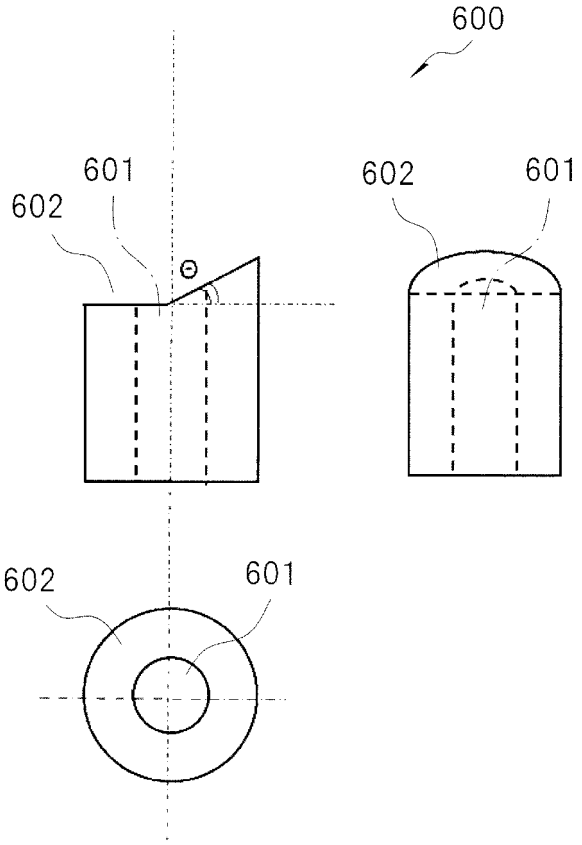


FIG. 22

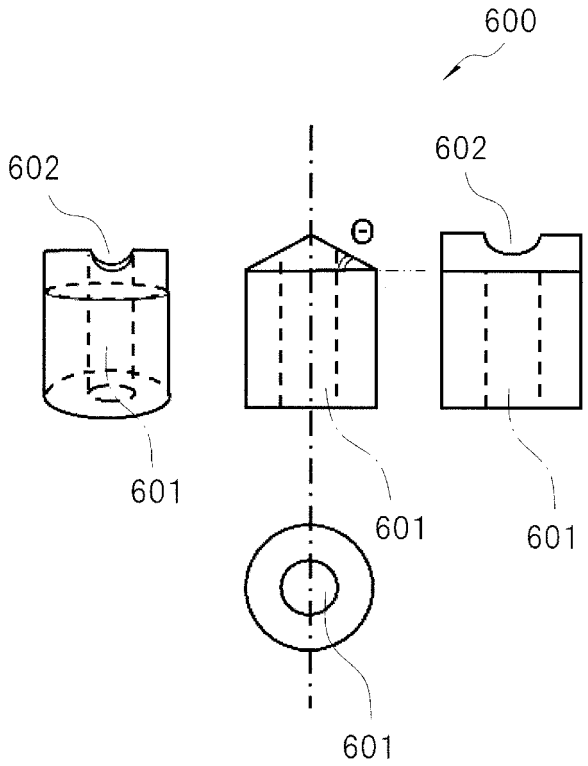


FIG. 23

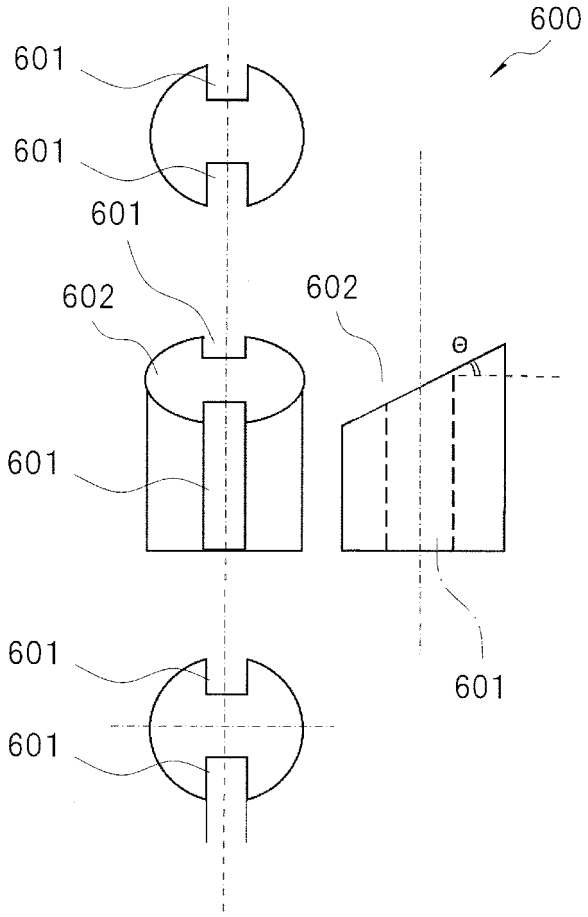


FIG. 24

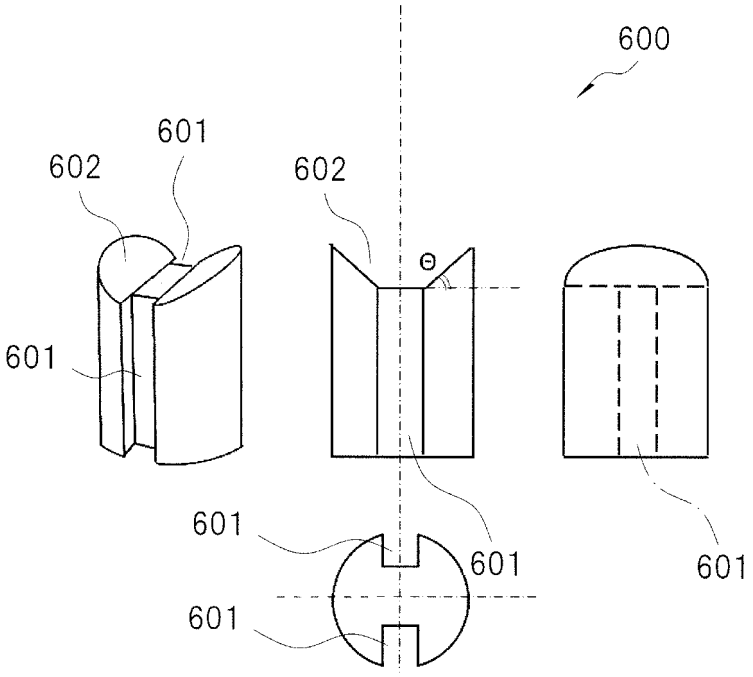


FIG. 25

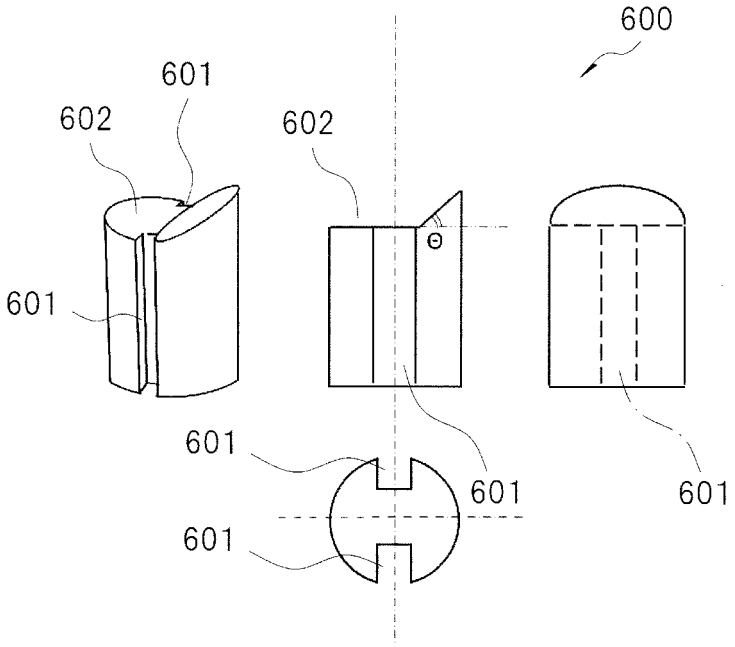


FIG. 26

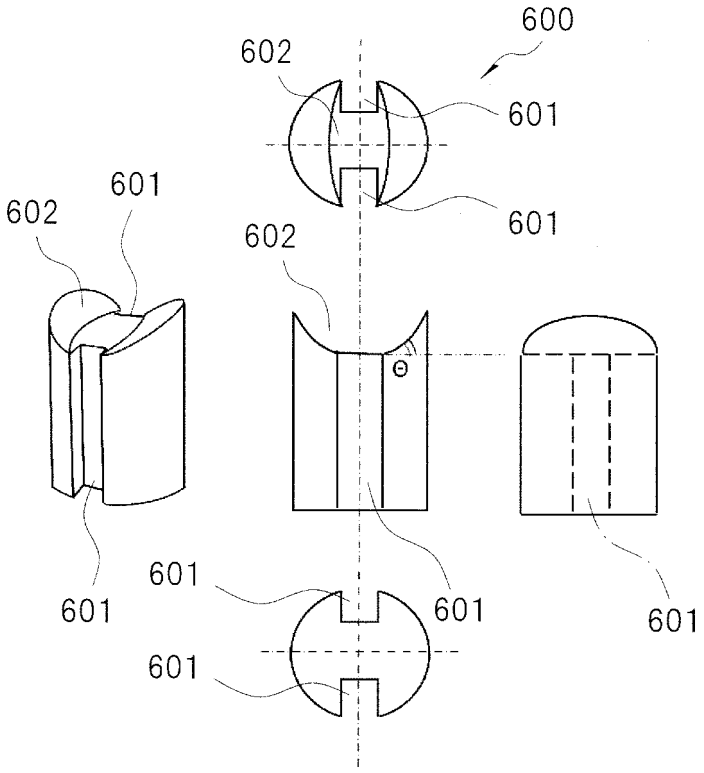


FIG. 27

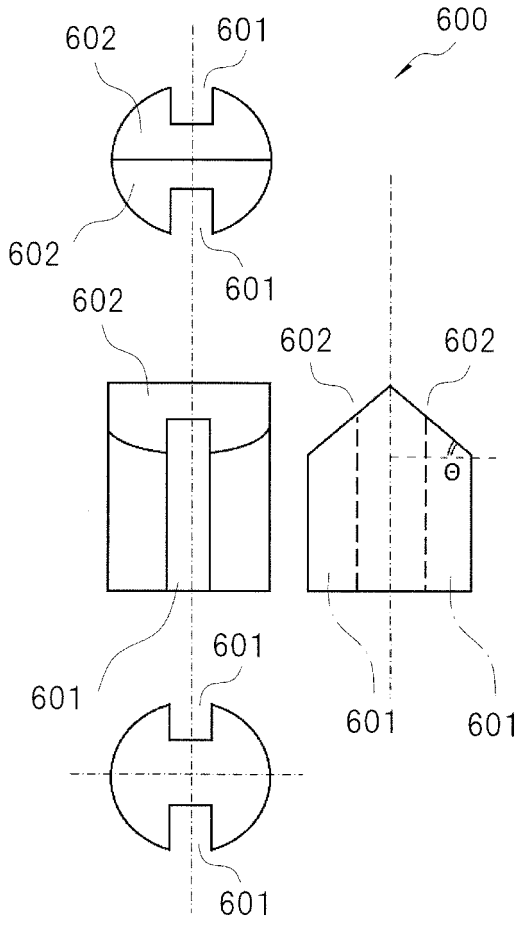


FIG. 28

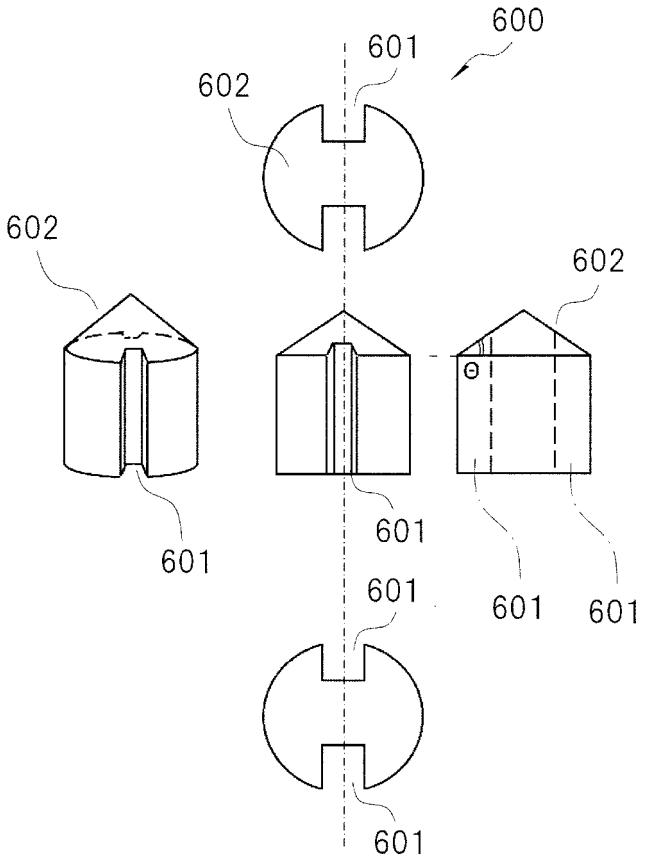


FIG. 29

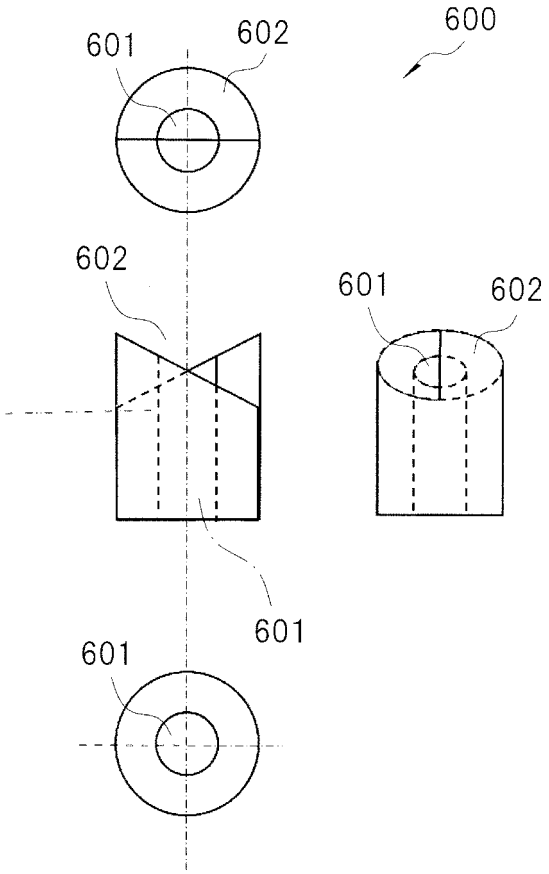


FIG. 30

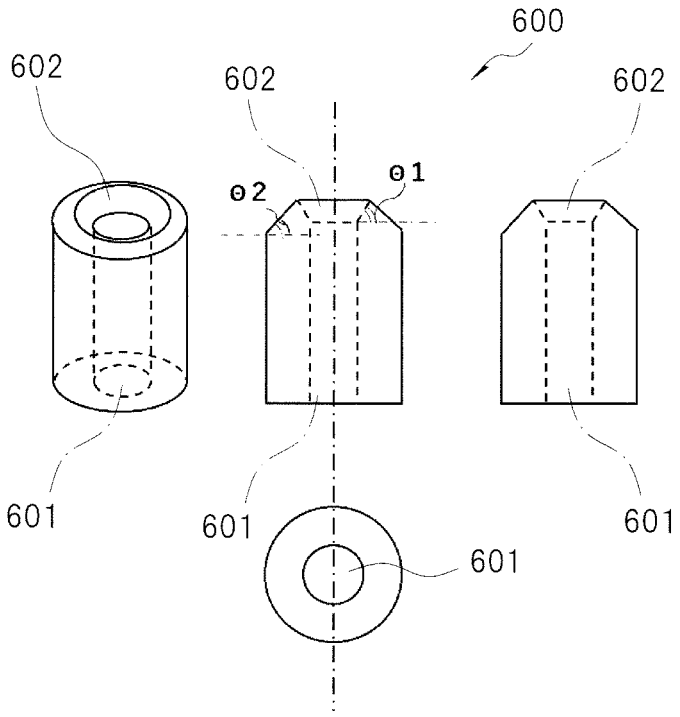


FIG. 31

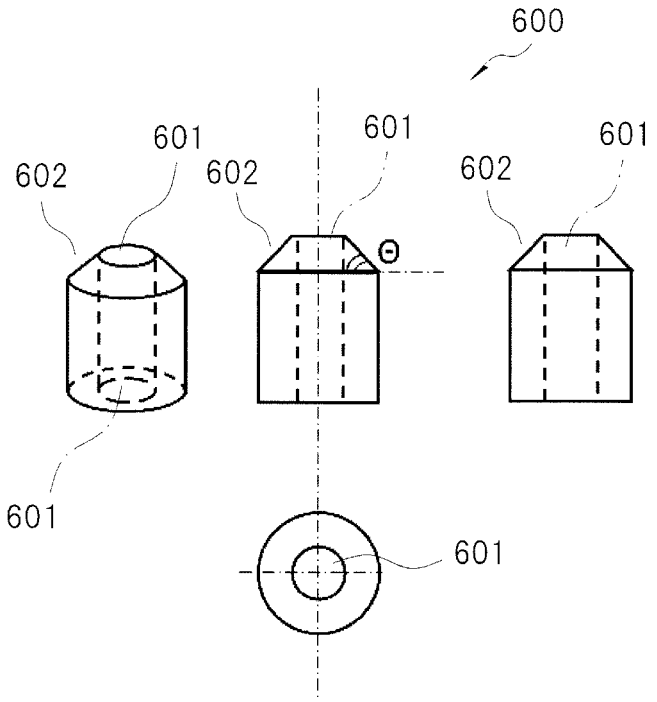


FIG. 32

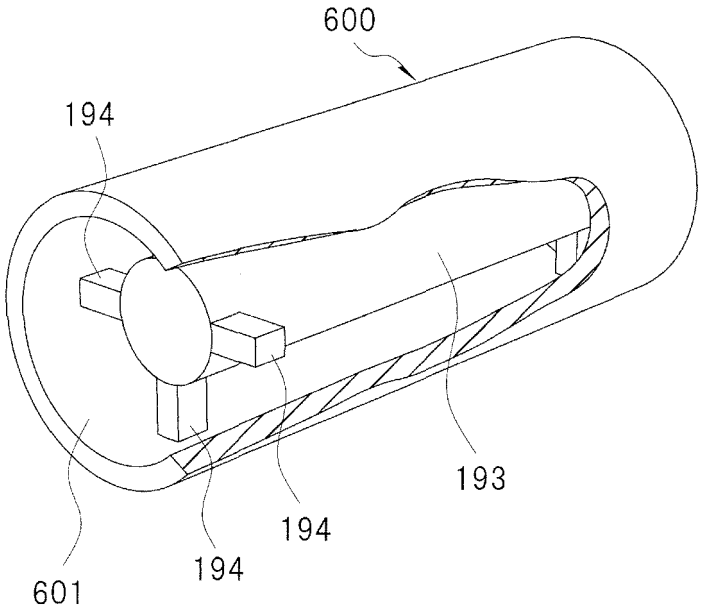


FIG. 33

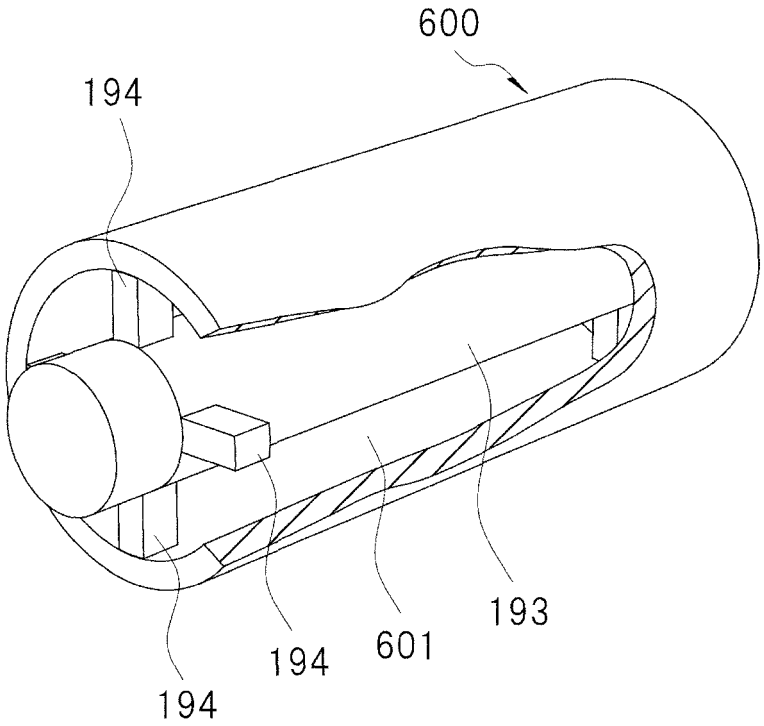


FIG. 34

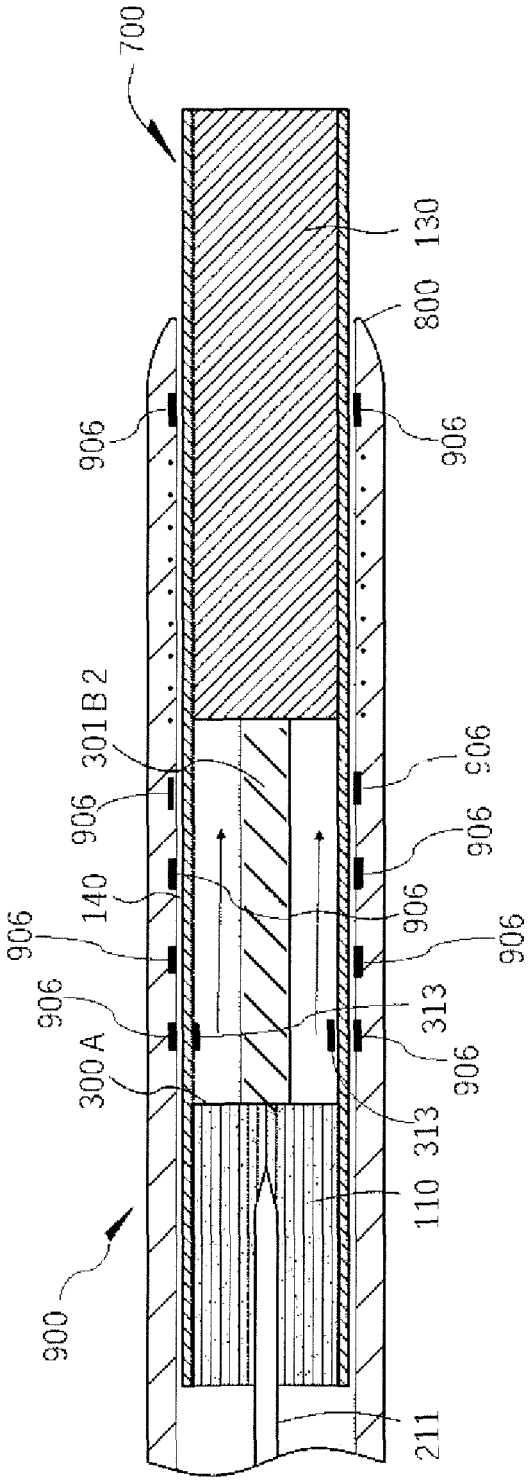

700
130
800
906
906
301B2
906
906
906
140
906
906
906
906
313
300A
906
313
110
900
211

FIG. 35

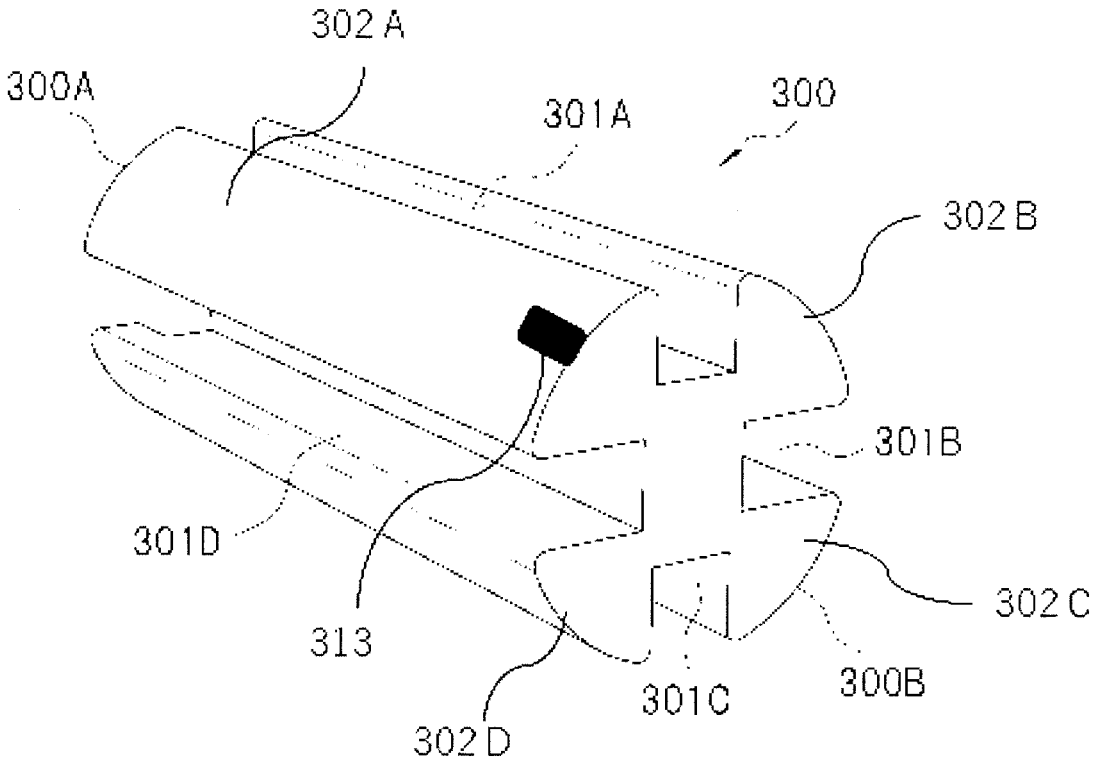


FIG. 36

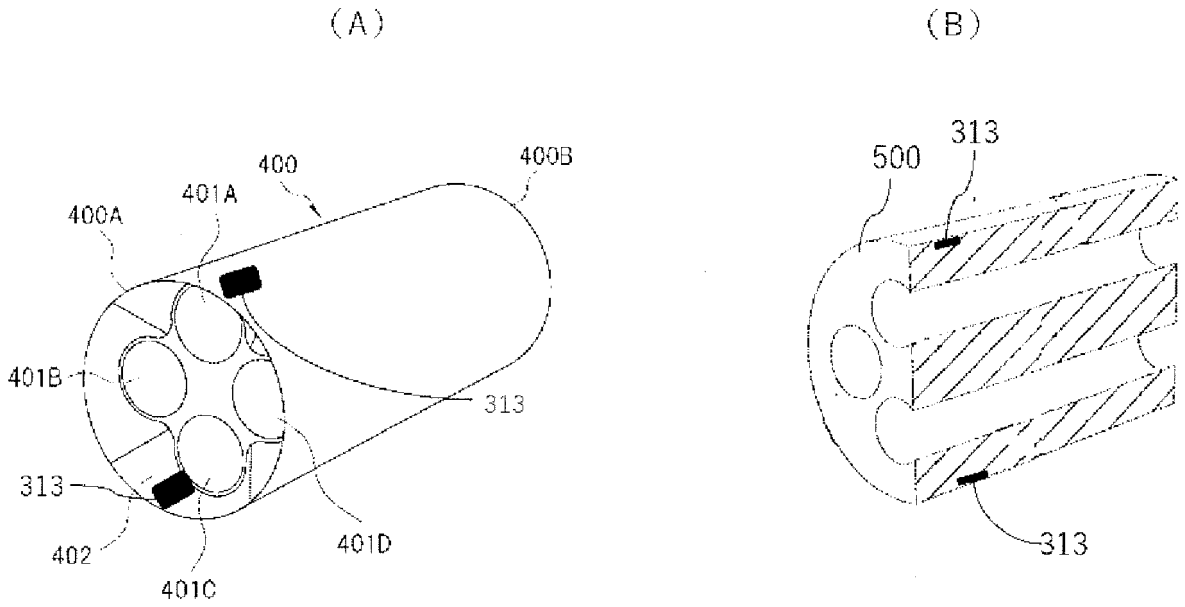


FIG. 37

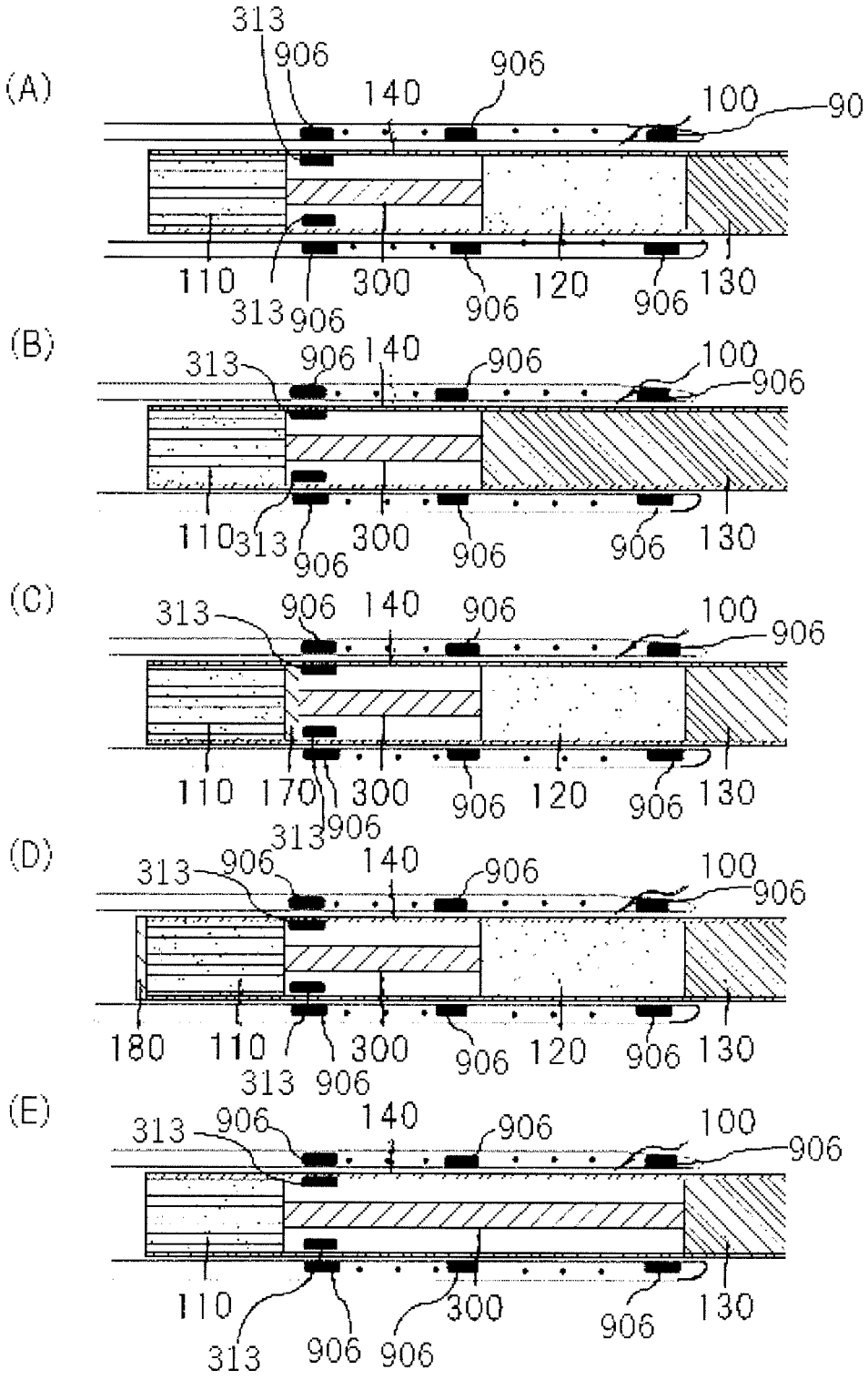

(A)
313
906
906
140
100
90
110
313
906
300
906
120
906
130
(B)
313
906
140
906
100
906
110
313
906
300
906
906
130
(C)
313
906
140
906
100
906
110
170
313
906
300
906
120
906
130
(D)
313
906
140
906
100
906
180
110
313
906
300
906
120
906
130
(E)
313
906
140
906
100
906
110
313
906
906
300
906
130

FIG. 38

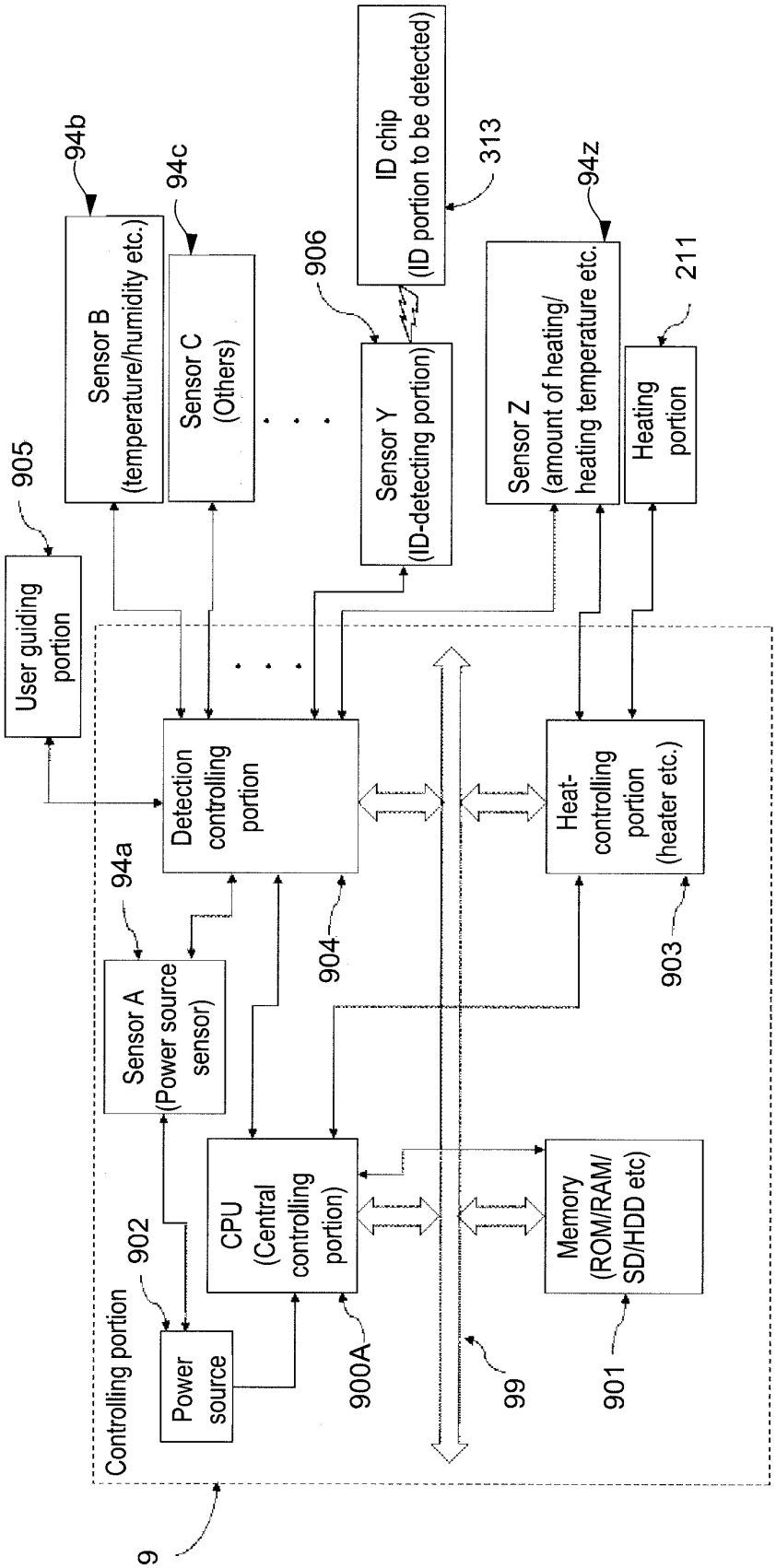

94b
Sensor B (temperature/humidity etc.)
94c
Sensor C (Others)
906
ID chip (ID portion to be detected)
313
94z
Sensor Z (amount of heating/ heating temperature etc.)
211
Heating portion
905
User guiding portion
Sensor Y (ID-detecting portion)
Detection controlling portion
Heat-controlling portion (heater etc.)
94a
Sensor A (Power source sensor)
904
903
CPU (Central controlling portion)
Memory (ROM/RAM/ SD/HDD etc)
902
Controlling portion
Power source
900A
99
901
9

FIG. 39

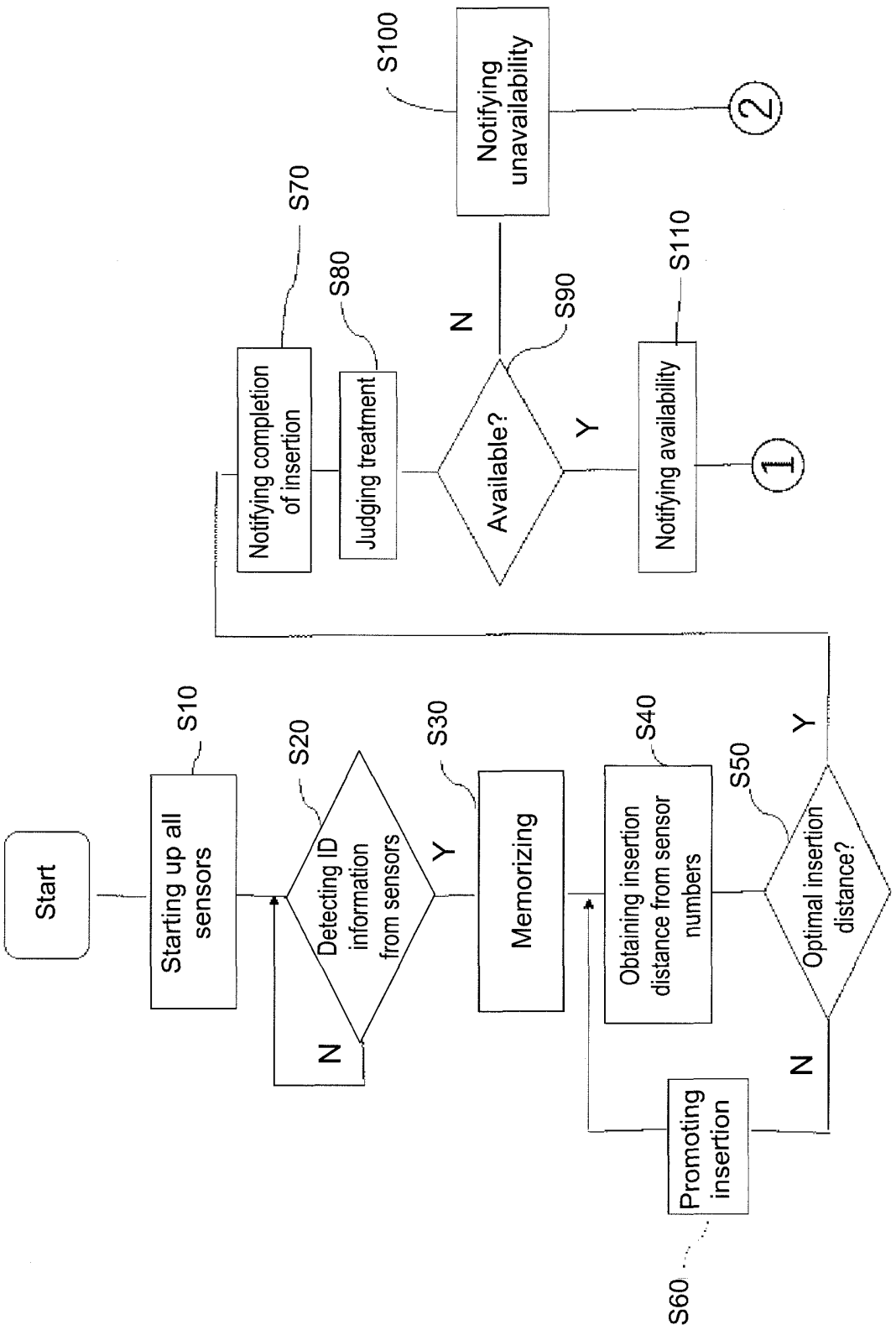

Start
Starting up all sensors
S10
Detecting ID information from sensors
S20
N
Y
Memorizing
S30
Obtaining insertion distance from sensor numbers
S40
Optimal insertion distance?
S50
Y
N
Promoting insertion
S60
Notifying completion of insertion
S70
Judging treatment
S80
Available?
S90
N
Y
Notifying unavailability
S100
Notifying availability
S110
1
2

FIG. 40

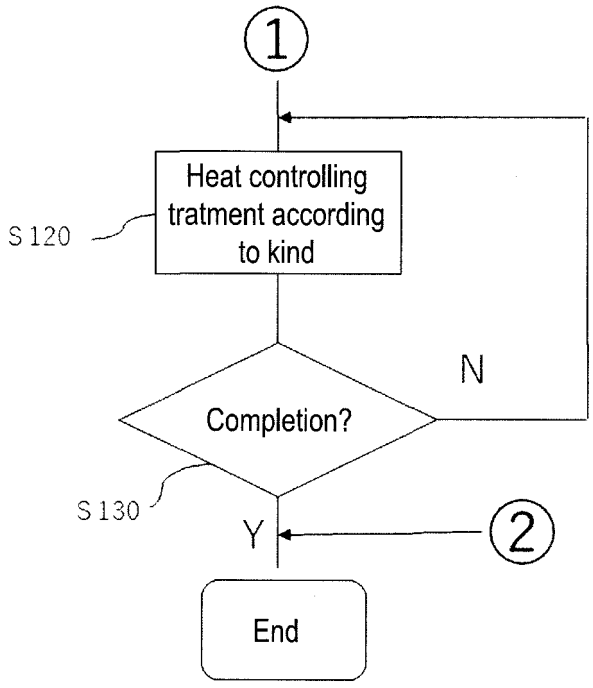
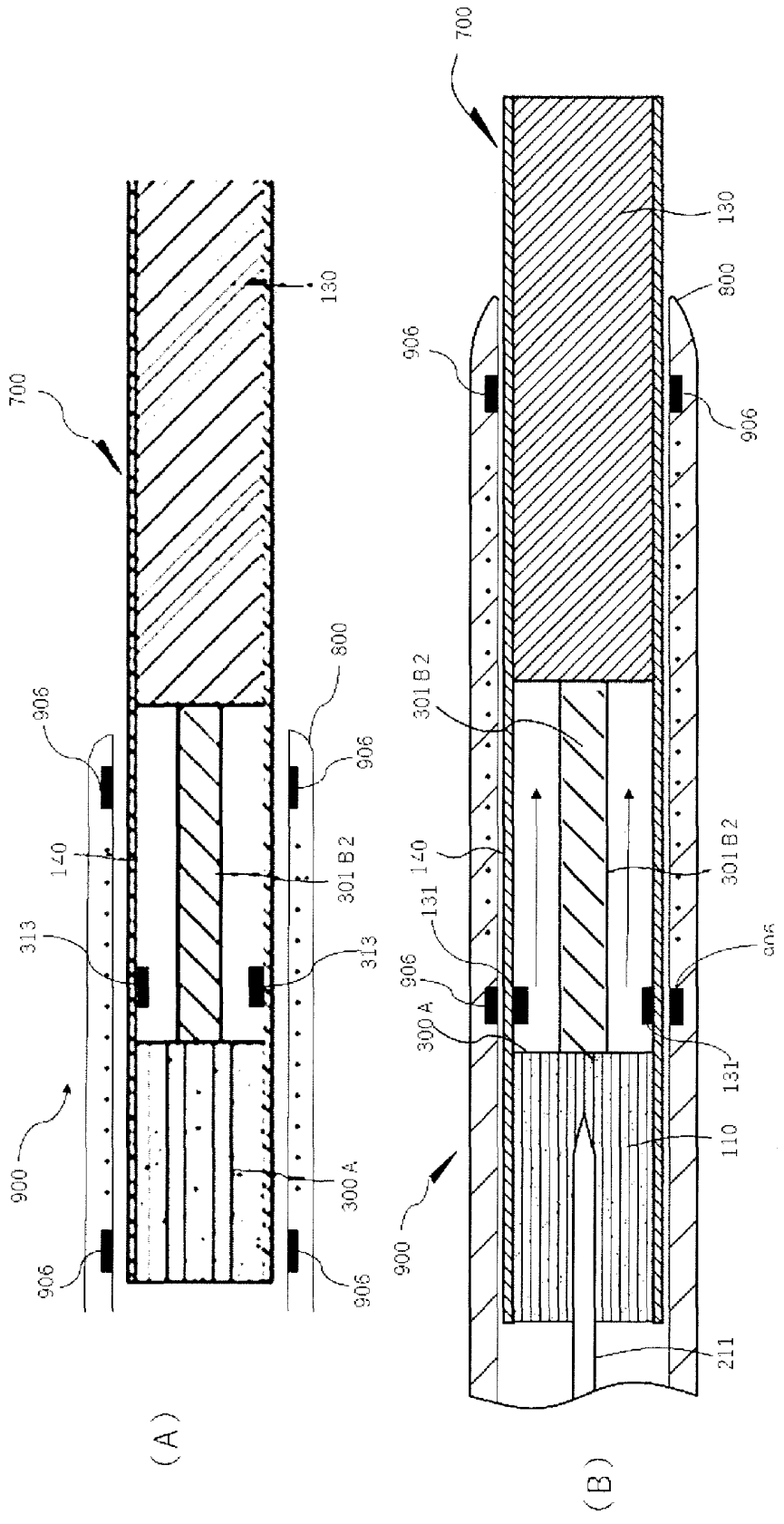

1
Heat controlling tratment according to kind
S120
Completion?
N
S130
Y
2
End

FIG. 41


700
130
906
800
906
906
301B2
140
313
313
900
300A
906
906
(A)
700
130
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800
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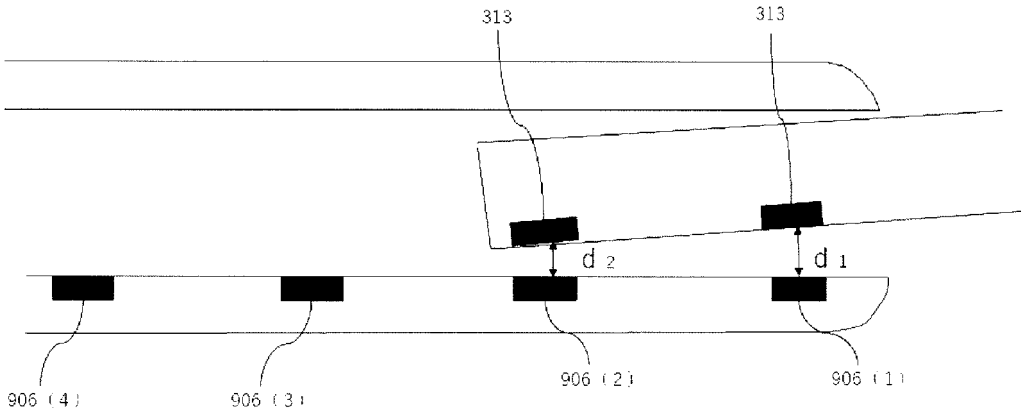
301B2
140
131
301B2
906
300A
131
110
900
211
(B)

FIG. 42

(A)



(B)

906 (1)	d_1
906 (2)	d_2
906 (3)	d_3
906 (4)	d_4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2020/014857

A. CLASSIFICATION OF SUBJECT MATTER
Int. Cl. A24F40/485(2020.01)i, A24F47/00(2020.01)i
FI: A24F47/00, A24F40/485

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)
Int. Cl. A24F40/485, 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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	CN 104921296 A (CHINA TOBACCO YUNNAN IND CO., LTD.) 23 September 2015, paragraphs [0009]-[0058], fig. 1, 2	1-5, 10-15, 24-26, 31-33
Y		23-37
A		7-9
X	CN 104939314 A (CHINA TOBACCO YUNNAN IND CO., LTD.) 30 September 2015, paragraphs [0009]-[0063], fig. 1, 2	1-5, 10, 16-17, 19-22, 24-26, 31-33
Y		18-37
A		7-9
X	CN 207505912 U (NANTONG JINYUAN NEW MAT CO., LTD.) 19 June 2018, paragraphs [0044]-[0084], fig. 1, 2	1, 6, 10, 24-26, 31-33
Y		23-37
A		7-9

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

* Special categories of cited documents:
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"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
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Date of the actual completion of the international search	Date of mailing of the international search report
03.06.2020	16.06.2020
Name and mailing address of the ISA/ Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2020/014857

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y A	JP 3212228 U (TOA INDUSTRY CO., LTD.) 31 August 2017, fig. 5-8	18-37 7-9
Y	JP 2018-143765 A (HAUNI MASCHINENBAU GMBH) 20 September 2018, paragraph [0022]	23, 27-37
Y	JP 2018-531582 A (RAI STRATEGIC HOLDINGS INC.) 01 November 2018, paragraphs [0007]-[0026]	23, 27-37

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2020/014857

Patent Documents referred to in the Report	Publication Date	Patent Family	Publication Date
CN 104921296 A	23.09.2015	(Family: none)	
CN 104939314 A	30.09.2015	(Family: none)	
CN 207505912 U	19.06.2018	(Family: none)	
JP 3212228 U	31.08.2017	CN 109414064 A WO 2018/230003 A1	
JP 2018-143765 A	20.09.2018	US 2018/0249763 A1 paragraph [0025] EP 3372096 A1	
JP 2018-531582 A	01.11.2018	US 2017/0020191 A1 paragraphs [0003]-[0024] EP 3325068 A1	

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Patent documents cited in the description

- JP 6000451 B **[0006]**
- JP 2017518041 A **[0006]**