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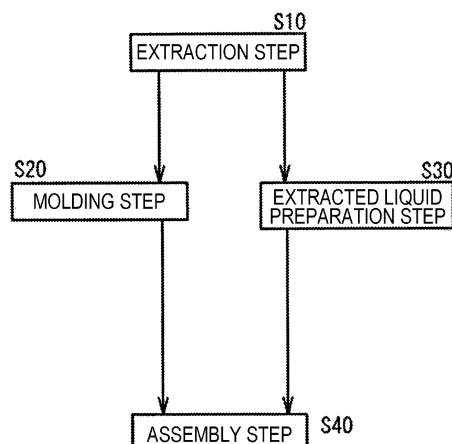
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(54) **METHOD FOR MANUFACTURING ATOMIZATION UNIT OF SUCTION TOOL**

(57) Provided is a technology capable of suppressing the occurrence of scorching in an electrical load of an atomization unit of a suction tool. A method for manufacturing an atomization unit of a suction tool having a liquid storage section and an electrical load comprises: an extraction step (S10) in which a tobacco material subjected to an alkali treatment is heated to extract a flavor component from the tobacco material; a molding step (S20) in which a tobacco residue, which is the tobacco material

after being extracted in the extraction step, is cleaned by means of an acidic cleaning liquid having a pH of 7.0 or less to reduce the pH of the tobacco residue to less than 8.0, and the tobacco residue after the cleaning is solidified to mold into a predetermined shape, thereby producing a molded body; and an assembly step (S40) in which an aerosol liquid and the molded body produced in the molding step are stored in the liquid storage section.

Fig. 7



Description

TECHNICAL FIELD

5 **[0001]** The present invention relates to a method for manufacturing an atomization unit of a suction tool.

BACKGROUND ART

10 **[0002]** Hitherto, as a non-combustion-heating-type suction tool, there is known an atomization unit of a suction tool including a liquid storage section that stores an aerosol liquid and an electrical load that atomizes the aerosol liquid introduced from the liquid storage section and generates an aerosol, with tobacco material powder being dispersed and disposed in the aerosol liquid of the liquid storage section (refer to, for example, PTL 1). According to such an atomization unit, a flavor component of the tobacco material can be eluted to the aerosol liquid of the liquid storage section. Therefore, a user can sense the flavor of the tobacco material.

15 **[0003]** Note that, as other related art documents, PTL 2 and PTL 3 are given. PTL 2 discloses a basic structural embodiment of a non-combustion-heating-type suction tool. PTL 3 discloses a technology of extracting a flavor component from a tobacco material, and specifically discloses a technology of heating a tobacco material subjected to an alkali treatment to thereby extract a flavor component from the tobacco material.

20 CITATION LIST

PATENT LITERATURE

[0004]

25 PTL 1: International Publication No. 2019/211332
PTL 2: Japanese Unexamined Patent Application Publication No. 2020-141705
PTL 3: International Publication No. 2016/063775

30 SUMMARY OF INVENTION

TECHNICAL PROBLEM

35 **[0005]** In the case of the atomization unit of the suction tool of the related art exemplified in PTL 1 above, the tobacco material dispersed in the aerosol liquid of the liquid storage section may adhere to the electrical load. In this case, scorching may occur in the electrical load.

[0006] In the case of the atomization unit of the suction tool of the related art above, a "component that causes scorching to occur in the electrical load when the component adheres to the electrical load (hereinafter referred to as a "scorching component")", such as water-soluble polyphenols or polysaccharides, may be eluted in a large amount to the aerosol liquid from the tobacco material dispersed in the aerosol liquid of the liquid storage section. Even in this case, scorching may occur in the electrical load.

[0007] The present invention has been made in consideration of the above, and it is an object of the present invention to provide a technology capable of suppressing occurrence of scorching in an electrical load of an atomization of a suction tool.

45 SOLUTION TO PROBLEM

(First Aspect)

50 **[0008]** To this end, a method for manufacturing an atomization unit of a suction tool according to a first aspect of the present invention is a method for manufacturing an atomization unit of a suction tool including a liquid storage section that stores an aerosol liquid and an electrical load that atomizes the aerosol liquid introduced from the liquid storage section and generates an aerosol, the method comprising: an extraction step in which a tobacco material subjected to an alkali treatment is heated to extract a flavor component from the tobacco material; a molding step in which a tobacco residue, which is the tobacco material after being extracted in the extraction step, is cleaned by means of an acidic cleaning liquid having a pH of 7.0 or less to cause a pH of the tobacco residue to become less than 8.0, and the tobacco residue after the cleaning is solidified and is molded into a predetermined shape, thereby producing a molded body; and an assembly step in which the aerosol liquid and the molded body produced in the molding step are stored in the liquid

storage section.

[0009] According to this aspect, the molded body formed by solidifying the tobacco residue and molding the tobacco residue into a predetermined shape is disposed in the aerosol liquid of the liquid storage section, and the molded body and the electrical load are physically separated from each other, as a result of which it is possible to suppress the tobacco residue from adhering to the electrical load. Therefore, it is possible to suppress occurrence of scorching in the electrical load.

[0010] Further, according to this aspect, in the molding step, the tobacco residue is cleaned by means of an acidic cleaning liquid having a pH of 7.0 or less to cause the pH of the tobacco residue to be less than 8.0, and the tobacco residue after the cleaning is solidified and molded into a predetermined shape, thereby producing the molded body. Therefore, compared to when a molded body is produced without performing such cleaning, it is possible to reduce a scorching component contained in the molded body. Consequently, it is possible to suppress a large amount of the scorching component from being eluted to the aerosol liquid from the molded body stored in the liquid storage section. As a result, it is possible to effectively suppress occurrence of scorching in the electrical load of the atomization unit of the suction tool.

(Second Aspect)

[0011] In the first aspect above, the molding step may include coating an entire surface of the molded body with a coating material containing a water-soluble polymer made up of at least one substance selected from polyvinyl alcohol, agar, gelatin, chitosan, and alginic acid.

[0012] The water-soluble polymer made up of at least one substance selected from polyvinyl alcohol, agar, gelatin, chitosan, and alginic acid has the property of, while allowing a substance having a relatively low molecular weight (low-molecular-weight substance) to pass through a combining gap of the water-soluble polymer, suppressing a substance having a relatively high molecular weight (high-molecular-weight substance) from passing through the combining gap. Therefore, according to this aspect, since the entire surface of the molded body is coated with the coating material in which such water-soluble polymer is a material, it is possible to, while allowing the flavor component (this is a low-molecular-weight substance) contained in the tobacco material of the molded body to be eluted to the aerosol liquid, suppress the scorching component (this is a high-molecular-weight substance) from being eluted to the aerosol liquid.

[0013] When the flavor component contained in the tobacco material of the molded body and the scorching component are compared to each other, although it is possible to dissolve the flavor component in the water-soluble polymer above, it is difficult to dissolve the scorching component in the water-soluble polymer. Therefore, it is possible to dissolve the flavor component of the tobacco material in the water-soluble polymer, and then elute the flavor component to the aerosol liquid. On the other hand, since it is difficult to dissolve the scorching component in the water-soluble polymer, the scorching component is suppressed from being eluted to the aerosol liquid. Even in this viewpoint, according to this aspect, it is possible to, while allowing the flavor component to be eluted to the aerosol liquid, suppress the scorching component from being eluted to the aerosol liquid.

(Third Aspect)

[0014] In the first aspect or the second aspect above, the method for manufacturing the atomization unit of the suction tool may further comprise: an extracted liquid preparation step in which the flavor component extracted in the extraction step is added to a solvent to prepare a tobacco material extracted liquid, in which the aerosol liquid that is stored in the liquid storage section in the assembly step contains the extracted liquid prepared in the extracted liquid preparation step.

(Fourth Aspect)

[0015] In the first aspect or the second aspect above, the method for manufacturing the atomization unit of the suction tool may further comprise: an extracted liquid preparation step in which the flavor component extracted in the extraction step is added to a solvent to prepare a tobacco material extracted liquid, in which the molding step may include adding to the molded body a part of the extracted liquid prepared in the extracted liquid preparation step, and in which the aerosol liquid that is stored in the liquid storage section in the assembly step may contain at least a part of a remaining portion of the extracted liquid prepared in the extracted liquid preparation step.

(Fifth Aspect)

[0016] In the first aspect or the second aspect above, the method for manufacturing the atomization unit of the suction tool may further comprise: an extracted liquid preparation step in which the flavor component extracted in the extraction step is added to a solvent to prepare a tobacco material extracted liquid, in which the molding step may include adding

to the molded body all of the extracted liquid prepared in the extracted liquid preparation step.

ADVANTAGEOUS EFFECTS OF INVENTION

5 **[0017]** According to the aspects of the present invention, it is possible to suppress occurrence of scorching in the electrical load of the atomization unit of the suction tool.

BRIEF DESCRIPTION OF DRAWINGS

10 **[0018]**

[Fig. 1] Fig. 1 is a perspective view schematically showing an external appearance of a suction tool according to an embodiment.

15 [Fig. 2] Fig. 2 is a schematic sectional view showing a main portion of an atomization unit of the suction tool according to the embodiment.

[Fig. 3] Fig. 3 is a sectional view along line A1-A1 in Fig. 2.

[Fig. 4] Fig. 4 is a schematic perspective view of a tobacco consumption member according to the embodiment.

[Fig. 5] Fig. 5 is a schematic sectional view of the tobacco consumption member in Fig. 4 that has been cut by an X-Y plane.

20 [Fig. 6] Fig. 6 is a schematic sectional view of the tobacco consumption member in Fig. 4 that has been cut by a Y-Z plane.

[Fig. 7] Fig. 7 is a flowchart for illustrating a method for manufacturing the atomization unit of the suction tool according to the embodiment.

25 [Fig. 8] Fig. 8 is a flowchart for illustrating a method for manufacturing the atomization unit of the suction tool according to Modification 1 of the embodiment.

[Fig. 9] Fig. 9 is a flowchart for illustrating a method for manufacturing the atomization unit of the suction tool according to Modification 2 of the embodiment.

[Fig. 10] Fig. 10 is a schematic perspective view of a tobacco consumption member according to Modification 3 of the embodiment.

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DESCRIPTION OF EMBODIMENTS

35 **[0019]** A method for manufacturing an atomization unit 12 of a suction tool 10 according to an embodiment of the present invention is described below with reference to the drawings. Specifically, first, a structure of the atomization unit 12 that is manufactured by the manufacturing method according to the present embodiment and the structure of the suction tool 10 that includes the atomization unit 12 are described, and, then, the manufacturing method according to the present embodiment is described. Note that the figures of the present application are schematic figures for facilitating understanding of the features, and, for example, a dimensional ratio of each structural element is not necessarily the same as the actual ratio thereof. The figures illustrate X-Y-Z orthogonal coordinates if necessary.

40 **[0020]** Fig. 1 is a perspective view schematically showing an external appearance of the suction tool 10 according to the present embodiment. The suction tool 10 according to the present embodiment is a non-combustion-heating-type suction tool, and is specifically a non-combustion-heating-type electronic cigarette.

45 **[0021]** As one example, the suction tool 10 according to the present embodiment extends in a direction of a central axis CL of the suction tool 10. Specifically, as one example, the suction tool 10 has an external shape having a "longitudinal direction (direction of the central axis CL)", a "width direction" orthogonal to the longitudinal direction, and a "thickness direction" orthogonal to the longitudinal direction and the width direction. The dimension of the suction tool 10 in the longitudinal direction, the dimension of the suction tool 10 in the width direction, and the dimension of the suction tool 10 in the thickness direction become smaller in this order. Note that, in the present embodiment, of the X-Y-Z orthogonal coordinates, a direction of a Z axis (Z direction or -Z direction) corresponds to the longitudinal direction, a direction of an X axis (X direction or -X direction) corresponds to the width direction, and a direction of a Y axis (Y direction or -Y direction) corresponds to the thickness direction.

50 **[0022]** The suction tool 10 includes a power supply unit 11 and the atomization unit 12. The power supply unit 11 is attachably and detachably connected to the atomization unit 12. For example, a battery, serving as a power supply, and a control device are disposed inside the power supply unit 11. When the atomization unit 12 is connected to the power supply unit 11, the power supply of the power supply unit 11 and a load 40 (described later) of the atomization unit 12 are electrically connected to each other.

[0023] A discharge port 13 for discharging air is provided in the atomization unit 12. The air containing an aerosol is discharged from the discharge port 13. When using the suction tool 10, a user of the suction tool 10 can inhale the air

discharged from the discharge port 13.

[0024] A sensor that outputs a value of a pressure change inside the suction tool 10, caused by the inhalation of the user through the discharge port 13, is disposed at the power supply unit 11. When the inhalation of the air by the user is started, the sensor senses the start of the inhalation of the air, transmits it to the control device, and causes the control device to start passing an electrical current to the load 40 of the atomization unit 12 described below. When the inhalation of the air by the user ends, the sensor senses the end of the inhalation of the air, transmits it to the control device, and causes the control device to end passing the electrical current to the load 40.

[0025] Note that an operation switch that is operated by a user to transmit to the control device an air inhalation start request and an air inhalation end request may be disposed at the power supply unit 11. In this case, when the user operates the operation switch, it is possible to transmit to the control device the air inhalation start request or the air inhalation end request. The control device that has received the air inhalation start request or the air inhalation end request starts passing an electrical current to the load 40 or ends passing the electrical current to the load 40.

[0026] Note that, since the structure of the power supply unit 11 as described above is similar to that of, for example, a power supply unit of a suction tool of a related art such as that exemplified in PTL 2, further details thereof will not be given.

[0027] Fig. 2 is a schematic sectional view showing a main portion of the atomization unit 12. Specifically, Fig. 2 schematically shows a cross section made by cutting the main portion of the atomization unit 12 by a plane including the central axis CL. Fig. 3 schematically shows a cross section along line A1-A1 in Fig. 2 (a cross section made by a cutting plane in which the central axis CL is a normal line). The atomization unit 12 is described with reference to Figs. 2 and 3.

[0028] The atomization unit 12 includes a plurality of wall portions (a wall portion 70a to a wall portion 70g) extending in the longitudinal direction (the direction of the central axis CL), and a plurality of wall portions (a wall portion 71a to a wall portion 71c) extending in the width direction. The atomization unit 12 includes an air passage 20, a wick 30, the electrical load 40, and a liquid storage section 50. Tobacco consumption members 60 are disposed inside the liquid storage section 50.

[0029] The air passage 20 is a passage for passing air therethrough when a user inhales the air (that is, inhales an aerosol). The air passage 20 according to the present embodiment includes an upstream passage portion, a load passage portion 22, and a downstream passage portion 23. As one example, the upstream passage portion according to the present embodiment includes a plurality of upstream passage portions, specifically, an upstream passage portion 21a ("first upstream passage portion") and an upstream passage portion 21b ("second upstream passage portion").

[0030] The upstream passage portions 21a and 21b are disposed on an upstream side (an upstream side in an air flow direction) of the load passage portion 22. A downstream side end portion of each of the upstream passage portions 21a and 21b communicates with the load passage portion 22. The load passage portion 22 is a passage portion inside which the load 40 is disposed. The downstream passage portion 23 is a passage portion disposed on a downstream side (a downstream side in the air flow direction) of the load passage portion 22. An upstream side end portion of the downstream passage portion 23 communicates with the load passage portion 22. A downstream side end portion of the downstream passage portion 23 communicates with the discharge port 13 above. Air that has passed through the downstream passage portion 23 is discharged from the discharge port 13.

[0031] Specifically, the upstream passage portion 21a according to the present embodiment is provided in a region surrounded by the wall portion 70a, the wall portion 70b, the wall portion 70e, the wall portion 70f, the wall portion 71a, and the wall portion 71b. The upstream passage portion 21b is provided in a region surrounded by the wall portion 70c, the wall portion 70d, the wall portion 70e, the wall portion 70f, the wall portion 71a, and the wall portion 71b. The load passage portion 22 is provided in a region surrounded by the wall portion 70a, the wall portion 70d, the wall portion 70e, the wall portion 70f, the wall portion 71b, and the wall portion 71c. The downstream passage portion 23 is provided in a region surrounded by the cylindrical wall portion 70g.

[0032] A hole 72a and a hole 72b are provided in the wall portion 71a. Air flows into the upstream passage portion 21a from the hole 72a, and air flows into the upstream passage portion 21b from the hole 72b. A hole 72c and a hole 72d are provided in the wall portion 71b. The air that has passed through the upstream passage portion 21a flows into the load passage portion 22 from the hole 72c, and the air that has passed through the upstream passage portion 21b flows into the load passage portion 22 from the hole 72d.

[0033] In the present embodiment, an air flow direction in the upstream passage portions 21a and 21b is a direction opposite to an air flow direction in the downstream passage portion 23. Specifically, in the present embodiment, the air flow direction in the upstream passage portions 21a and 21b is the -Z direction, and the air flow direction in the downstream passage portion 23 is the Z direction.

[0034] With reference to Figs. 2 and 3, the upstream passage portion 21a and the upstream passage portion 21b according to the present embodiment are disposed adjacent to the liquid storage section 50 such that the liquid storage section 50 is interposed between the upstream passage portion 21a and the upstream passage portion 21b.

[0035] Specifically, as shown in Fig. 3, in sectional view of a cross section made by a cutting plane in which the central axis CL is a normal line, the upstream passage portion 21a according to the present embodiment is disposed on one

side (a side toward the -X direction) with the liquid storage section 50 being interposed between the upstream passage portions. On the other hand, in the sectional view, the upstream passage portion 21b is disposed on the other side (a side toward the X direction) with the liquid storage section 50 being interposed between the upstream passage portions. In other words, the upstream passage portion 21a is disposed on one side of the liquid storage section 50 in the width direction of the suction tool 10, and the upstream passage portion 21b is disposed on the other side of the liquid storage section 50 in the width direction of the suction tool 10.

[0036] The wick 30 is a member for introducing an extracted liquid of the liquid storage section 50 into the load 40 of the load passage portion 22. As long as such a function is provided, the specific structure of the wick 30 is not particularly limited. However, as one example, the wick 30 according to the present embodiment introduces an extracted liquid of the liquid storage section 50 into the load 40 by making use of a capillary phenomenon.

[0037] The load 40 is an electrical load into which an extracted liquid of the liquid storage section 50 is introduced and that is provided for atomizing the introduced extracted liquid and generating an aerosol. The specific structure of the load 40 is not particularly limited, and, for example, a heating element, such as a heater, or an element like an ultrasonic generator can be used. In the present embodiment, as one example of the load 40, a heater is used. As the heater, for example, a heating resistor (that is, a heating wire), a ceramic heater, or a dielectric heating type heater can be used. In the present embodiment, as one example of the heater, a heating resistor is used. In the present embodiment, the heater, serving as the load 40, has the shape of a coil. That is, the load 40 according to the present embodiment is a so-called coil heater. The coil heater is wound around the wick 30.

[0038] The load 40 is electrically connected to the control device and the power supply of the power supply unit 11 above, and generates heat when electricity is supplied to the load 40 from the power supply (that is, generates heat when an electrical current is passed). The operation of the load 40 is controlled by the control device. The load 40 heats the extracted liquid of the liquid storage section 50 introduced into the load 40 through the wick 30 and atomizes the extracted liquid to generate an aerosol.

[0039] Note that, since the structure of the wick 30 and the structure of the load 40 are similar to those of the wick and the load used in, for example, a suction tool of a related art such as that exemplified in PTL 2 or the like, further details thereof are not given.

[0040] The liquid storage section 50 is a member for storing an aerosol liquid Le. The liquid storage section 50 according to the present embodiment is provided in a region surrounded by the wall portion 70b, the wall portion 70c, the wall portion 70e, the wall portion 70f, the wall portion 71a, and the wall portion 71b.

[0041] In the present embodiment, as one example, the downstream passage portion 23 above is provided so as to extend through the liquid storage section 50 in the direction of the central axis CL. However, the structure of the downstream passage portion 23 is not limited to this structure, and, for example, the downstream passage portion 23 may be disposed so as to be adjacent to the liquid storage section 50 in the thickness direction of the suction tool 10 (the Y axis direction).

[0042] At least when the suction tool 10 is used, the tobacco consumption members 60 are disposed in the aerosol liquid Le of the liquid storage section 50. Two tobacco consumption members 60 according to the present embodiment are disposed in the aerosol liquid Le of the liquid storage section 50. However, the number of tobacco consumption members 60 is not limited thereto, and may be one or three or more.

[0043] Although the details are given below, each tobacco consumption member 60 contains a tobacco material. A flavor component of the tobacco material contained in each tobacco consumption member 60 is eluted to the aerosol liquid Le of the liquid storage section 50.

[0044] Inhalation using the suction tool 10 is performed as follows. First, when a user starts inhaling air, the air passes through the upstream passage portions 21a and 21b of the air passage 20, and flows into the load passage portion 22. An aerosol that has been generated in the load 40 is added to the air that has flowed to the load passage portion 22. The aerosol contains a flavor component eluted from the tobacco material contained in each tobacco consumption member 60. The air to which the aerosol containing the flavor component is added is discharged to the discharge port 13 through the downstream passage portion 23 and is inhaled by the user.

[0045] Fig. 4 is a schematic perspective view of a tobacco consumption member 60. As one example, the tobacco consumption member 60 according to the present embodiment has the shape of a sheet extending in a predetermined direction.

[0046] Although, specific values of an entire length (L1), a width (L2), and a thickness (L3) of each tobacco consumption member 60 are not particularly limited, one example of a numerical value of each of the entire length (L1), the width (L2), and the thickness (L3) is as follows. That is, as the entire length (L1) of each tobacco consumption member 60, a value selected from, for example, a range of 5 mm to 50 mm can be used. As the width (L2) of each tobacco consumption member 60, a value selected from, for example, a range of 2 mm to 10 mm can be used. As the thickness (L3) of each tobacco consumption member 60, a value selected from, for example, a range of 1 mm to 5 mm can be used. However, these values are only examples of the dimensions of each tobacco consumption member 60, and the dimensions of each tobacco consumption member 60 may be set as appropriate in accordance with the size of the suction tool 10.

[0047] Fig. 5 is a schematic sectional view of the tobacco consumption member 60 in Fig. 4 that has been cut by an X-Y plane. Fig. 6 is a schematic sectional view of the tobacco consumption member in Fig. 4 that has been cut by a Y-Z plane. Each tobacco consumption member 60 according to the present embodiment includes a molded body 61 and a coating material 62 that coats the entire surface of the molded body 61.

[0048] The molded body 61 is formed by solidifying the tobacco material and molding the solidified tobacco material into a predetermined shape. Note that, in the present embodiment, as the tobacco material constituting the molded body 61, a "tobacco residue" described later is used.

[0049] The entire surface (entire outer surface) of the molded body 61 is coated with the coating material 62 such that the outer surface of the molded body 61 is not exposed at the surface of each tobacco consumption member 60. Therefore, the entire surface of each tobacco consumption member 60 according to the present embodiment is constituted by the surface of the coating material 62.

[0050] Next, the method for manufacturing the atomization unit 12 according to the present embodiment is described. Fig. 7 is a flowchart for illustrating the method for manufacturing the atomization unit 12 according to present embodiment. The manufacturing method according to the present embodiment includes steps such as those described below, that is, an extraction step according to Step S10, a molding step according to Step S20, an extracted liquid preparation step according to Step S30, and an assembly step according to Step S40.

[0051] In the extraction step according to Step S10, a flavor component is extracted from a tobacco material. Specifically, in Step S10 according to the present embodiment, the tobacco material is subjected to an alkali treatment, and the tobacco material that has been subjected to the alkali treatment is heated to extract the flavor component from the tobacco material. The details of Step S10 are as follows.

[0052] First, in the present embodiment, as one example of the "tobacco material", tobacco leaves are used. As the tobacco leaves, "tobacco lamina" may be used, or "tobacco stem" may be used, or both "tobacco lamina" and "tobacco stem" may be used. A specific type of tobacco leaves is not particularly limited, and various types, such as orient leaves or virginia leaves, can be used. The tobacco leaves used in Step S10 may be one type of tobacco leaves or may be a plurality of types of tobacco leaves.

[0053] In Step S10, first, an alkali substance is added to the tobacco material (this treatment is called "alkali treatment"). As the alkali substance, for example, a basic substance, such as a potassium carbonate aqueous solution, can be used.

[0054] Next, the tobacco material that has been subjected to the alkali treatment is heated (this operation is called a heating operation) to a predetermined temperature (a temperature of, for example, 80°C or higher and lower than 150°C). When performing the heating operation, for example, one substance selected from the group consisting of glycerol, propylene glycol, triacetin, 1,3-butanediol, and water, or two or more types of substances selected from this group (one substance or two or more types of substances selected from this group are hereunder called "specific solvent substances") are brought into contact with the tobacco material.

[0055] By the heating operation, a releasing component (containing the flavor component) that is released in a gas phase from the tobacco material is collected by a predetermined collecting solvent. As the collecting solvent, for example, any one of the specific solvent substances above can be used. Therefore, it is possible to obtain the collecting solvent containing the flavor component (that is, it is possible to extract the flavor component from the tobacco leaves).

[0056] Alternatively, in Step S10, a structure that does not use a collecting substance such as that described above can be used. In this case, after performing the heating operation above on the tobacco material that has been subjected to the alkali treatment, the tobacco material is cooled by using, for example, a condenser to thereby condense the releasing component that has been released in the gas phase from the tobacco material, as a result of which the flavor component is extracted.

[0057] After Step S10, the molding step according to Step S20 and the extracted liquid preparation step according to Step S30, which are described below, are performed.

[0058] In Step S20, a "tobacco residue", which is the tobacco material after being extracted in the extraction step according to Step S10, is cleaned by means of an acidic cleaning liquid having a pH of 7.0 or less to cause the pH of the tobacco residue to become less than 8.0. Next, the tobacco residue after the cleaning is solidified and is molded into a predetermined shape (in the present embodiment, the shape of a sheet as one example), thereby producing a molded body 61 as a tobacco consumption member 60. Note that, when molding the tobacco residue into the shape of a sheet, the tobacco residue may be formed into the shape of a sheet by, for example, a sheet forming operation, a casting operation, or a rolling operation.

[0059] The tobacco residue after being extracted in the extraction step according to Step S10 is considered as having its pH on an alkali side. Therefore, in the present embodiment, in Step S20, the tobacco residue is cleaned by means of the acidic cleaning liquid until the pH of the tobacco residue is on a neutral side or the acidic side, thereby effectively cleaning the tobacco residue.

[0060] A specific type of the acidic cleaning liquid used in Step S20 is not particularly limited. As a specific example of the acidic cleaning liquid, a cleaning liquid containing inorganic acid (for example, hydrochloric acid or the like) may be used, or a cleaning liquid containing an organic acid (for example, acetic acid, malic acid, or the like) may be used.

[0061] Although a specific cleaning method is not particularly limited, as one example, the tobacco residue may be cleaned by immersing the tobacco residue in an acidic cleaning liquid.

[0062] The tobacco residue after being extracted in Step S10 may be cleaned by means of a cleaning liquid after the tobacco residue is formed into powder. The powdered tobacco residue may be molded to produce the molded body 61. Alternatively, the tobacco residue after being extracted in Step S10 may be cleaned by means of the cleaning liquid and then may be formed into powder. Then, the powdered tobacco residue may be molded to produce the molded body 61. That is, in this case, the molded body 61 is formed by solidifying a plurality of portions of the powdered tobacco residue (tobacco material) and molding them into a predetermined shape.

[0063] When, as described above, the tobacco residue is formed into powder, although the average particle diameter of the powdered tobacco residue is not particularly limited, the average particle diameter may be, for example, 100 μm or less. In this way, when the average particle diameter of the powdered tobacco residue is 100 μm or less, the surface of the molded body 61 can be smoother compared to that, for example, when the average particle diameter is larger than 100 μm . Therefore, it is possible to easily uniformly coat the entire surface of the molded body 61 with the coating material 62 described below.

[0064] Note that, as the average particle diameter of the tobacco residue decreases, the unevenness of the surface of the molded body 61 tends to decrease, as a result of which it is possible to more easily uniformly coat the entire surface of the molded body 61 with the coating material 62. In this viewpoint, the average particle diameter of the tobacco residue is more preferably 80 μm or less, even more preferably 50 μm or less, and still even more preferably 30 μm or less.

[0065] In Step S20 according to the present embodiment, the surface of the molded body 61 that has been produced as described above is coated with the coating material 62. Therefore, it is possible to produce the "tobacco consumption member 60" having a structure in which the surface of the tobacco residue solidified into a predetermined shape is covered with the coating material 62.

[0066] A specific method for coating by using the coating material 62 is not particularly limited. For example, it is possible to coat the surface of the molded body 61 with the coating material 62 by immersing the molded body 61 that has not been coated yet in a solvent containing the coating material and then by drying the molded body 61. Alternatively, it is possible to coat the surface of the molded body 61 with the coating material 62 by spraying and applying the coating material 62 to the surface of the molded body 61 that has not been coated yet.

[0067] As the coating material 62, a water-soluble polymer can be used. As the water-soluble polymer, a water-soluble polymer made up of at least one substance selected from polyvinyl alcohol (PVA), agar, gelatin, chitosan, and alginic acid can be used. That is, the coating material 62 may be polyvinyl alcohol, may be agar, may be gelatin, may be chitosan, may be alginic acid, or may be a combination of these. The content of Step S20 is as described above.

[0068] In the extracted liquid preparation step according to Step S30 in Fig. 7, the flavor component extracted in Step S10 is added to a predetermined solvent to prepare a "tobacco material extracted liquid". As the predetermined solvent, for example, any one of the specific solvent substances above can be used.

[0069] In the present embodiment, the extracted liquid prepared in Step S30 is used as an aerosol liquid Le that is stored in the liquid storage section 50. That is, the aerosol liquid Le according to the present embodiment contains at least the extracted liquid prepared in Step S30.

[0070] Note that, in Step S30, the tobacco material extracted liquid may be prepared by condensing the flavor component extracted in Step S10 and then by adding the flavor component to the predetermined solvent above. According to this structure, it is possible to increase the concentration of the flavor component contained in the tobacco material extracted liquid.

[0071] After Step S20 and Step S30, the assembly step according to Step S40 is performed. In Step S40, the tobacco consumption member 60 produced in Step S20 (that is, in the embodiment, the molded body 61 whose surface has been coated with the coating material 62) is stored in the liquid storage section 50 of the atomization unit 12, and the extracted liquid prepared in Step S30 (this becomes the aerosol liquid Le) is stored in the liquid storage section 50.

[0072] Note that the aerosol liquid Le that is stored in the liquid storage section 50 in Step S40 may be one in which a predetermined solvent is further added to the extracted liquid prepared in Step S30. As the predetermined solvent, for example, any one of the specific solvent substances can be used.

[0073] By performing the steps above, the atomization unit 12 of the suction tool 10 according to the present embodiment is manufactured.

[0074] According to the manufacturing method according to the present embodiment as described above, it is possible to manufacture the atomization unit 12 of the suction tool 10 while effectively using the tobacco residue as the material of the molded body 61.

[0075] According to the present embodiment, the molded body 61 formed by solidifying the tobacco residue and molding the solidified tobacco residue into a predetermined shape is disposed in the aerosol liquid Le of the liquid storage section 50, and the molded body 61 and the electrical load 40 are physically separated from each other, as a result of which it is possible to suppress the tobacco residue from adhering to the electrical load 40. Therefore, it is possible to suppress occurrence of scorching in the electrical load 40.

[0076] Further, according to this embodiment, in the molding step according to Step S20, the tobacco residue is cleaned by means of an acidic cleaning liquid having a pH of 7.0 or less to cause the pH of the tobacco residue to be less than 8.0, and the tobacco residue after the cleaning is solidified to produce the molded body 61. Therefore, compared to when a molded body 61 is produced without performing such cleaning, it is possible to reduce the amount of a scorching component included in the molded body 61. Consequently, it is possible to suppress a large amount of the scorching component from being eluted to the aerosol liquid Le from the molded body 61 stored in the liquid storage section 50. As a result, it is possible to effectively suppress occurrence of scorching in the load 40.

[0077] According to the present embodiment, since the entire surface of the molded body 61 is coated with the coating material 62 in the molding step according to Step S20, it is possible to realize the following operational effects.

[0078] The water-soluble polymer above used as the coating material 62 has the property of, while allowing a substance having a relatively low molecular weight (low-molecular-weight substance) to pass through a combining gap of the water-soluble polymer, suppressing a substance having a relatively high molecular weight (high-molecular-weight substance) from passing through the combining gap. Therefore, according to the present embodiment, since the entire surface of the molded body 61 is coated with the coating material 62 in which such water-soluble polymer is a material, it is possible to, while allowing the flavor component (this is a low-molecular-weight substance) contained in the tobacco material of the molded body 61 to be eluted to the aerosol liquid Le, suppress the scorching component (this is a high-molecular-weight substance) from being eluted to the aerosol liquid Le.

[0079] When the flavor component contained in the tobacco material of the molded body 61 and the scorching component are compared to each other, although it is possible to dissolve the flavor component in the water-soluble polymer, it is difficult to dissolve the scorching component in the water-soluble polymer. Therefore, it is possible to dissolve the flavor component in the water-soluble polymer, after which it is possible to elute the flavor component to the aerosol liquid Le. On the other hand, since it is difficult to dissolve the scorching component in the water-soluble polymer, the scorching component is suppressed from being eluted to the aerosol liquid Le. Even in this viewpoint, according to the present embodiment, it is possible to, while allowing the flavor component to be eluted to the aerosol liquid Le, suppress the scorching component from being eluted to the aerosol liquid Le.

[0080] However, the layout of the molding step according to Step S20 is not limited to the layout above. For example, the molding step according to Step S20 can have a layout in which coating of the entire surface of the molded body 61 with the coating material 62 is not included. In this case, in the assembly step according to Step S40, the molded body 61 that is not coated with the coating material 62 (that is, the tobacco consumption member 60 that does not include the coating material 62) is disposed in the aerosol liquid Le of the liquid storage section 50. Even in this case, it is possible to suppress occurrence of scorching in the load 40.

[0081] Although the method for manufacturing the atomization unit 12 according to the present embodiment above includes the extracted liquid preparation step according to Step S30, the layout of the method is not limited thereto. For example, the method for manufacturing the atomization unit 12 can have a layout that does not include the extracted liquid preparation step according to Step S30. In this case, for example, as the aerosol liquid Le that is stored in the liquid storage section 50 in the assembly step according to Step S40, it is possible to use a predetermined solvent that does not previously contain the flavor component. As the predetermined solvent, it is possible to use, for example, any one of the specific solvent substances above.

[0082] However, as in the present embodiment, when the method for manufacturing the atomization unit 12 includes the extracted liquid preparation step according to Step S30, the aerosol liquid Le contains not only the flavor component eluted to the aerosol liquid Le from the molded body 61 but also the flavor component contained in the extracted liquid prepared in Step S30. Therefore, for example, compared to when the aerosol liquid Le of the liquid storage section 50 does not contain at all the extracted liquid prepared in Step S30, it is possible to increase the concentration of the flavor component contained in the aerosol liquid Le. Therefore, it is possible to sufficiently sense the flavor of the tobacco material.

(Modification 1)

[0083] Fig 8 is a flowchart for illustrating a method for manufacturing the atomization unit 12 of the suction tool 10 according to Modification 1 of the embodiment. The manufacturing method according to the present modification primarily differs from the manufacturing method according to the embodiment described by using Fig. 7 in including Step S20A instead of Step S20.

[0084] A molding step according to Step S20A differs from the molding step according to Step S20 in including adding to the molded body 61 a part of the extracted liquid prepared in the extracted liquid preparation step according to Step S30.

[0085] That is, in Step S20A according to the present modification, after cleaning the tobacco residue by means of an acidic cleaning liquid, the tobacco residue is solidified and is molded into a predetermined shape to produce the molded body 61, and a part of the extracted liquid prepared in Step S30 is added to the molded body 61. Note that the entire surface of the molded body 61 to which a part of the extracted liquid has been added may be coated with the coating

material 62.

[0086] The aerosol liquid Le that is stored in the liquid storage section 50 in Step S40 according to the present modification contains at a least part of a remaining portion of the extracted liquid (remaining portion after addition to the molded body 61) prepared in Step S30. That is, in Step S40 according to the present modification, the aerosol liquid Le that is stored in the liquid storage section 50 may contain all of the remaining portion of the extracted liquid prepared in Step S30, or may contain a part of the remaining portion of the extracted liquid prepared in Step S30.

[0087] Even in the present modification, similarly to the embodiment above, it is possible to suppress occurrence of scorching in the load 40.

(Modification 2)

[0088] Fig 9 is a flowchart for illustrating a method for manufacturing the atomization unit 12 of the suction tool 10 according to Modification 2 of the embodiment. The manufacturing method according to the present modification primarily differs from the manufacturing method according to Modification 1 described by using Fig. 8 in including Step S20B instead of Step S20A.

[0089] A molding step according to Step S20B differs from the molding step according to Step S20A in including adding to the molded body 61 all of the extracted liquid prepared in the extracted liquid preparation step according to Step S30.

[0090] That is, in Step S20B according to the present modification, after cleaning the tobacco residue by means of an acidic cleaning liquid, the tobacco residue is solidified and is molded into a predetermined shape to produce the molded body 61, and all of the extracted liquid prepared in Step S30 is added to the molded body 61. Note that the entire surface of the molded body 61 to which all of the extracted liquid has been added may be coated with the coating material 62.

[0091] In Step S40 according to the present modification, as the aerosol liquid Le stored in the liquid storage section 50, a predetermined solvent that does not previously contain the flavor component is used. As the predetermined solvent, it is possible to use, for example, any one of the specific solvent substances above.

[0092] Even in the present modification, similarly to the embodiment above, it is possible to suppress occurrence of scorching in the load 40.

(Modification 3)

[0093] Although, in the embodiment and the modifications above, each tobacco consumption member 60 has the shape of a sheet, the shape of each tobacco consumption member 60 is not limited thereto. Fig. 10 is a schematic perspective view of a tobacco consumption member 60A according to Modification 3 of the embodiment. For example, the tobacco consumption member 60A may have the shape of a pellet (or the shape of a tablet). Specifically, the tobacco consumption member 60A has a structure in which the entire surface of the pellet-shaped molded body 61 is coated with the coating material 62.

[0094] Note that although the tobacco consumption member 60A exemplified in Fig. 10 is circular in cross section, the structure of the tobacco consumption member 60A is not limited thereto. The cross-sectional shape of the tobacco consumption member 60A may be an elliptical shape or may be an angular shape (a shape having angles n (where n is a number that is 3 or more), such as a triangular shape, a quadrangular shape, or a pentagonal shape).

[0095] Although specific dimensions of the tobacco consumption member 60A are not particularly limited, one example of each dimension is as follows. As an entire length (L1) of the tobacco consumption member 60A, a value selected from, for example, a range of 1 mm to 10 mm can be used. As a maximum dimension (D1) of the tobacco consumption member 60A in the width direction, for example, a value selected from, for example, a range of 1 mm to 10 mm can be used. However, these values are only examples of the dimensions of the tobacco consumption member 60A, and the dimensions of the tobacco consumption member 60A may be set as appropriate in accordance with the size of the suction tool 10.

[0096] Even in the present modification, similarly to the embodiment above, it is possible to suppress occurrence of scorching in the load 40.

<Examples>

[0097] With regard to the operational effects of producing the molded body 61 after cleaning the tobacco residue with a cleaning liquid, an experiment was performed. The experiment is described below.

(Tobacco Residue Used in Experiment)

[0098] First, a "tobacco residue" used in the experiment is a tobacco residue below. Potassium carbonate having a dry weight of 20 (wt%) (that is, an alkali substance) was added to a tobacco material (this corresponds to an alkali

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treatment). Next, under conditions in which the moisture content was 30 (%) and the temperature was 100 (°C), a heating operation was performed on the tobacco material to which the potassium carbonate was added. Then, water of an amount that was 15 times the weight of the tobacco material before the heating operation was added to the tobacco residue after the heating operation, and the tobacco residue was immersed in the water for 10 (min) and then was dehydrated by a centrifugal dehydrator. Next, the tobacco residue after the dehydration was dried by a dryer. The tobacco residue after the drying was used as the tobacco residue for samples SA1 to SA7 described below.

(Cleaning Method)

[0099] The samples SA2, SA3, SA4, SA6, and SA7 were cleaned by a cleaning liquid of an amount that was 30 times the weight of the tobacco residue before the cleaning. When, as the cleaning liquid, an acidic cleaning liquid having a pH of 7.0 or less was to be used, hydrochloric acid was used. When, as the cleaning liquid, a neutral cleaning liquid was to be used, water was used. The samples SA2, SA3, and SA4 were cleaned two times.

(Method for Measuring Carbide Production Amount)

[0100] A "liquid (propylene glycol: 47.5 (wt%), glycerol: 47.5 (wt%), and water: 5 (wt%))" having a weight that was 5 times the weight of each sample was prepared. Next, the liquid was added to each sample, and a component contained in each sample was extracted to the liquid at 60 (°C) and for 168 hours (hr). Next, the liquid was placed in a centrifugal separator, and a supernatant liquid was collected. Next, the collected supernatant liquid was filtered by a 0.45 (μm) filter.

[0101] A liquid of a predetermined amount (g) was taken out from the liquid (the supernatant liquid) after the filtering, and was heated in an aluminum container having a surface temperature of 250 (°C). Next, the mass (mg) of carbides remaining in the container after the heating was measured. By dividing the mass (mg) of the carbides by the mass (predetermined mass) of the liquid after the filtering, the "carbide production amount (mg/g liq.)", which was the mass (mg) of the carbides produced per 1 g of the liquid after the filtering, was calculated. The carbide production amount of each sample was measured by the method above. Note that the carbide production amount is correlated with how easily scorching occurs in the load 40. That is, as the carbide production amount of a sample increases, the amount of scorching in the load 40 increases when the sample is applied to the actual suction tool 10.

(Experiment Results)

[0102] Experiment results are shown in Table 1. Specifically, Table 1 shows the results of measurements of the carbide production amounts of the samples SA1 to SA7. As the sample SA1, a molded body in which the tobacco residue was not cleaned (that is, an uncleaned tobacco residue was used) was used. As the sample SA2, a molded body in which the tobacco residue was cleaned by neutral water to mold the tobacco residue after the cleaning whose pH became 9.6 was used. As the sample SA3, a molded body in which the tobacco residue was cleaned by means of an acidic cleaning liquid to mold the tobacco residue after the cleaning whose pH became 7.5 was used. As the sample SA4, a molded body in which the tobacco residue was cleaned by means of an acidic cleaning liquid to mold the tobacco residue after the cleaning whose pH became 4.1 was used.

[0103] As the sample SA5, a molded body in which an uncleaned tobacco residue was used and whose entire surface was coated with polyvinyl alcohol (PVA) was used. As the sample SA6, a molded body in which the tobacco residue was cleaned by neutral water to have a pH of 9.6 and whose entire surface was coated with PVA was used. As the sample SA7, a molded body in which the tobacco residue was cleaned by means of an acidic cleaning liquid to have a pH of 4.1 and whose entire surface was coated with PVA was used.

[0104] Note that, of the samples SA1 to SA7, the samples SA3, SA4, and SA7 correspond to examples, and the samples SA1, SA2, SA5, and SA6 correspond to comparative examples.

[Table 1]

	Sample Number	Cleaning	Coating	Carbide Production Amount (mg/g liq.)
Comparative Example 1	SA1	Not Performed	Not Performed	13.251
Comparative Example 2	SA2	Performed (pH 9.6)	Not Performed	2.362
Example 1	SA3	Performed (pH 7.5)	Not Performed	1.650

(continued)

	Sample Number	Cleaning	Coating	Carbide Production Amount (mg/g liq.)
Example 2	SA4	Performed (pH 4.1)	Not Performed	1.547
Comparative Example 4	SA5	Not Performed	Performed	1.092
Comparative Example 5	SA6	Performed (pH 9.6)	Performed	0.235
Example 3	SA7	Performed (pH 4.1)	Performed	0.207

15 **[0105]** In Table 1, when SA1 to SA4 in which coating is not performed are compared, the carbide production amounts of SA2 to SA4 in which the cleaning was performed are smaller than the carbide production amount of SA1 in which cleaning is not performed. In addition, the carbide production amounts of SA3 and SA4 in which the pH of the tobacco residue after the cleaning is less than 8.0 is smaller than the carbide production amount of SA2 in which the pH of the tobacco residue after the cleaning is 9.6. In addition, as can be seen from the comparison of SA3 and SA4 to each other, the carbide production amount of SA4 in which the pH of the tobacco residue after the cleaning is low is smaller than the carbide production amount of SA3.

20 **[0106]** In Table 1, as can be seen from a comparison of SA1 to SA4 in which coating is not performed to SA5 to SA7 in which the coating has been performed, the carbide production amounts of SA5 to SA7 in which the coating has been performed are in general smaller than the carbide production amounts of SA1 to SA4.

25 **[0107]** From the above, it has been confirmed by the experiment that, when the pH of a tobacco residue is made less than 8.0 by cleaning by means of an acidic cleaning liquid having a pH of 7.0 or less, the carbide production amount is reduced. In addition, it has been confirmed by the experiment that, when coating is performed on the entire surface of a tobacco residue whose pH has become less than 8.0 by cleaning by means of an acidic cleaning liquid having a pH of 7.0 or less, the carbide production amount is more effectively reduced.

30 **[0108]** From the experiment results above, when the molded body 61 is produced by using a tobacco residue whose pH has become less than 8.0 by cleaning by means of an acidic cleaning liquid having a pH of 7.0 or less, it is possible to suppress occurrence of scorching in the load 40, and when the entire surface of the molded body 61 is coated with the coating material 62, it is possible to further suppress occurrence of scorching in the load 40.

35 **[0109]** Although the embodiment and the modifications of the present invention have been described in detail above, the present invention is not limited to such a specific embodiment and such specific modifications. Various modifications and changes can be made within a scope of the spirit of the present invention as described in the claims.

REFERENCE SIGNS LIST

[0110]

- 10 suction tool
- 12 atomization unit
- 45 40 electrical load
- 50 liquid storage section
- 60 tobacco consumption member
- 61 molded body
- 62 coating material
- 50 Le aerosol liquid

Claims

- 55 1. A method for manufacturing an atomization unit of a suction tool, the atomization unit including a liquid storage section that stores an aerosol liquid and an electrical load that atomizes the aerosol liquid introduced from the liquid storage section and generates an aerosol, and the method for manufacturing the atomization unit of the suction tool comprising:

an extraction step in which a tobacco material subjected to an alkali treatment is heated to extract a flavor component from the tobacco material;

a molding step in which a tobacco residue, which is the tobacco material after being extracted in the extraction step, is cleaned by means of an acidic cleaning liquid having a pH of 7.0 or less to cause a pH of the tobacco residue to become less than 8.0, and the tobacco residue after the cleaning is solidified and is molded into a predetermined shape, thereby producing a molded body; and

an assembly step in which the aerosol liquid and the molded body produced in the molding step are stored in the liquid storage section.

2. The method for manufacturing the atomization unit of the suction tool according to claim 1, wherein the molding step includes coating an entire surface of the molded body with a coating material containing a water-soluble polymer made up of at least one substance selected from polyvinyl alcohol, agar, gelatin, chitosan, and alginic acid.

3. The method for manufacturing the atomization unit of the suction tool according to claim 1 or claim 2, further comprising:

an extracted liquid preparation step in which the flavor component extracted in the extraction step is added to a solvent to prepare a tobacco material extracted liquid,

wherein the aerosol liquid that is stored in the liquid storage section in the assembly step contains the extracted liquid prepared in the extracted liquid preparation step.

4. The method for manufacturing the atomization unit of the suction tool according to claim 1 or claim 2, further comprising:

an extracted liquid preparation step in which the flavor component extracted in the extraction step is added to a solvent to prepare a tobacco material extracted liquid,

wherein the molding step includes adding to the molded body a part of the extracted liquid prepared in the extracted liquid preparation step, and

wherein the aerosol liquid that is stored in the liquid storage section in the assembly step contains at least a part of a remaining portion of the extracted liquid prepared in the extracted liquid preparation step.

5. The method for manufacturing the atomization unit of the suction tool according to claim 1 or claim 2, further comprising:

an extracted liquid preparation step in which the flavor component extracted in the extraction step is added to a solvent to prepare a tobacco material extracted liquid,

wherein the molding step includes adding to the molded body all of the extracted liquid prepared in the extracted liquid preparation step.

Fig. 1

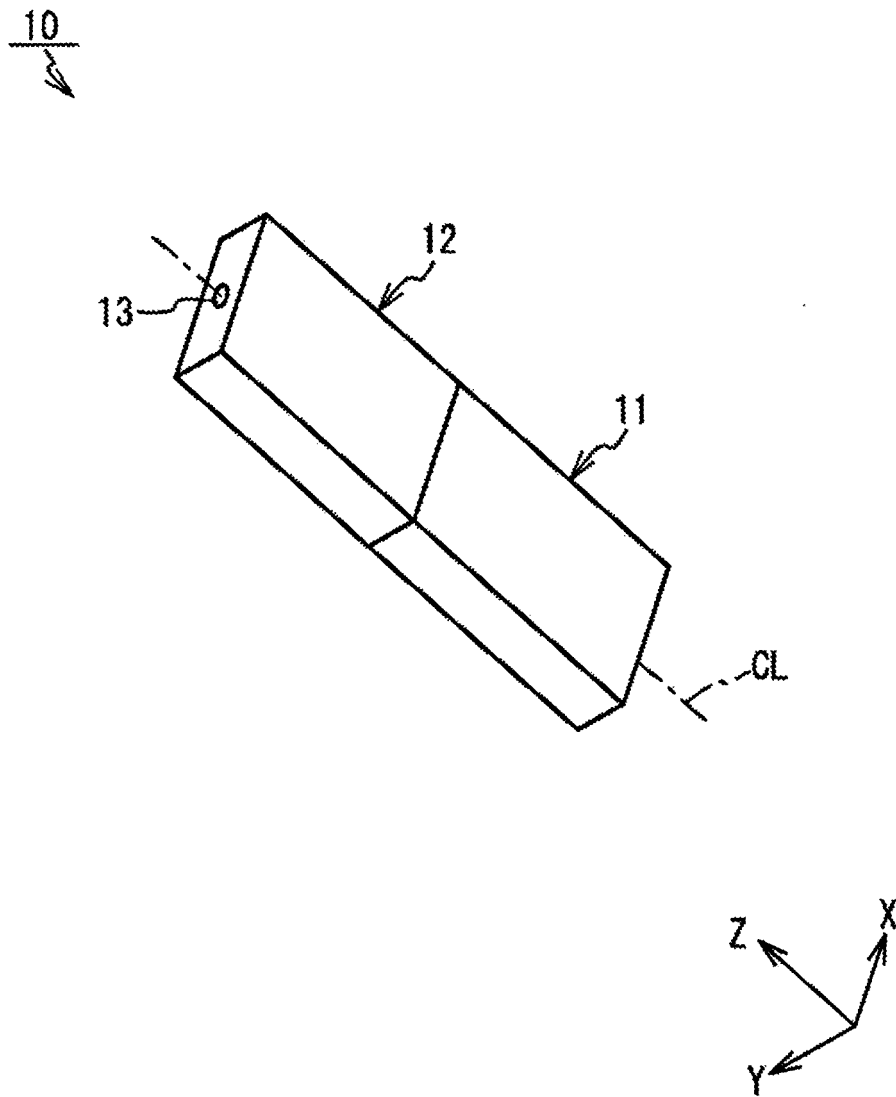


Fig. 2

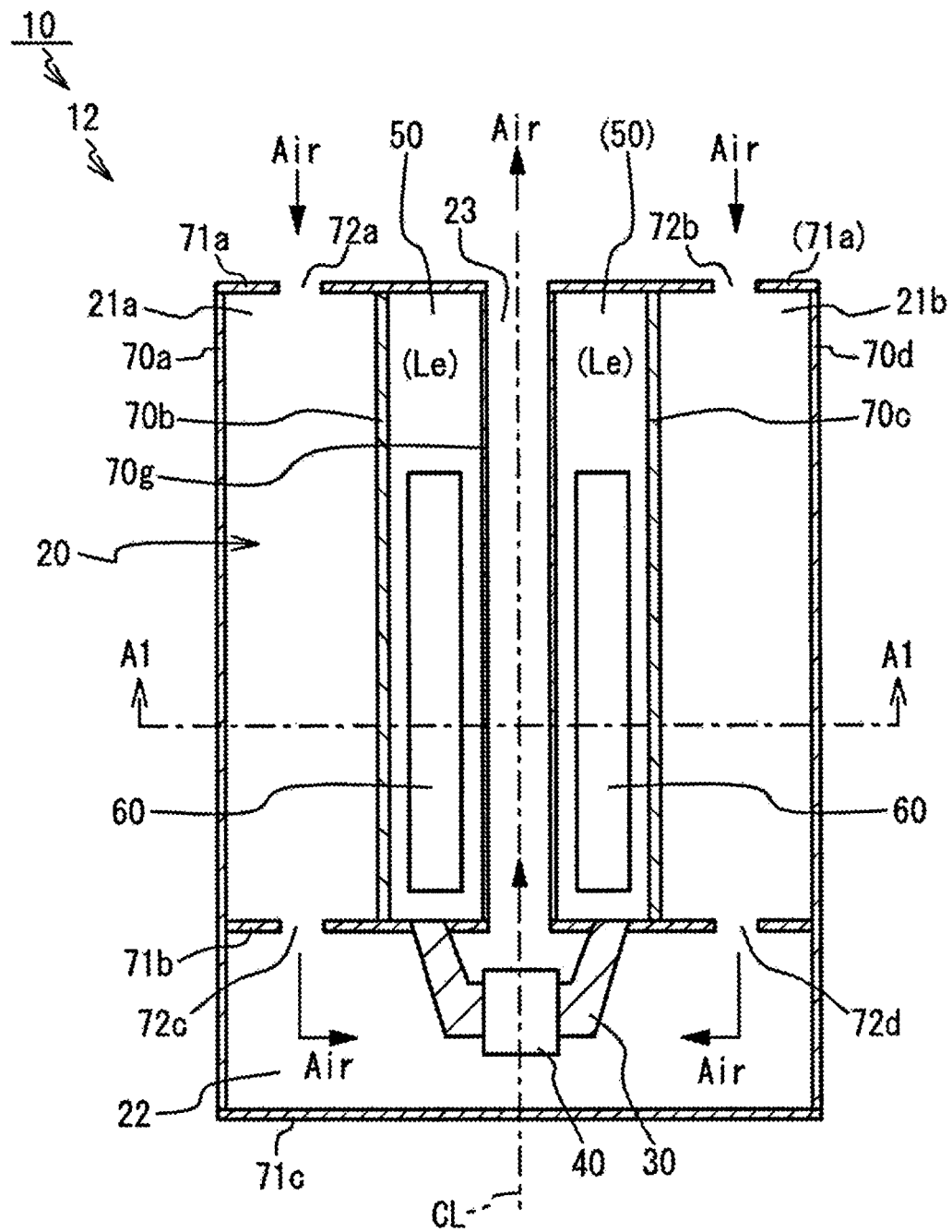


Fig. 3

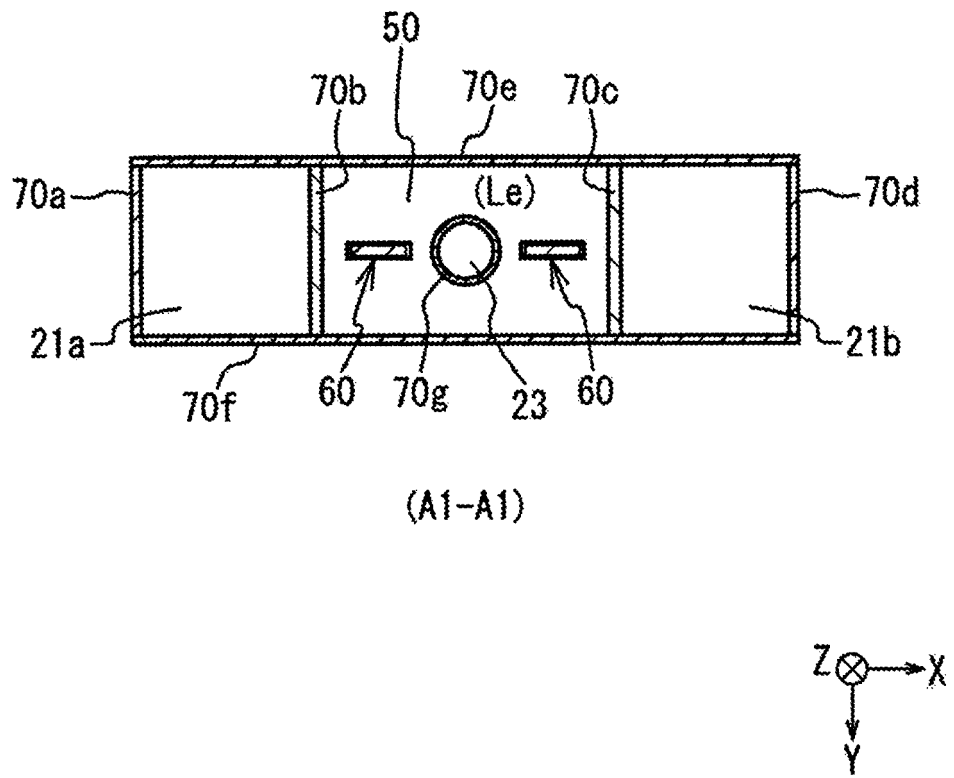


Fig. 4

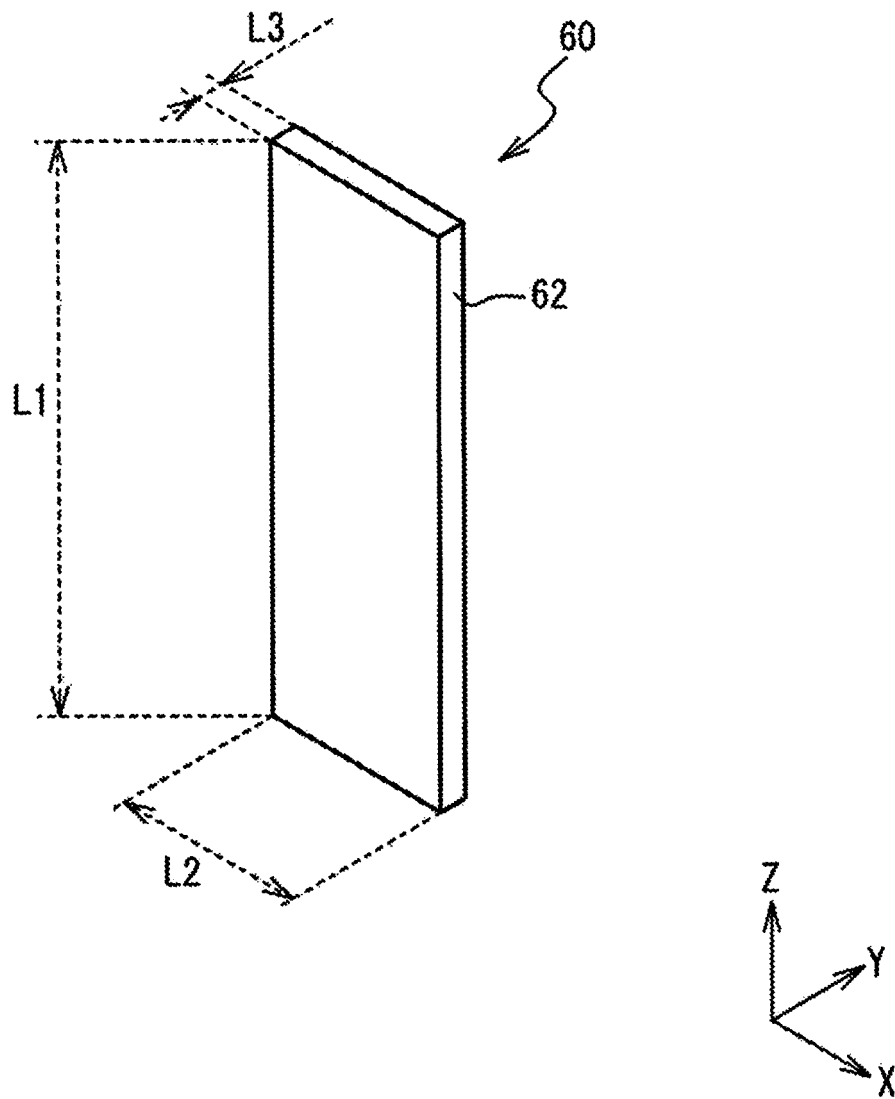


Fig. 5

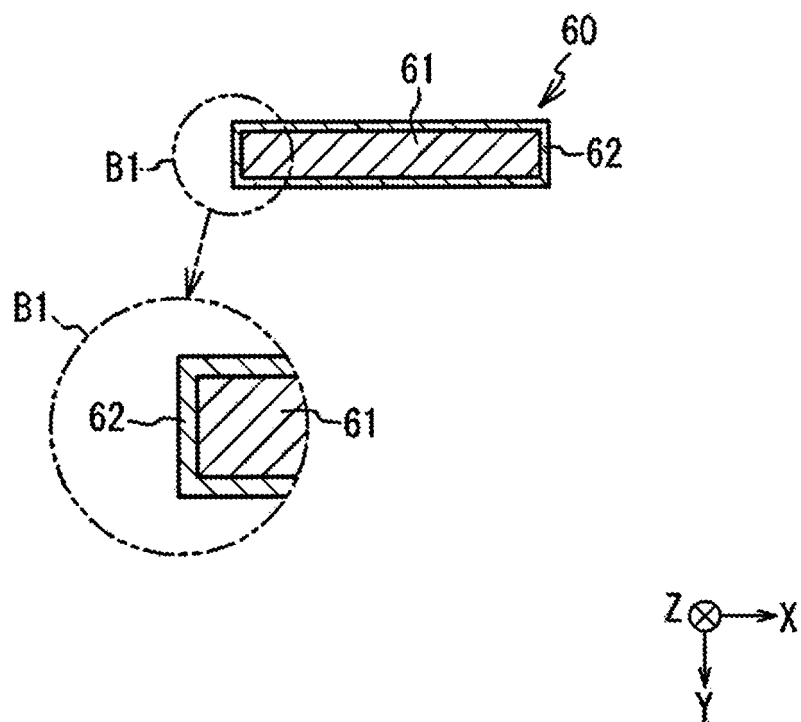


Fig. 6

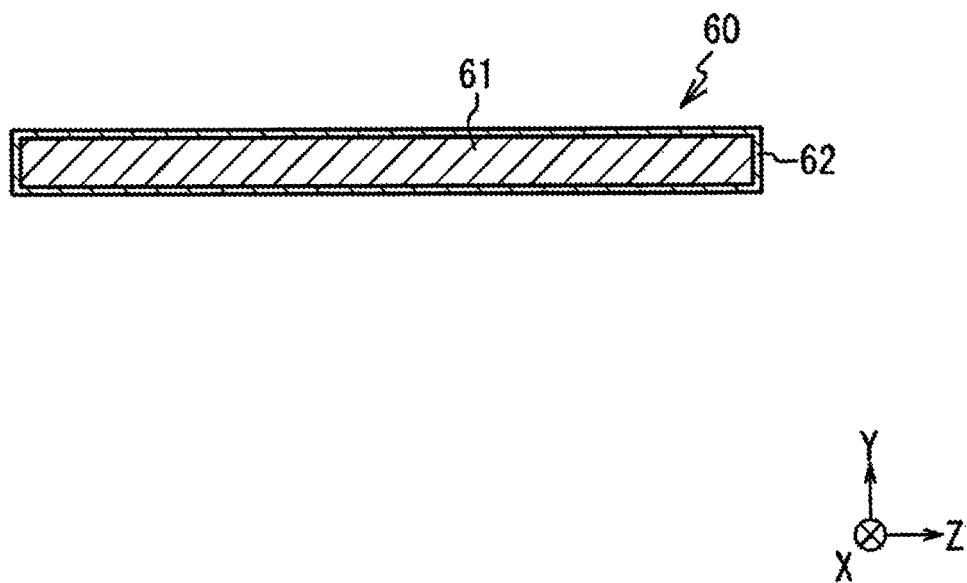


Fig. 7

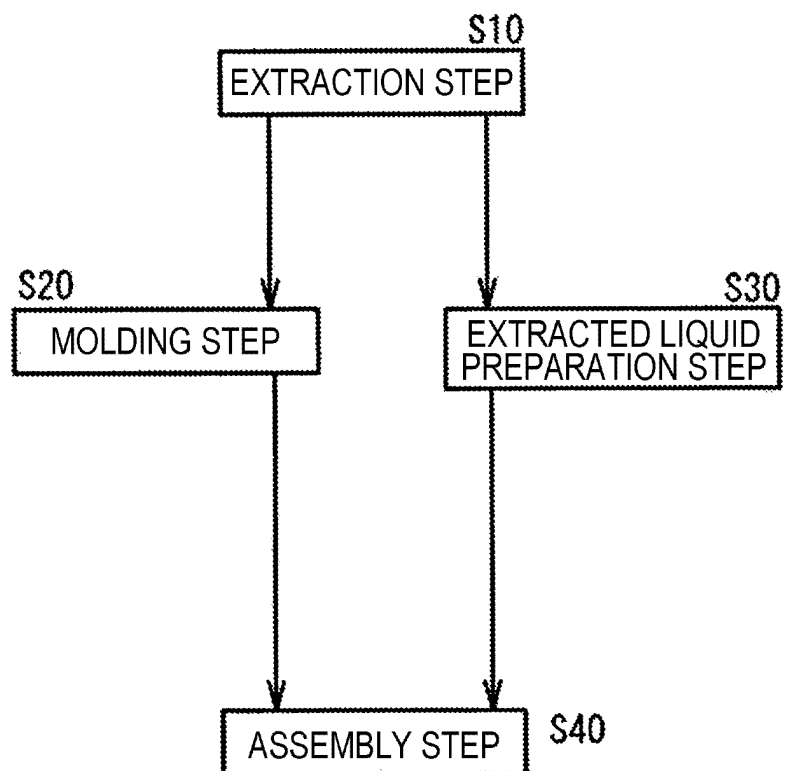


Fig. 8

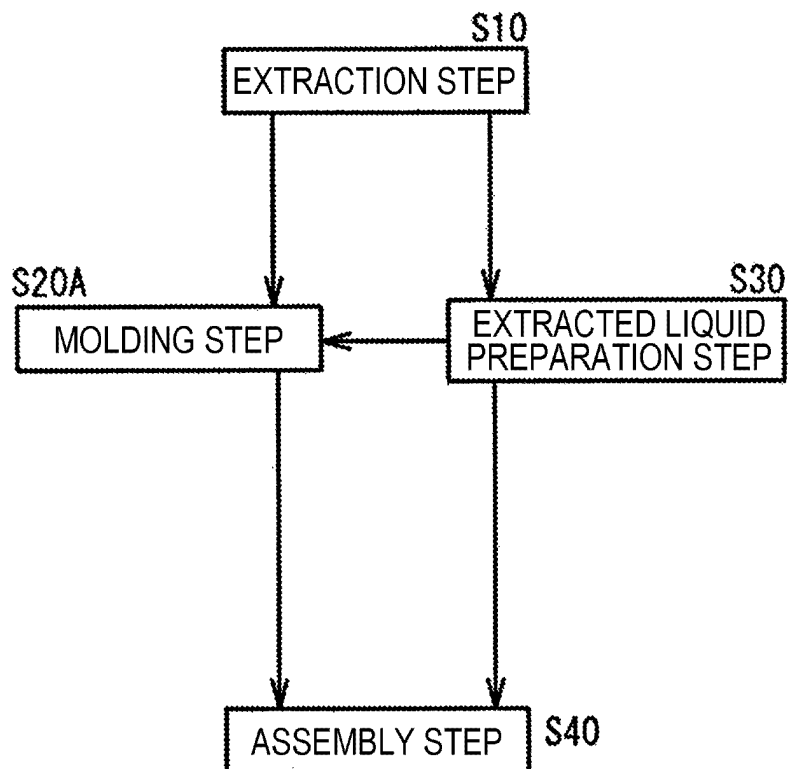


Fig. 9

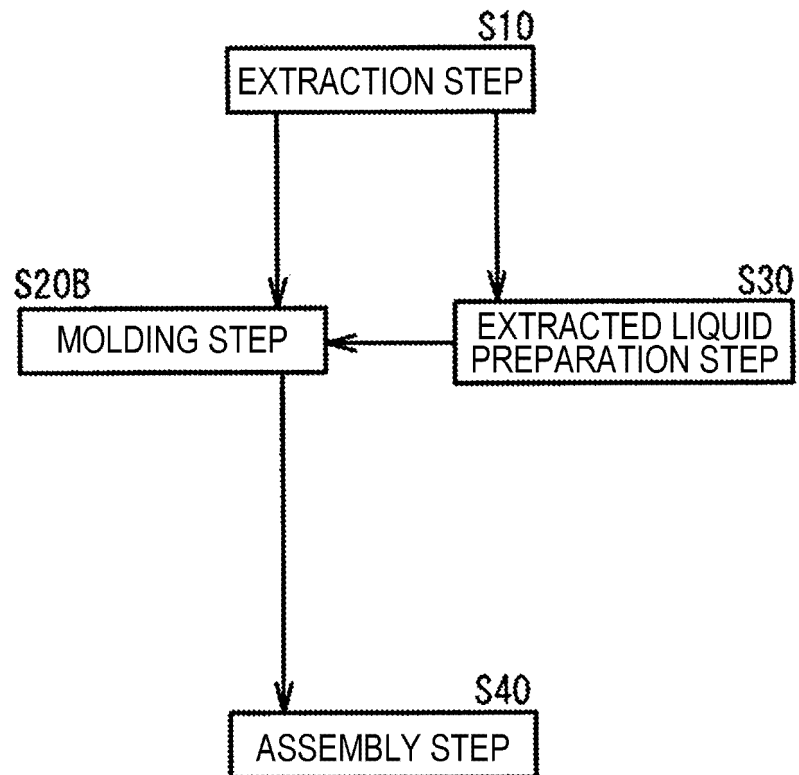
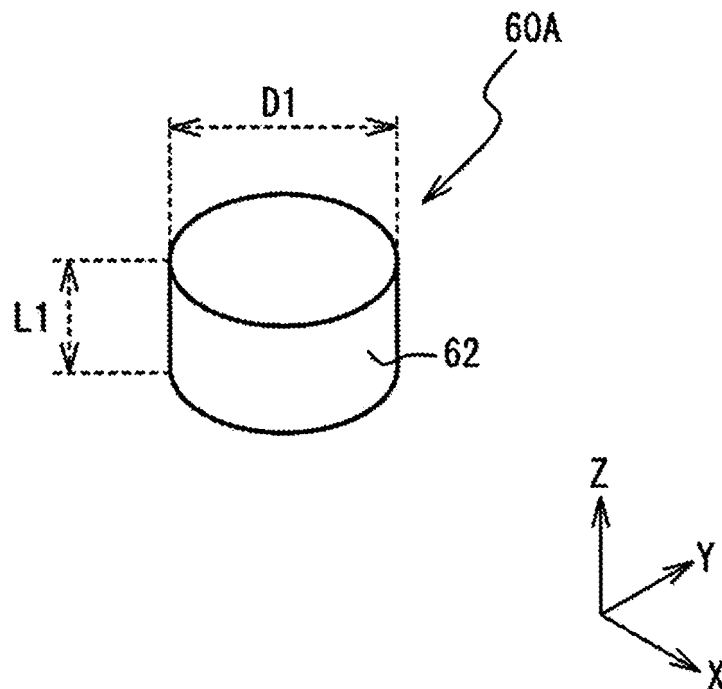


Fig. 10



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2021/035600

A. CLASSIFICATION OF SUBJECT MATTER <i>A24B 15/28</i> (2006.01)i; <i>A24F 40/70</i> (2020.01)i FI: A24F40/70; A24B15/28 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) A24B15/28; A24F40/70 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 1971-2021 Registered utility model specifications of Japan 1996-2021 Published registered utility model applications of Japan 1994-2021 Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)												
C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1"> <thead> <tr> <th>Category*</th> <th>Citation of document, with indication, where appropriate, of the relevant passages</th> <th>Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>WO 2016/063775 A1 (JAPAN TOBACCO INC.) 28 April 2016 (2016-04-28) entire text, all drawings</td> <td>1-5</td> </tr> <tr> <td>A</td> <td>WO 2019/211332 A1 (NERUDIA LIMITED) 07 November 2019 (2019-11-07) entire text, all drawings</td> <td>1-5</td> </tr> <tr> <td>A</td> <td>CN 111329104 A (CHINA TOBACCO JIANGSU INDUSTRIAL CO., LTD.) 26 June 2020 (2020-06-26) entire text, all drawings</td> <td>1-5</td> </tr> </tbody> </table>	Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	A	WO 2016/063775 A1 (JAPAN TOBACCO INC.) 28 April 2016 (2016-04-28) entire text, all drawings	1-5	A	WO 2019/211332 A1 (NERUDIA LIMITED) 07 November 2019 (2019-11-07) entire text, all drawings	1-5	A	CN 111329104 A (CHINA TOBACCO JIANGSU INDUSTRIAL CO., LTD.) 26 June 2020 (2020-06-26) entire text, all drawings	1-5
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A	CN 111329104 A (CHINA TOBACCO JIANGSU INDUSTRIAL CO., LTD.) 26 June 2020 (2020-06-26) entire text, all drawings	1-5										
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Date of the actual completion of the international search 09 November 2021	Date of mailing of the international search report 22 November 2021											
Name and mailing address of the ISA/JP Japan Patent Office (ISA/JP) 3-4-3 Kasumigaseki, Chiyoda-ku, Tokyo 100-8915 Japan	Authorized officer Telephone No.											

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2021/035600

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WO 2016/063775 A1	28 April 2016	US 2017/0224009 A1 entire text, all drawings EP 3207809 A1 CN 106028843 A KR 10-2016-0110996 A	
WO 2019/211332 A1	07 November 2019	(Family: none)	
CN 111329104 A	26 June 2020	(Family: none)	

REFERENCES CITED IN THE DESCRIPTION

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