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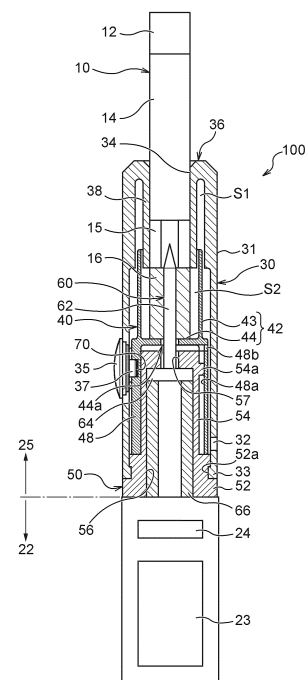
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(54) **FLAVOR INHALER**

(57) The invention improves the safety of a flavor inhaler. Provided is a flavor inhaler capable of heating a smokable substance contained in consumable. The flavor inhaler comprises a tubular receiving member in which the consumable is inserted; a heating element configured to heat the smokable substance from inside; a tubular portion surrounding the outer periphery of the receiving member, configured not to move in the direction that the consumable is inserted, and configured to be rotatable around the receiving member in a circumferential direction; a supporting portion configured to support the receiving member in such a manner that the receiving member is movable in the direction that the consumable is inserted; a spiral guide formed in either one of the receiving member and the tubular portion; and a first engaging portion formed in the receiving member or the tubular portion, whichever the spiral guide is not formed in, the first engaging portion being configured to be engaged with the spiral guide.

Fig. 1



## Description

### TECHNICAL FIELD

**[0001]** The invention relates to flavor inhalers.

### BACKGROUND ART

**[0002]** Flavor inhalers for inhaling flavors or the like without burning material have conventionally been known. Known as such flavor inhalers include, for example, an electric aerosol generating system comprising, inside the housing thereof, a receiving member that accommodates a smoking article (Patent Literature 1).

### CITATION LIST

### PATENT LITERATURE

**[0003]** PTL 1: Japanese Patent No. 5963375

### SUMMARY OF INVENTION

### TECHNICAL PROBLEM

**[0004]** The electric aerosol generating system disclosed in Patent Literature 1 comprises a base material holding portion that is separated from a main body. When the smoking article is intended to be removed from the main body, the base material holding portion is pulled, and the smoking article is thereby removed from a blade-like heater. The smoking article (consumable) can be afterwards removed from the base material holding portion.

**[0005]** An object of the invention is to provide a flavor inhaler with a novel structure for removing consumable.

### SOLUTION TO PROBLEM

**[0006]** A first aspect provides a flavor inhaler capable of heating a smokable substance contained in consumable. The flavor inhaler includes a tubular receiving member into which the consumable is inserted, a heating element configured to heat the smokable substance from inside, a tubular portion surrounding an outer periphery of the receiving member and configured to be rotatable around the receiving member in a circumferential direction, a supporting portion configured to support the receiving member in such a manner that the receiving member is movable in a direction that the consumable is inserted, a spiral guide that is formed in either one of the receiving member and the tubular portion, and a first engaging portion that is formed in the receiving member or the tubular portion, whichever the spiral guide is not formed in, the first engaging portion being engaged with the spiral guide.

**[0007]** According to the first aspect, the tubular portion rotates around the receiving member in the circumferential direction, whereby the first engaging portion moves

along the spiral guide. This allows the receiving member to move in the direction that the consumable is inserted in relation to the tubular portion, which facilitates the removal of the consumable. The first aspect thus provides the flavor inhaler with a novel structure for removing the consumable.

**[0008]** In a second aspect according to the first aspect, the tubular portion is configured not to move in the direction that the consumable is inserted.

**[0009]** According to the second aspect, it is possible to move the receiving member in the direction that the consumable is inserted without moving the tubular portion located at the outer periphery of the receiving member in the direction that the consumable is inserted. This restrains the receiving member from being exposed due to the motion of the tubular portion in the direction that the consumable is inserted, to thereby improve the safety of the flavor inhaler.

**[0010]** In a third aspect according to the first or second aspect, the receiving member includes an accommodating portion configured to be movable between a first position at which the consumable is removed and a second position at which the consumable is heated and configured to accommodate the smokable substance, the accommodating portion including a tubular side wall and a bottom wall.

**[0011]** According to the third aspect, since the accommodating portion of the receiving member is movable between the first and second positions, it is possible to easily remove the smokable substance from the heating element while restraining the smokable substance, such as cut tobacco, from spilling from the consumable by moving the accommodating portion to the first position after use of the consumable in a state where the smokable substance is arranged inside the accommodating portion.

**[0012]** In a fourth aspect according to the third aspect, the tubular portion includes an insertion end portion, into which the consumable is inserted. When the accommodating portion is located at the first position, the side wall of the accommodating portion does not protrude from the insertion end portion in the direction that the consumable is inserted.

**[0013]** According to the fourth aspect, since the side wall of the accommodating portion does not protrude from the insertion end portion of the tubular portion in the direction that the consumable is inserted, the accommodating portion is prevented from being exposed in the direction that the consumable is inserted. This prevents the user from touching the accommodating portion and thus improves the safety of the flavor inhaler. Furthermore, if located inside the receiving member, the heating element is prevented from being damaged by unnecessary force applied thereto through the accommodating portion touched by the user.

**[0014]** In a fifth aspect according to the third or fourth aspect, a space is provided over a whole circumference between the consumable accommodated in the accom-

modating portion and the side wall of the accommodating portion.

**[0015]** According to the fifth aspect, the space is provided between the accommodating portion and the consumable. Therefore, as compared to a case where a side surface of the consumable is in contact with the accommodating portion, the heat of the heating element and the heated smokable substance can be more reliably restrained from being transmitted to the accommodating portion of the receiving member and the tubular portion through space. It is therefore possible to reduce a temperature rise in a surface of the tubular portion and restrain the heat from being drawn from the smokable substance by the receiving member. Furthermore, since the side surface of the consumable is not in contact with the accommodating portion, it is possible to prevent the accommodating portion from being applied with unnecessary force when the consumable is removed from the accommodating portion. The heating element is therefore prevented from being damaged by unnecessary force applied thereto through the accommodating portion touched by the user in a case where the heating element is located inside the receiving member.

**[0016]** In a sixth aspect according to any one of the third to fifth aspects, the tubular portion includes a guide portion configured to contact a side surface of the consumable to guide the smokable substance to the heating element. The guide portion is located on an inner side of the side wall of the accommodating portion located at the first position.

**[0017]** According to the sixth aspect, since the guide portion is located on the inner side of the accommodating portion, the consumable is prevented from coming into contact with the accommodating portion when the consumable is removed from the accommodating portion. The accommodating portion can be prevented from being applied with unnecessary force when the consumable is removed from the accommodating portion. The heating element is therefore prevented from being damaged by unnecessary force applied thereto through the accommodating portion touched by the user in a case where the heating element is located inside the receiving member.

**[0018]** In a seventh aspect according to any one of the third to sixth aspects, the flavor inhaler includes an air inlet and an air flow path extending from the air inlet into the accommodating portion. The bottom wall of the accommodating portion includes an opening. The air flow path is in communication with the opening of the bottom wall of the accommodating portion.

**[0019]** According to the seventh aspect, air can be supplied to an end portion of the smokable substance through the opening of the bottom wall of the accommodating portion.

**[0020]** In an eighth aspect according to any one of the first to seventh aspects, the receiving member includes a contact portion configured to contact the supporting portion. The contact portion is arranged at such a position

as not to overlap with the heating element in the direction that the consumable is inserted.

**[0021]** According to the eighth aspect, the accommodating portion that accommodates the smokable substance is provided at the position away from the contact portion of the receiving member, so that the heat of the heated smokable substance can be restrained from being transmitted through the contact portion to the supporting portion. The smokable substance therefore can be efficiently heated.

**[0022]** In a ninth aspect according to the eighth aspect, the spiral guide or the first engaging portion is formed in the contact portion.

**[0023]** According to the ninth aspect, it is not necessary to form the spiral guide or the first engaging portion in the accommodating portion of the receiving member, so that it is possible to prevent the accommodating portion from being affected by forming the spiral guide or the first engaging portion in the accommodating portion. Specifically, for example, it is possible to restrain irregularity in circumferential thermal insulation properties of the accommodating portion which is caused by forming the spiral guide or the first engaging portion in the accommodating portion.

**[0024]** In a 10th aspect according to any one of the first to ninth aspects, the supporting portion includes a second engaging portion configured to be engaged with the receiving member to prevent the receiving member from rotating around the supporting portion in the circumferential direction.

**[0025]** According to the 10th aspect, the receiving member can be prevented from rotating around the supporting portion in the circumferential direction when the tubular portion rotates around the receiving member in the circumferential direction, so that the first engaging portion more surely can move along the spiral guide. The receiving member therefore can move in the direction that the consumable is inserted relative to the tubular portion without fail.

## BRIEF DESCRIPTION OF DRAWINGS

### [0026]

Fig. 1 is a schematic sectional side view of a heating system according to the present embodiment.

Fig. 2 is a perspective view of a receiving member.

Fig. 3 is a transparent perspective view of a first part of a flavor inhaler in a situation where the receiving member is located at a second position.

Fig. 4 is a transparent perspective view of the first part of the flavor inhaler in a situation where the receiving member is located between the second position and a first position.

Fig. 5 is a transparent perspective view of the first part of the flavor inhaler in a situation where the receiving member is located at the first position.

## DESCRIPTION OF EMBODIMENTS

**[0027]** An embodiment of the invention is discussed below with reference to the attached drawings. In the drawings discussed below, the same or corresponding constituent elements are provided with the same reference signs, and overlapping descriptions are omitted.

**[0028]** Fig. 1 is a schematic sectional side view of a heating system according to the embodiment. The heating system according to the embodiment includes a consumable 10 and a flavor inhaler 100. The flavor inhaler 100 is preferably a portable or hand-held device. As illustrated in Fig. 1, the consumable 10 includes a smokable substance 16 that is heated by the flavor inhaler 100, a center hole filter 15, a hollow filter 14, and a filter portion 12.

**[0029]** The flavor inhaler 100 is configured to heat the smokable substance 16 as a solid and atomize the smokable substance 16. The smokable substance 16 configures a part of the consumable 10 having a pillar-like shape which extends along a longitudinal direction, for example. The consumable 10 may be a tobacco stick in which, for example, the smokable substance 16 contains tobacco. The smokable substance 16 contained in the consumable 10 may contain an aerosol source that is heated at predetermined temperature to generate aerosol. The aerosol source is not limited in kind. The aerosol source may be selected from extract substances obtained from various natural products and/or constituents thereof, depending on the intended use. Aerosol sources include, for example, glycerin, propylene glycol, triacetin, 1,3-Butanediol, and mixtures of these. Tobacco, such as laminae and midribs, or other publicly-known plants may be used as the smokable substance 16. The smokable substance 16, such as tobacco, may be in the form of shreds, a sheet, a string, powder, particles, pellets, slurry, a porous element or another like form.

**[0030]** The flavor inhaler 100 includes a first part 25 and a second part 22. The second part 22 includes a battery 23 and a PCB 24 (Printed Circuit Board). The battery 23 accumulates electric power used in the flavor inhaler 100. For example, the battery 23 is a lithium ion battery. The battery 23 may be rechargeable through an external power source.

**[0031]** The PCB 24 comprises a CPU, a memory, and other constituent elements and controls the operation of the flavor inhaler 100. For example, the PCB 24 begins the heating of the smokable substance 16 in response to operation by the user on an input device, such as a push button and a slide switch, not shown, and after a lapse of a certain period of time, stops the heating of the smokable substance 16. When the number of puffs taken by the user exceeds a certain value, the PCB 24 may stop the heating of the smokable substance 16 even before a lapse of a certain period of time since the beginning of the heating of the smokable substance 16. For example, puffing action is detected by a sensor, not shown.

**[0032]** The PCB 24 may start heating the smokable

substance 16 in response to the beginning of puffing action and stop heating the smokable substance 16 in response to the stop of puffing action. When a certain period of time elapses since the beginning of puffing action, the PCB 24 may stop heating the smokable substance 16 even before the puffing action stops. In the embodiment, the PCB 24 is arranged between the battery 23 and the first part 25.

**[0033]** In an example illustrated in the drawing, the flavor inhaler 100 is configured to receive the consumable 10 in the form of a stick. As illustrated in the drawing, the battery 23, the PCB 24, and the first part 25 may be aligned in a direction that the consumable 10 is inserted into the flavor inhaler 100. In the present description, the direction that the consumable 10 is inserted is also referred to as an axial direction. A circumferential direction in this description means a direction of circumference centered on an axial axis.

**[0034]** The first part 25 includes a tubular portion 30, a receiving member 40, a supporting portion 50, and a heating portion 60. The heating portion 60 has a shape that allows the heating portion 60 to be inserted into the smokable substance 16 and is configured to heat the smokable substance 16 from inside. Specifically, the heating portion 60 includes a pin 62 (corresponding to an example of a heating element) that is inserted into the smokable substance 16 and a holder portion 64 for fixing the pin 62 to the supporting portion 50. The pin 62 may include, for example, a heating track or the like which is capable of performing resistive heating on a surface or interior portion thereof. The heating portion 60 may include a blade-like heater instead. The pin 62 includes a portion that comes into contact with the smokable substance 16 in a state where the consumable 10 is located at a desired position inside the receiving member 40. This portion of the pin 62 functions as the heating element.

**[0035]** The pin 62 is supplied with electric power from the battery 23. A fixing portion 66 functions to push the pin 62 and the holder portion 64 against a second supporting part 54 to fix the pin 62 and the holder portion 64. Electric power may be supplied from the battery 23 to the pin 62 through any suitable configuration. The electric power supply may be performed, for example, through configuration in which the pin 62 and the battery 23 are electrically connected together through a lead wire, not shown, which extends from the battery 23. The pin 62 may include a susceptor (corresponding to an example of the heating element) which is inductively heated by an induction coil. In such a case, the susceptor is inserted inside the smokable substance 16 and inductively heated by the induction coil, not shown, to thereby heat the smokable substance 16. If the pin 62 includes the susceptor, the tubular portion 30 or the receiving member 40 preferably has permeability and non-conductivity (electrical insulating property). This makes it difficult for the tubular portion 30 or the receiving member 40 to produce heat due to the induction coil, and the susceptor efficiently can

produce heat. Materials having permeability and non-conductivity (electrical insulating property) include, for example, glass, plants, wood, paper, resin such as PEEK, and other like materials. The induction coil may be, for example, a planar coil or a cylindrical coil. The induction coil may be provided on the side opposite to the consumable 10 with the bottom wall 44 of the receiving member 40 intervening therebetween or so as to surround the receiving member 40 in the state where the consumable 10 is positioned at the desired position inside the receiving member 40.

**[0036]** The supporting portion 50 has a substantially tubular shape as a whole and includes a first supporting part 52 that supports the tubular portion 30 and the second supporting part 54 that supports the receiving member 40. The first supporting part 52 has a substantially cylindrical shape and includes a circumferential groove 52a in an outer peripheral surface thereof. The circumferential groove 52a enables the first supporting part 52 to be engaged with the tubular portion 30. The circumferential groove 52a is a groove that is not changed in position in the axial direction of the supporting portion 50 (the direction that the consumable 10 is inserted). In other words, the circumferential groove 52a is not spiral, so that the tubular portion 30 is supported by the supporting portion 50 so as not to move in the direction that the consumable 10 is inserted. The first supporting part 52 is located closer to the second part 22 than the second supporting part 54 and may be formed integrally with the second supporting part 54. The second supporting part 54 has a substantially cylindrical shape having outer diameter that is smaller than the first supporting part 52. The second supporting part 54 is configured to support the receiving member 40 in such a manner that the receiving member 40 is movable in the direction that the consumable 10 is inserted. To be specific, the second supporting part 54 is fitted inside an after-mentioned contact portion 48 of the receiving member 40 and includes a key 54a on an outer peripheral surface thereof. The supporting portion 50 includes, in a substantially central portion thereof, a hollow portion 56 in which a holder portion 64 of the heating portion 60 and the fixing portion 66 are arranged, and an opening 57 that is in communication with the hollow portion 56. The pin 62 of the heating portion 60 is held by the holder portion 64 so as to extend through the opening 57.

**[0037]** In the embodiment, the tubular portion 30 is a housing that accommodates the heating portion 60 and the receiving member 40. Specifically, the tubular portion 30 includes a circumferential wall 31 surrounding an outer periphery of the receiving member 40. The tubular portion 30 includes an air inlet 32 for supplying air to the heating portion 60 and an insertion end portion 36 in which an opening 34 is formed. The consumable 10 is inserted in the opening 34. In an example shown in the drawing, the air inlet 32 is formed in the circumferential wall 31. The air inlet 32 may comprise a plurality of air inlets 32 provided in the circumferential wall 31 along the

circumferential direction. The insertion end portion 36 configures one end portion of the circumferential wall 31. The tubular portion 30 further includes an engaging projection 33 that is engaged with the circumferential groove 52a of the supporting portion 50. The engaging projection 33 is located in an end portion of the tubular portion 30 which is on the side opposite to the insertion end portion 36. To be specific, in the example shown in the drawing, the engaging projection 33 is formed in the end portion on the side opposite to the insertion end portion 36 of the circumferential wall 31. The engaging projection 33 is configured to slide against the circumferential groove 52a of the supporting portion 50. The tubular portion 30 is thus configured to be rotatable around the supporting portion 50 in the circumferential direction. In other words, the supporting portion 50 supports the tubular portion 30 so that the tubular portion 30 is rotatable in the circumferential direction. It can be said that the tubular portion 30 is rotatable around the receiving member 40 in the circumferential direction.

**[0038]** The tubular portion 30 includes a convex portion 37 (corresponding to an example of the first engaging portion). Specifically, the convex portion 37 is provided in an inner surface of the circumferential wall 31 of the tubular portion 30. Formed in an outer surface of the circumferential wall 31 of the tubular portion 30 is an operation convex portion 35 that is intended to help the user grasp the tubular portion 30 easily when the user rotates the tubular portion 30 in the circumferential direction.

**[0039]** The tubular portion 30 includes a guide portion 38. The opening 34 into which the consumable 10 is inserted is defined by the guide portion 38. The guide portion 38 is a tubular member extending from the insertion end portion 36 partially defining the opening 34 toward the battery 23 side. The guide portion 38 may be formed integrally with the insertion end portion 36. The guide portion 38 includes an inner surface that comes into contact with a side surface of the consumable 10 inserted in the flavor inhaler 100 through the opening 34 and thus guides the smokable substance 16 to the pin 62.

**[0040]** The tubular portion 30 includes a space S1 between the guide portion 38 and the circumferential wall 31. The receiving member 40 partially enters the space S1. The space S1 extends in the direction that the consumable 10 is inserted. As mentioned later, the receiving member 40 is movable in the direction that the consumable 10 is inserted, and the space S1 is a range of motion of the receiving member 40 when the receiving member 40 moves toward the insertion end portion 36.

**[0041]** Fig. 2 is a perspective view of the receiving member 40. As illustrated in Figs. 1 and 2, the receiving member 40 has a tubular shape as a whole and may be so configured that the consumable 10 is inserted therein. Specifically, the receiving member 40 includes an accommodating portion 42 that accommodates the smokable substance 16 and the contact portion 48 that contacts the supporting portion 50. The accommodating portion 42 is movable in the direction that the consumable

10 is inserted between a first position at which the consumable 10 is removed from the accommodating portion 42 and a second position at which the consumable 10 is heated by the heating portion 60. Fig. 1 shows a state in which the accommodating portion 42 is arranged at the second position.

**[0042]** As illustrated in Fig. 1, the accommodating portion 42 of the receiving member 40 includes a tubular side wall 43 and bottom wall 44. The bottom wall 44 includes an opening 44a. As illustrated in Fig. 1, the pin 62 of the heating portion 60 extends through the opening 44a of the bottom wall 44, and the pin 62 is partially located inside the accommodating portion 42. The side wall 43 of the accommodating portion 42 may be at least partially inserted in the space S1 in the state where the accommodating portion 42 is located at the second position shown in Fig. 1.

**[0043]** As illustrated in Fig. 1, it is preferable that a space S2 be provided over a whole circumference between the consumable 10 (smokable substance 16) accommodated in the accommodating portion 42 and the side wall 43 of the accommodating portion 42. The space S2 makes it possible to restrain the heat of the pin 62 and the heated smokable substance 16 from being transmitted to the accommodating portion 42 of the receiving member 40 and the tubular portion 30 more reliably than a case in which the side surface of the consumable 10 is in contact with the accommodating portion 42. It is therefore possible to reduce a temperature rise in a surface of the tubular portion 30 and restrain the heat from being drawn from the smokable substance 16 by the receiving member 40. Since the side surface of the consumable 10 is not in contact with the accommodating portion 42, the accommodating portion 42 can be prevented from being applied with unnecessary force when the consumable 10 is removed from the accommodating portion 42. Consequently, when located inside the receiving member 40, the pin 62 is prevented from being damaged by unnecessary force applied thereto through the accommodating portion 42 touched by the user.

**[0044]** The contact portion 48 of the receiving member 40 includes an aperture 48b connecting the inside and outside of the contact portion 48. Air that enters from the air inlet 32 of the tubular portion 30 flows through the aperture 48b of the contact portion 48 into an interior portion of the contact portion 48 and then flows through the opening 44a formed in the accommodating portion 42 into an interior portion of the accommodating portion 42. In other words, the flavor inhaler 100 includes an airflow path extending from the air inlet 32 to the opening 44a of the bottom wall 44 of the accommodating portion 42. This makes it possible to supply air to an end portion of the smokable substance 16 through the opening 44a of the bottom wall 44 of the accommodating portion 42.

**[0045]** As illustrated in Fig. 1, the contact portion 48 is preferably arranged at a position that does not overlap with a portion of the pin 62 which functions as a heating element in the direction that the consumable 10 is insert-

ed. In the embodiment, the contact portion 48 is arranged closer to the battery 23 (on the side opposite to the insertion end portion 36 of the tubular portion 30) than the portion of the pin 62 which functions as a heating element, that is, the portion of the pin 62 which contacts the smokable substance 16 in the direction that the consumable 10 is inserted. The pin 62 accordingly can be provided away from the contact portion 48 of the receiving member 40, so that the heat of the pin 62 is restrained from being transmitted through the contact portion 48 to the supporting portion 50. Consequently, the smokable substance 16 can be efficiently heated, and the temperature rise in the supporting portion 50 can be restrained or reduced.

**[0046]** As illustrated in Figs. 1 and 2, according to the embodiment, a spiral guide 70 is formed along an outer peripheral surface of the contact portion 48 of the receiving member 40. The spiral guide 70 may be, for example, a bottomed concave portion (groove) as illustrated in Figs. 1 and 2. The spiral guide 70 includes a first end portion 71 and a second end portion 72 that is located closer to the insertion end portion 36 than the first end portion 71 in the axial direction of the receiving member 40 (the direction that the consumable 10 is inserted). As illustrated in Fig. 1, the convex portion 37 provided in the inner surface of the circumferential wall 31 of the tubular portion 30 is engaged with the spiral guide 70. The convex portion 37 illustrated in Fig. 1 is located in the second end portion 72 of the spiral guide 70. The receiving member 40 is accordingly located at the second position where the consumable 10 is heated by the heating portion 60.

**[0047]** The following discussion explains the motion of the receiving member 40 between the first and second positions. Fig. 3 is a transparent perspective view of the first part 25 of the flavor inhaler 100 in a situation where the receiving member 40 is located at the second position. Fig. 4 is a transparent perspective view of the first part 25 of the flavor inhaler 100 in a situation where the receiving member 40 is located between the second position and the first position. Fig. 5 is a transparent perspective view of the first part 25 of the flavor inhaler 100 in a situation where the receiving member 40 is located at the first position. In the state illustrated in Fig. 3, if the tubular portion 30 is rotated in the circumferential direction, the convex portion 37 of the tubular portion 30 moves along the spiral guide 70. At this time, the tubular portion 30 does not move in the direction that the consumable 10 is inserted, so that the convex portion 37 of the tubular portion 30 pushes the receiving member 40 toward the insertion end portion 36 side. The receiving member 40 thus can be moved relative to the heating element in the direction that the consumable 10 is inserted in relation to the tubular portion 30, namely, a direction away from the portion included in the pin 62 which corresponds to the heating element, whereby the accommodating portion 42 moves in the direction that the consumable 10 is inserted (see Fig. 4). According to the embodiment, the receiving member 40 can be moved in the direction that the consumable 10 is inserted, and yet the tubular portion

30 located on an outer peripheral side of the receiving member 40 does not need to be moved in the direction that the consumable 10 is inserted. The embodiment thus restrains the receiving member 40 from being exposed by the tubular portion 30 moving in the direction that the consumable 10 is inserted and improves the safety of the flavor inhaler 100.

**[0048]** When the tubular portion 30 is further rotated, and the convex portion 37 of the tubular portion 30 reaches the first end portion 71 of the spiral guide 70, the receiving member 40 reaches the first position at which the consumable 10 is removed from the accommodating portion 42. At this time, the bottom wall 44 of the accommodating portion 42 pushes the consumable 10 toward the insertion end portion 36 side, and the smokable substance 16 is pulled out of the pin 62. This enables the user to remove the consumable 10 from the flavor inhaler 100 in the state where the receiving member 40 is located at the first position. In the embodiment, the accommodating portion 42 of the receiving member 40 is allowed to move between the first and second positions. If, after the use of the consumable 10, the accommodating portion 42 is moved to the first position with the smokable substance 16 arranged inside the accommodating portion 42 as illustrated in Figs. 3 to 5, the smokable substance 16 can be removed from the pin 62 without difficulty while the smokable substance 16, such as cut tobacco, is restrained from spilling from the consumable 10.

**[0049]** The tubular portion 30 is moved from the first position to the second position by rotating the tubular portion 30 backwards in the state illustrated in Fig. 5. The smokable substance 16 can be arranged inside the accommodating portion 42 located at the second position by inserting a fresh consumable 10 into the opening 34 in the state where the smokable substance 16 is not accommodated in the accommodating portion 42.

**[0050]** As illustrated in Fig. 5, when the accommodating portion 42 is located at the first position, the side wall 43 of the accommodating portion 42 preferably does not protrude from the insertion end portion 36 in the direction that the consumable 10 is inserted. This prevents the accommodating portion 42 from being exposed in the direction that the consumable 10 is inserted. The user is then prevented from touching the accommodating portion 42 having a relatively high temperature, which further improves the safety of the flavor inhaler 100. If the pin 62 is at least partially located inside the receiving member 40, the pin 62 is prevented from being damaged by unnecessary force applied thereto through the accommodating portion 42 touched by the user.

**[0051]** When the accommodating portion 42 is located at the first position as illustrated in Fig. 5, the guide portion 38 illustrated in Fig. 1 is preferably located on the inner side of the side wall 43 of the accommodating portion 42 located at the first position. If the guide portion 38 is located on the inner side of the accommodating portion 42, the consumable 10 is prevented from contacting the ac-

commodating portion 42 when removed from the accommodating portion 42. The accommodating portion 42 is then prevented from being applied with unnecessary force when the consumable 10 is removed from the accommodating portion 42. Consequently, if located inside the receiving member 40, the pin 62 is prevented from being damaged by unnecessary force applied thereto through the accommodating portion 42 touched by the user.

**[0052]** In the embodiment discussed above, the spiral guide 70 is formed in the receiving member 40, and the convex portion 37 engaged with the spiral guide 70 is formed in the tubular portion 30. The invention, however, does not necessarily have to be configured this way. The spiral guide 70 may be formed in the tubular portion 30, and the convex portion 37 engaged with the spiral guide 70 may be formed on the outer peripheral surface of the receiving member 40. In other words, the spiral guide 70 may be formed in either the receiving member 40 or the tubular portion 30, and the convex portion 37 engaged with the spiral guide 70 may be formed in either the receiving member 40 or the tubular portion 30, whichever the spiral guide 70 is not formed in. The spiral guide 70 may be a bottomed concave portion (groove) formed in the surface of the receiving member 40 or the tubular portion 30 or a slit extending through the receiving member 40 or the tubular portion 30.

**[0053]** The spiral guide 70 or the convex portion 37 may be formed in the accommodating portion 42 of the receiving member 40 but is preferably formed in the contact portion 48 as in the embodiment. In such a case, it is not necessary to form the spiral guide 70 or the convex portion 37 in the accommodating portion 42 of the receiving member 40, so that the accommodating portion 42 can be prevented from being affected by forming the spiral guide 70 or the convex portion 37 in the accommodating portion 42. Specifically, for example, the accommodating portion 42 is restrained from becoming uneven in thermal insulating properties in the circumferential direction by forming the spiral guide 70 or the convex portion 37 in the accommodating portion 42.

**[0054]** As illustrated in Figs. 1 and 2, the contact portion 48 of the receiving member 40 has a substantially tubular shape in the embodiment. The contact portion 48, however, does not necessarily have to have such a shape. On the contrary, the contact portion 48 may have any shape that allows the spiral guide 70 or the convex portion 37 to be formed in the contact portion 48. As illustrated in Figs. 1 and 2, the contact portion 48 is provided in an inner surface thereof with the groove 48a extending in the axial direction (the direction that the consumable 10 is inserted) to be so configured that the receiving member 40 is prevented from rotating around the supporting portion 50 in the circumferential direction. The contact portion 48, however, does not necessarily have to be configured that way as long as it has a function of preventing the rotation of the receiving member 40. If the groove 48a is provided, when the contact portion 48 is fitted in

the second supporting part 54 of the supporting portion 50 as illustrated in Fig. 1, the key 54a (corresponding to an example of the second engaging portion) of the second supporting part 54 is inserted in the groove 48a. In other words, the key 54a of the supporting portion 50 can be engaged with the receiving member 40 so that the receiving member 40 does not rotate around the supporting portion 50 in the circumferential direction. This prevents the receiving member 40 from rotating around the supporting portion 50 in the circumferential direction when the tubular portion 30 rotates around the receiving member 40 in the circumferential direction, so that the convex portion 37 more surely can move along the spiral guide 70. The receiving member 40 therefore can move around the tubular portion 30 in the direction that the consumable 10 is inserted without fail.

**[0055]** The embodiment of the invention has been discussed, but the invention is not limited to the embodiment. On the contrary, the invention may be modified in various ways within the scope of the technical ideas disclosed in the claims, the description, and the drawings. Any shape and material which provides the operation and advantageous effects of the present invention are within the scope of technical ideas of the invention even if they are not directly mentioned in the description and the drawings.

#### REFERENCE SIGNS LIST

##### **[0056]**

10: Consumable  
 16: Smokable substance  
 30: Tubular portion  
 32: Air inlet  
 36: Insertion end portion  
 37: Convex portion  
 38: Guide portion  
 40: Receiving member  
 42: Accommodating portion  
 43: Side wall  
 44: Bottom wall  
 44a: Opening  
 48: Contact portion  
 50: Supporting portion  
 54a: Key  
 62: Pin  
 70: Spiral guide  
 100: Flavor inhaler  
 S2: Space

#### Claims

1. A flavor inhaler capable of heating a smokable substance contained in consumable, the flavor inhaler comprising:

a tubular receiving member into which the consumable is inserted;  
 a heating element configured to heat the smokable substance from inside;  
 a tubular portion surrounding an outer periphery of the receiving member and configured to be rotatable around the receiving member in a circumferential direction;  
 a supporting portion configured to support the receiving member in such a manner that the receiving member is movable in a direction that the consumable is inserted;  
 a spiral guide that is formed in either one of the receiving member and the tubular portion; and  
 a first engaging portion that is formed in the receiving member or the tubular portion, whichever the spiral guide is not formed in, the first engaging portion being engaged with the spiral guide.

2. The flavor inhaler according to Claim 1, wherein the tubular portion is configured not to move in the direction that the consumable is inserted.

3. The flavor inhaler according to Claim 1 or 2,

wherein the receiving member includes an accommodating portion configured to be movable between a first position at which the consumable is removed and a second position at which the consumable is heated and configured to accommodate the smokable substance, and wherein the accommodating portion includes a tubular side wall and a bottom wall.

4. The flavor inhaler according to Claim 3,

wherein the tubular portion includes an insertion end portion, into which the consumable is inserted, and wherein when the accommodating portion is located at the first position, the side wall of the accommodating portion does not protrude from the insertion end portion in the direction that the consumable is inserted.

5. The flavor inhaler according to Claim 3 or 4, wherein a space is provided over a whole circumference between the consumable accommodated in the accommodating portion and the side wall of the accommodating portion.

6. The flavor inhaler according to any one of Claims 3 to 5,

wherein the tubular portion includes a guide portion configured to contact a side surface of the consumable to guide the smokable substance

to the heating element, and  
 wherein the guide portion is located on an inner  
 side of the side wall of the accommodating por-  
 tion located at the first position.

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7. The flavor inhaler according to any one of Claims 3  
 to 6, including:

an air inlet, and  
 an air flow path extending from the air inlet into 10  
 the accommodating portion,  
 wherein the bottom wall of the accommodating  
 portion includes an opening, and  
 wherein the air flow path is in communication 15  
 with the opening of the bottom wall of the ac-  
 commodating portion.

8. The flavor inhaler according to any one of Claims 1  
 to 7,

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wherein the receiving member includes a con-  
 tact portion configured to contact the supporting  
 portion, and  
 wherein the contact portion is arranged at a po- 25  
 sition not to overlap with the heating element in  
 the direction that the consumable is inserted.

9. The flavor inhaler according to Claim 8,  
 wherein the spiral guide or the first engaging portion  
 is formed in the contact portion. 30

10. The flavor inhaler according to any one of Claims 1  
 to 9,  
 wherein the supporting portion includes a second  
 engaging portion configured to be engaged with the 35  
 receiving member to prevent the receiving member  
 from rotating around the supporting portion in the  
 circumferential direction.

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Fig. 1

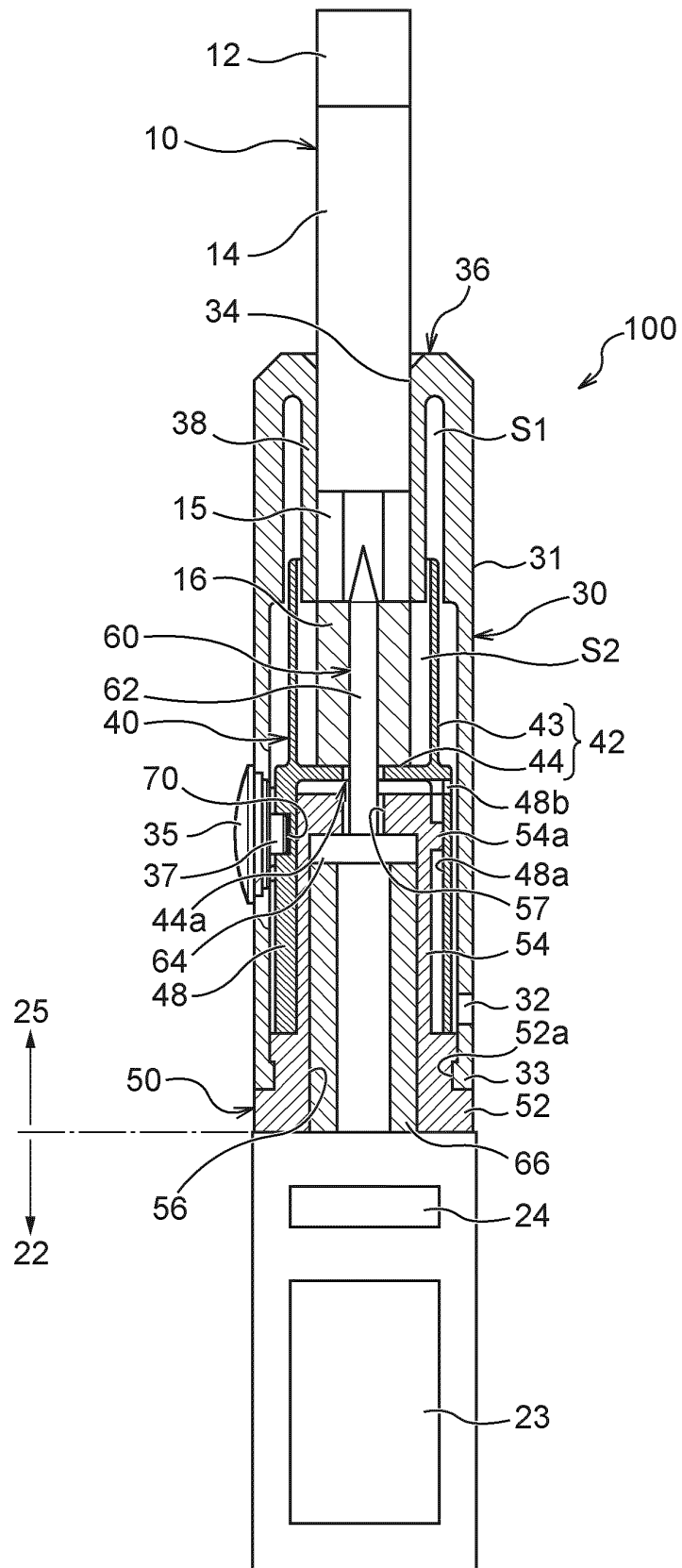


Fig. 2

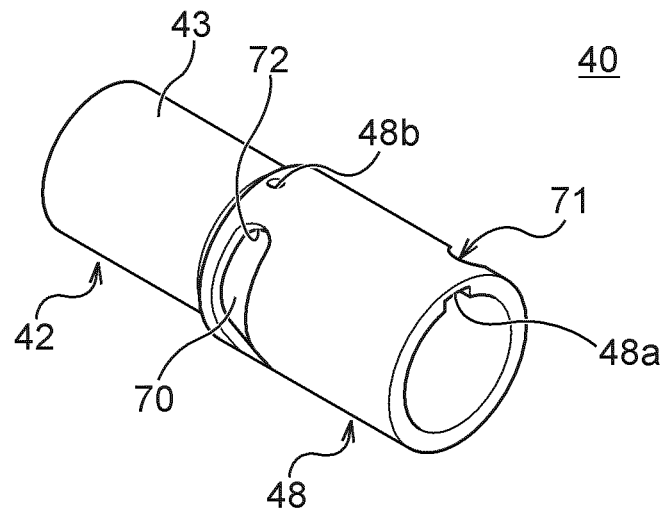


Fig. 3

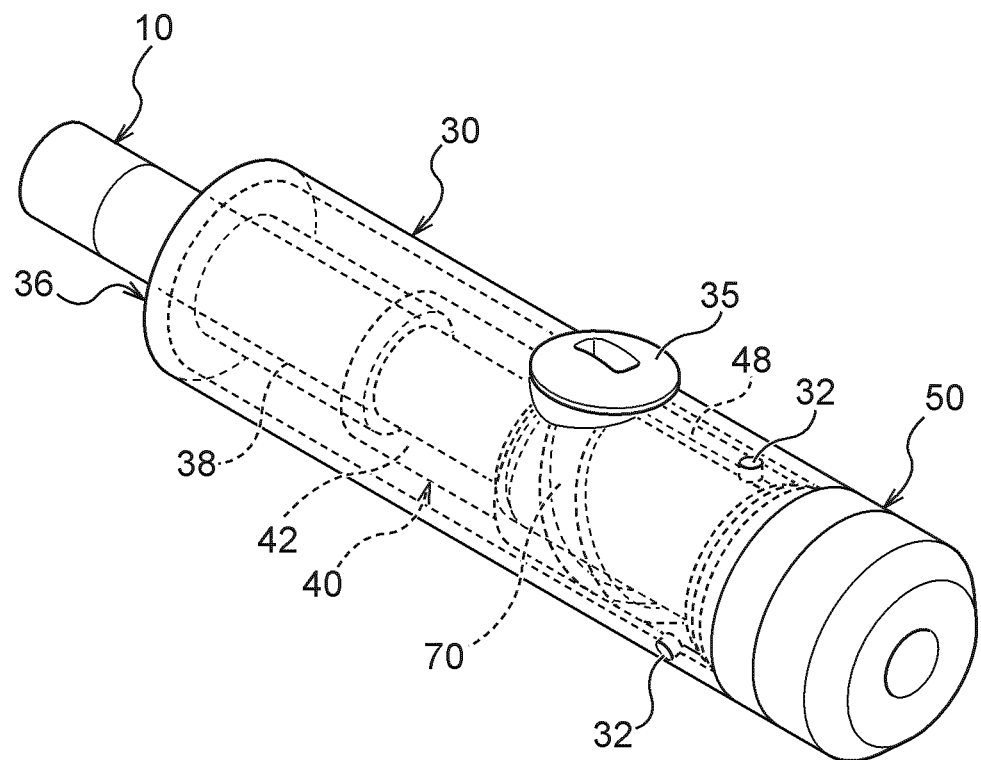


Fig. 4

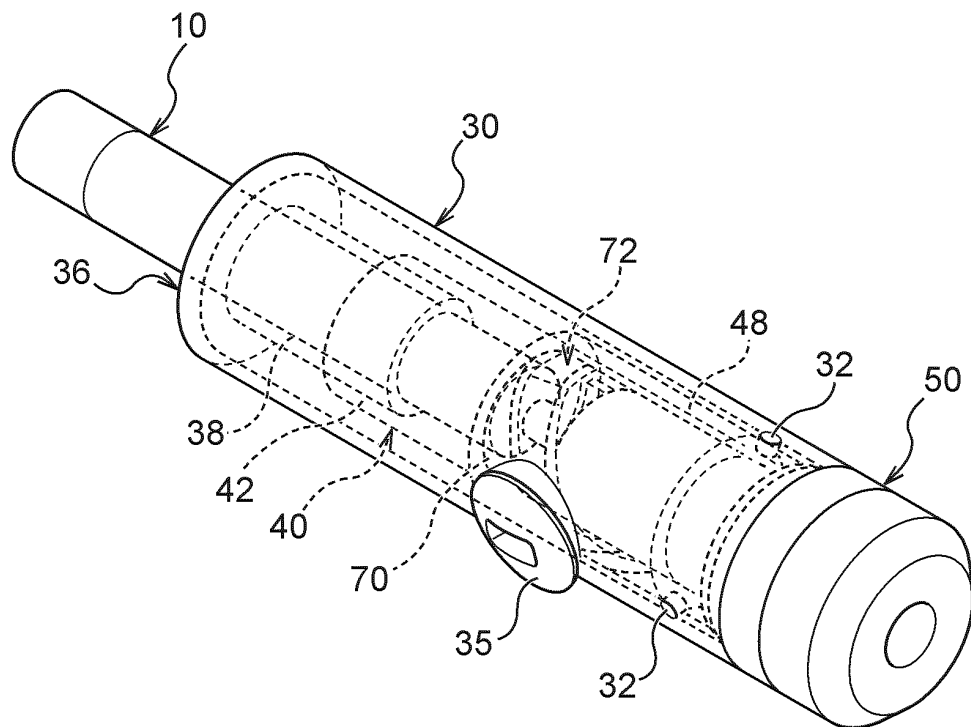
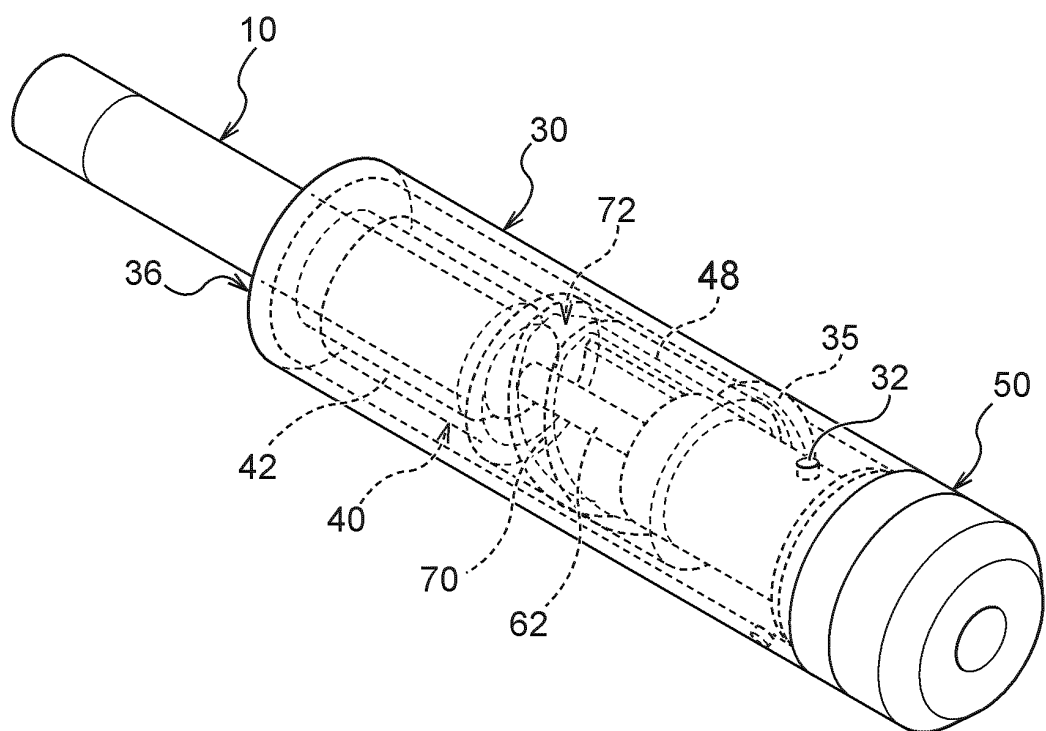


Fig. 5



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2020/045828

## A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. A24F40/20 (2020.01) i, A24F40/40 (2020.01) i

FI: A24F40/40, A24F40/20

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. A24F40/20, A24F40/40

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

| Category* | Citation of document, with indication, where appropriate, of the relevant passages                                    | Relevant to claim No.  |
|-----------|-----------------------------------------------------------------------------------------------------------------------|------------------------|
| X<br>A    | CN 108143010 A (SHENZHEN MINCMINC ELECTRONIC CO., LTD.) 12 June 2018 (2018-06-12), paragraphs [0045]-[0056], fig. 2-4 | 1-3, 7, 10<br>4-6, 8-9 |
| A         | JP 2020-516267 A (KT & G CORPORATION) 11 June 2020 (2020-06-11), entire text, all drawings                            | 4-6                    |
| A         | JP 2014-533513 A (PHILIP MORRIS PRODUCTS S.A.) 15 December 2014 (2014-12-15), entire text, all drawings               | 5                      |
| A         | JP 2020-516268 A (KT & G CORPORATION) 11 June 2020 (2020-06-11), entire text, all drawings                            | 5                      |

☒ 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  
20.01.2021Date of mailing of the international search report  
02.02.2021Name 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

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|----------------------------------------------------|
| International application No.<br>PCT/JP2020/045828 |
|----------------------------------------------------|

| C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT |                                                                                                |                       |
|-------------------------------------------------------|------------------------------------------------------------------------------------------------|-----------------------|
| Category*                                             | Citation of document, with indication, where appropriate, of the relevant passages             | Relevant to claim No. |
| A                                                     | WO 2020/009489 A1 (KT & G CORPORATION) 09 January 2020 (2020-01-09), entire text, all drawings | 5                     |

## INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/JP2020/045828

| Patent Documents referred to in<br>the Report | Publication Date | Patent Family                                           | Publication Date |
|-----------------------------------------------|------------------|---------------------------------------------------------|------------------|
| CN 108143010 A                                | 12.06.2018       | (Family: none)                                          |                  |
| JP 2020-516267 A                              | 11.06.2020       | US 2020170298 A1<br>entire text, all<br>drawings        |                  |
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Form PCT/ISA/210 (patent family annex) (January 2015)

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- JP 5963375 B [0003]