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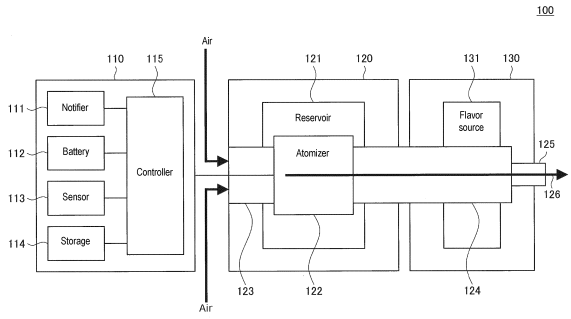
(54) FLAVOR COMPONENT GENERATION CONTROL DEVICE, FLAVOR COMPONENT GENERATION DEVICE, CONTROL METHOD, AND PROGRAM

(57) [Problem] To provide a mechanism that makes it possible to further improve the quality of the inhalation experience provided by a flavor component generation device. [Solution] A flavor component generation control device for controlling a flavor component generation device comprising an attachment section that has detachably attached thereto an element configured so as to consume stored contents and thereby contribute to the generation of a gas to which a flavor component is added, said flavor component generation control device comprising a controller that controls processing in which, for each of a plurality of the elements that have been attached to the attachment section in the past, identification information for the element is associated with a parameter indicating the consumption amount of the contents consumed in generation of the gas to which the flavor component is added, and the result is stored in a storage.

Fig. 1



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Description

TECHNICAL FIELD

[0001] The present invention relates to a flavor component generation control device, a flavor component generation device, a control method, and a program.

BACKGROUND ART

[0002] Flavor component generation devices, such as an electronic cigarette, a nebulizer, and so on, each of which generates gas to which a flavor component that is to be sucked by a user has been added, have spread through the market. For example, elements which contribute to generation of flavor-component-added gas, such as an aerosol source for generating aerosol, a flavor source for adding flavor to aerosol, and so on, are installed in a flavor component generation device; and contents stored in the elements are consumed every time when gas is generated. A user can taste the flavor together with the gas, by sucking (hereinafter, this action may be referred to as puffing) the flavor-component-added gas generated by each of the above flavor component generation device.

[0003] For effectively using the elements while providing a user with sufficient inhalation experience, it is desirable that an element be replaced at timing when contents stored in the element are completely consumed. As a technique for realizing the above desired operation, Patent Literature 1 cited below discloses a technique comprising a construction for counting the number of times of suction actions that are performed by using a device which heats a smoking article inserted therein to make it be able to be sucked, and informing a use of a state that the number of times of suction actions has reached a maximum number of times of suction actions when the number has reached the maximum number.

CITATION LIST

PATENT LITERATURE

[0004] PTL 1: Japanese Patent Application Public Disclosure No. 2018-093877

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0005] According to the technique disclosed in Patent Literature 1, it appears that it is possible to urge a user to replace the smoking article at appropriate timing. However, there may be a case that a smoking article is replaced by a different smoking article before the number of times of suction actions thereof reaches the maximum number of times of suction actions; so that, when the above case is taken into consideration, it appears a user is not always urged to replace the smoking article at appropriate timing. For example, a user is urged to replace a smoking article at timing when the sum of the number of times of suction actions before replacement and the number of times of suction actions after replacement has reached the maximum number of times of suction actions, that is, at timing before the number of times of suction actions after replacement reaches the maximum number of times of suction actions, i.e., when some contents still remain in the smoking article which is being used after replacement. Thus, the degree of quality of inhalation experience offered to a user may be lowered.

[0006] Accordingly, the present invention has been achieved in view of the above problem; and an object of the present invention is to provide a construction which can further improve the quality of inhalation experience provided by a flavor component generation device.

SOLUTION TO PROBLEM

[0007] For solving the above problem, according to a point of view, a flavor component generation control device is provided; wherein the flavor component generation control device is that for controlling a flavor component generation device comprising an attaching part to which an element, which is constructed to contribute to generation of flavor-component-added gas by consuming stored contents, is attached in an attachable/detachable manner, and the flavor component generation control device comprising a controller which controls a process for associating, with respect to each of plural elements which have been attached to the attaching part, identification information of the element with a parameter representing a quantity of consumption of the contents, which have been consumed for generating the flavor-component-added gas, and storing the information and the parameter in a storage.

[0008] The controller may control, in the case that the parameter stored in association with the identification information

of the element has reached a threshold value, a process for providing information that informs that timing of replacement of the element has come.

[0009] The controller may control, in the case that the parameter stored in association with the identification information of the element has reached a threshold value, a process for stopping supplying of electric power to a gas generation unit which generates gas to which a flavor component is added by the element.

[0010] The controller may control, in the case that the parameter stored in association with the identification information of the element has reached a threshold value, a process for dissolving a state that the element is being attached to the attaching part.

[0011] The controller may control, in the case that the parameter stored in association with the identification information of the element has reached a threshold value, a process for opening an electric circuit included in the element.

[0012] The controller may delete, in the case that the parameter stored in association with the identification information of the element has reached a threshold value, the identification information and the parameter, that have been stored in relation to the element, from the storage.

[0013] The controller may delete the identification information and the parameter, that have been stored in relation to the element, from the storage after a predetermined period of time has elapsed since a point in time when the parameter, that has been stored in association with the identification information of the element, has reached the threshold value.

[0014] The controller may associate, in the case that the parameter stored in association with the identification information of the element has reached a threshold value, the identification information of the element with information representing a state that the element has been spent, and make the information be stored in the storage.

[0015] The controller may set the threshold value, based on the time elapsed since a point in time when the contents of the element is first consumed.

[0016] The controller may set the threshold value in such a manner that the value becomes smaller as the elapsed time becomes longer.

[0017] The controller may control the degree of reduction of the threshold value per unit time, based on history of environment surrounding the element.

[0018] The controller may obtain the identification information of the element, based on result of reading of an information code added to the element.

[0019] The controller may obtain the identification information of the element, based on result of reading of information stored in a storage medium attached to the element.

[0020] The controller may obtain the identification information of the element, based on result of detection of the shape of the element.

[0021] The controller may obtain the identification information of the element, based on result of detection of a component included in the element.

[0022] The controller may obtain the identification information of the element, based on result of detection of a flavor component included in a flavor source in the element.

[0023] The element may include an aerosol source.

[0024] The element may include a flavor source having a flavor component which is to be added to gas.

[0025] The parameter may be an accumulated number of times of consumption of the contents.

[0026] The parameter may be accumulated length of time spent for consumption of the contents.

[0027] The parameter may represent a sum of quantities of consumption of the contents which have been consumed for generating flavor-component-added gas during the state that the element is being attached to the flavor component generation device and the state that the element is being attached to a different flavor component generation device.

[0028] The storage may be included in an external device which is connected to the flavor component generation control device via a network.

[0029] The storage may be included in the element.

[0030] Plurality elements can be attached to the attaching part; and the controller may make a selected part of the elements in the plural elements, which are being attached to the attaching part, contribute to generation of flavor-component-added gas.

[0031] Further, for solving the above problem, according to a different point of view, a flavor component generation device is provided, wherein the flavor component generation device comprising: an attaching part to which an element is attached in an attachable/detachable manner, wherein the element is constructed to contribute to generation of flavor-component-added gas by consuming stored contents; and a controller which controls a process for associating, with respect to each of plural elements which have been attached to the attaching part, identification information of the element with a parameter representing the quantity of consumption of the contents, which have been consumed for generating the flavor-component-added gas, and storing the information and the parameter in a storage.

[0032] Further, for solving the above problem, according to a different point of view, a control method is provided; wherein the control method is that for controlling a flavor component generation device which comprises an attaching part to which an element is attached in an attachable/detachable manner, wherein the element is constructed to contribute

to generation of flavor-component-added gas by consuming stored contents; and the control method including: associating, with respect to each of plural elements which have been attached to the attaching part, identification information of the element with a parameter representing the quantity of consumption of the contents, which have been consumed for generating the flavor-component-added gas; and storing the information and the parameter in a storage.

[0033] Further, for solving the above problem, according to a different point of view, a program is provided; wherein the program is that which makes a computer, which controls a flavor component generation device which comprises an attaching part to which an element, which is constructed to contribute to generation of flavor-component-added gas by consuming stored contents, is attached in an attachable/detachable manner, function as a controller which controls a process for associating, with respect to each of plural elements which have been attached to the attaching part, identification information of the element with a parameter representing the quantity of consumption of the contents, which have been consumed for generating the flavor-component-added gas, and storing the information and the parameter in a storage.

ADVANTAGEOUS EFFECTS OF INVENTION

[0034] As explained above, according to the present invention, a construction which can further improve the quality of inhalation experience provided by a flavor component generation device is provided.

BRIEF DESCRIPTION OF DRAWINGS

[0035]

Fig. 1 is a figure showing a construction example of an inhaler according to an embodiment of the present invention.
Fig. 2 is a figure showing an example of an external-appearance construction of the inhaler according to the above embodiment.
Fig. 3 is a figure for explaining an example of a method for authenticating an element according to the above embodiment.
Fig. 4 is a figure for explaining an example of a method for authenticating an element according to the above embodiment.
Fig. 5 is a figure for explaining an example of a method for authenticating an element according to the above embodiment.
Fig. 6 is a figure for explaining an example of a process for dissolving a state that a capsule is being attached to a reception part, according to the above embodiment.
Fig. 7 is a flow chart showing an example of a flow of an aerosol generation process performed in the inhaler according to the above embodiment.

DESCRIPTION OF EMBODIMENTS

[0036] In the following description, preferred embodiments of the present invention will be explained in detail with reference to the attached figures. In this regard, in the specification and the figures, a reference number that is the same as that assigned to one component is assigned to the other component, in the case that the other component has a function/construction that is substantially the same as that of the one component, for omitting overlapping explanations thereof.

« 1. Summary of Suggested Technique »

[0037] A suggested technique relates to a flavor component generation control device. The flavor component generation control device is a device for controlling generation of gas, to which flavor components have been added, by a flavor component generation device. The flavor component generation device comprises an attaching part to which an element is attached, wherein the element is constructed to contribute to generation of flavor-component-added gas; and generates the flavor-component-added gas by consuming contents stored in the element attached to the attaching part. Especially, the flavor component generation control device controls the process, that relates to each of plural elements which have been attached to the flavor component generation device, for associating identification information of the element with a parameter representing the quantity of consumption of the contents, which have been consumed for generating flavor-component-added gas, and storing the information and the parameter in a storage. Thus, the quantity of consumption of the contents, which have been consumed for generating flavor-component-added gas, can be managed on an element basis.

[0038] In the suggested technique, even in the case that one element is replaced by the other element before contents

of the one element is completely consumed (hereinafter, "completely consumed" may be referred to as "has reached the end of the life" or "has been spent"), management of the quantity of consumption of the contents in the element which is being used after replacement is performed differently from management of the quantity of consumption of the contents in the element which was used before replacement. Thus, it becomes possible to prevent lowering of the quality of inhalation experience, due to an event such as that occurs in the case that an element is replaced by the other, specifically, an event wherein a user is urged to replace a smoking article, which is being attached as a result of replacement, even if the contents thereof still remain. Accordingly, it becomes possible to urge a user to replace a smoking article at timing when the contents of the smoking article, which is being used after replacement, is completely consumed.

« 2. Construction Example »

(1) Internal Construction

[0039] In the following description, a construction example of an inhaler according to the present invention will be explained with reference to Fig. 1. Fig. 1 is a figure showing a construction example of an inhaler 100 according to an embodiment of the present invention.

[0040] As shown in Fig. 1, the inhaler 100 comprises a first member 110 and a second member 120. As shown in the figure, the first member 110 may comprise, for example, a notifier 111, a battery 112, a sensor 113, a storage 114, and a controller 115. The second member 120 may comprise, for example, a reservoir 121, an atomizer 122, an air taking-in flow path 123, an aerosol flow path 124, and a suction opening part 125. Part of the components included in the first member 110 may be included in the second member 120. Part of the components included in the second member 120 may be included in the first member 110. The second member 120 may be constructed to be attachable/detachable to/from the first member 110. Alternatively, all components included in the first member 110 and the second member 120 may be included in a single housing in place of the first member 110 and the second member 120.

[0041] Further, as shown in Fig. 1, the inhaler 100 comprises a third member 130. For example, the third member 130 may comprise a flavor source 131. For example, in the case that the inhaler 100 is an electronic cigarette, the flavor source 131 may comprise fragrance inhaling taste components included in tobacco. The third member 130 may be constructed to be attachable/detachable to/from the second member 120. Alternatively, all components included in the second member 120 and the third member 130 may be included in a single housing in place of the second member 120 and the third member 130. Alternatively, part of components included in the first member 110 or the second member 120 may be included in the third member 130.

[0042] The reservoir 121 holds an aerosol source. For example, the reservoir 121 comprises fibrous or porous material, and holds the aerosol source, which is in the form of liquid, by use of spaces between fibers or pores in the porous material. For example, cotton or glass fibers, or tobacco raw material, or the like, may be used as the above-explained fibrous or porous material. The reservoir 121 may be constructed as a tank for storing liquid. The aerosol source is liquid such as polyhydric alcohol, such as glycerin or propylene glycol, or water, or the like, for example. In the case that the inhaler 100 is an inhaler for medical use, such as a nebulizer or the like, the aerosol source may comprise a medicine that is to be sucked by a patient. In a different example, the aerosol source may comprise a tobacco raw material or an extract originated from a tobacco raw material, which releases a fragrance-inhaling-taste component when it is heated. In the above case, aerosol including a flavor component is generated even if the third member 130 is not attached. The reservoir 121 may have a construction which allows replenishment of a consumed aerosol source. Alternatively, the reservoir 121 may be constructed in such a manner that the reservoir 121 itself is allowed to be replaced when the aerosol source is exhausted. Further, the aerosol source is not limited to that in a liquid form, and it may be solid. In the case that the aerosol source is solid, the reservoir 121 may be a hollow container which does not use fibrous or porous material, for example.

[0043] The atomizer 122 is constructed to atomize an aerosol source to generate aerosol. When a suction action is detected by the sensor 113, the atomizer 122 generates aerosol. For example, a wick (not shown in the figure) may be arranged for connection between the reservoir 121 and the atomizer 122. In the above case, a part of the wick extends to the inside of the reservoir 121 and is in contact with the aerosol source. The other part of the wick extends toward the atomizer 122. The aerosol source is sent from the reservoir 121 to the atomizer 122 by capillary effect in the wick. In an example, the atomizer 122 comprises a heater which is electrically connected to the battery 112. The heater is arranged to be in contact with or to be positioned close to the wick. When a suction action is detected, the controller 115 controls the heater in the atomizer 122 to heat an aerosol source, which is conveyed via the wick, to thereby atomize the aerosol source. Another example of the atomizer 122 may be an ultrasonic-type atomizer which atomizes the aerosol source by ultrasonic vibration. The air taking-in flow path 123 is connected to the atomizer 122, and the air taking-in flow path 123 leads to the outside of the inhaler 100. The aerosol generated in the atomizer 122 is mixed with air that is taken via the air taking-in flow path 123. The fluid mixture comprising the aerosol and the air is sent to the aerosol flow path

124, as shown by an arrow 126. The aerosol flow path 124 has a tubular structure for sending the fluid mixture comprising the air and the aerosol, that is generated in the atomizer 122, to the suction opening part 125.

[0044] The flavor source 131 is a component for adding flavor to aerosol. The flavor source 131 is positioned in the middle of the aerosol flow path 124. The fluid mixture comprising the air and the aerosol generated by the atomizer 122 (it should be reminded that the fluid mixture may simply be referred to as aerosol, hereinafter) flows to the suction opening part 125 through the aerosol flow path 124. In this manner, in the point of view of the flow of the aerosol, the flavor source 131 is arranged in a position downstream the atomizer 122. In other words, in the aerosol flow path 124, the position of the flavor source 131 is closer to the suction opening part 125 than the position of the atomizer 122. Thus, the aerosol generated in the atomizer 122 passes through the flavor source 131 and thereafter arrives at the suction opening part 125. When the aerosol passes through the flavor source 131, fragrance-inhaling-taste components included in the flavor source 131 are added to the aerosol. For example, in the case that the inhaler 100 is an electronic cigarette, the flavor source 131 may be that which originates from tobacco, such as shredded tobacco, a product which is made by processing tobacco raw material to have a granular form, a sheet form, or a powder form, or the like. Further, flavor source 131 may be that which does not originate from tobacco, such as a product made by use of a plant other than tobacco (for example, mint, a herb, and so on). For example, the flavor source 131 comprises a nicotine component. The flavor source 131 may comprise a flavor component such as menthol. In addition to the flavor source 131, the reservoir 121 may also have a material comprising a fragrance-inhaling-taste component. For example, the inhaler 100 may be constructed in such a manner that the flavor source 131 holds flavor material which originates from tobacco and the reservoir 121 includes flavor material which does not originate from tobacco.

[0045] The suction opening part 125 is constructed in such a manner that it is positioned at an end of the aerosol flow path 124, and makes the aerosol flow path 124 be opened toward the outside of the inhaler 100. As shown in the figure, the aerosol flow path 124 extends across the second member 120 and the third member 130. The suction opening part 125 is positioned in the third member 130.

[0046] A user can take air including the aerosol, to which the flavor has been added, into the mouth by holding the suction opening part 125 in the user's mouth and performing a suction action.

[0047] The notifier 111 may comprise a light emitting element such as an LED (Light Emitting Diode), a display, a speaker, a vibrator, and so on. The notifier 111 is constructed to provide a user with some information by light emission, display, vocalization, vibration, or the like, as necessary. Further, the notifier 111 may comprise a communication device, and transmit information to the other device such as a smartphone or the like to provide a user with the information via the other device.

[0048] The battery 112 is a power source which stores electric power, and supplies electric power to the respective components in the inhaler 100, such as the notifier 111, the sensor 113, the storage 114, the atomizer 122, and so on. The battery 112 may be charged by connecting it to an external electric power source via a predetermined port (not shown in the figure) of the inhaler 100. The battery 112 only may be able to be detached from the first member 110 or the inhaler 100, and may be able to be replaced by a new battery 112. Alternatively, the battery 112 may be able to be replaced by a new battery 112, by replacing the whole first member 110 by a new first member 110.

[0049] The sensor 113 may comprise a pressure sensor for detecting change in the pressure or a flow rate sensor for detecting a flow rate in the air taking-in flow path 123 and/or the aerosol flow path 124. Further, the sensor 113 may comprise a weight sensor for detecting the weight of a component such as the reservoir 121 or the like. Further, the sensor 113 may be constructed to count the number of times of puffs performed by a user by using the inhaler 100. Further, the sensor 113 may be constructed to accumulate time of electrical conduction to the atomizer 122. Further, the sensor 113 may be constructed to detect height of a liquid surface in the reservoir 121. Further, the sensor 113 may be constructed to detect attachment/detachment of the second member 120 to/from the first member 110, or attachment/detachment of the third member 130 to/from the second member 120. Further, the sensor 113 may be constructed to detect an SOC (State of Charge; charge state), an integrated current value, a voltage, or the like of the battery 112. The integrated current value may be obtained by using a current integration method, an SOC-OCV (Open Circuit Voltage; open circuit voltage) method, or the like. Further, the sensor 113 may be a manipulation button which can be manipulated by a user.

[0050] The controller 115 may be an electronic circuit module constructed as a microprocessor or a microcomputer. The controller 115 may be constructed to control operation of the inhaler 100 in accordance with computer-executable instructions stored in the storage 114. The storage 114 is a storage medium such as a ROM (Read Only Memory), a RAM (Random Access Memory), a flash memory, or the like. The storage 114 may store, in addition to computer-executable instructions such as those explained above, setting data which are necessary for controlling the inhaler 100 and other data. For example, the storage 114 may store various data such as methods for controlling the notifier 111 (modes of light emission, vocalization, vibration, etc., and so on), values detected by the sensor 113, history of heating of the atomizer 122, and so on. The controller 115 reads data from the storage 114 and uses the data for controlling the inhaler 100 as necessary, and stores data in the storage 114 as necessary.

[0051] In the following description, the first member 110 is also referred to as a power source 110, the second member

120 is also referred to as a cartridge 120, and the third member 130 is also referred to as a capsule 130.

(2) External-Appearance Construction

[0052] Next, an external-appearance construction of the inhaler 100 will be explained with reference to Fig. 2 Fig. 2 is a figure showing an example of an external-appearance construction of the inhaler 100 according to the present embodiment. According to the external-appearance construction example shown in Fig. 2, each of the power source 110, the cartridge 120, and the capsule 130 is constructed to have a columnar shape.

[0053] The power source 110 comprises, in its one end, a male connector 116. The male connector 116 comprises a spiral-shaped projection which extends in a circumferential direction. Further, the cartridge 120 comprises, in its one end, a female connector 127. The female connector 127 comprises a spiral-shaped groove which extends in a circumferential direction. By screwing the male connector 116 and the female connector 127 together, the cartridge 120 and the power source 110 are connected with each other. That is, the cartridge 120 is attached to the power source 110 in an attachable/detachable manner.

[0054] The cartridge 120 comprises a reception part 128 which has a columnar space and is positioned in the other end positioned opposite to the end which comprises the female connecter 127. The capsule 130 comprises a suction opening part 132 which has a diameter equal to or approximately equal to each of diameters of the power source 110 and the cartridge 120, and an insertion part 133 which has a diameter smaller than that of the suction opening part 132. The insertion part 133 is inserted into the reception part 128 to be mated therewith. That is, the capsule 130 is attached to the cartridge 120 in an attachable/detachable manner. A user can take air including flavor-added aerosol into the user's mouth, by holding the suction opening part 132 in the user's mouth and performing a suction action, during the state that the cartridge 120 is being attached to the power source 110 and the capsule 130 is being attached to the cartridge 120.

(3) Supplement

[0055] According to the suggested technique, the flavor component generation device comprises the attaching part to which an element, which contributes to generation of flavor-component-added gas by consuming contents stored therein, is to be attached in an attachable/detachable manner. Thus, the flavor component generation device generates flavor-component-added gas in accordance with control by the flavor component generation control device. For example, the capsule 130 may correspond to the element. In such a case, the power source 110 corresponds to the flavor component generation control device, and the cartridge 120 corresponds to the flavor component generation device. Further, the flavor components included in the flavor source 131 correspond to the contents, the reception part 128 corresponds to the attaching part, and the aerosol corresponds to the gas. The flavor component generation control device may be included in the flavor component generation device, and, in such a case, the power source 110 and the cartridge 120 correspond to the flavor component generation device. In the following description, the power source 110 and the cartridge 120 are also collectively referred to as the inhaler 100, and it is supposed that the capsule 130 is attached to the inhaler 100 in an attachable/detachable manner.

« 3. Technical Characteristics »

(1) Authentication

[0056] The controller 115 authenticates an element attached to the inhaler 100. Specifically, the controller 115 authenticates the capsule 130 attached to the cartridge 120. Authentication in this case refers to action for obtaining identification information for identifying an attached element. In the following description, an example of a method for authenticating an element will be explained with reference to Figs. 1-3. Each of Figs. 1-3 is a figure for explaining an example of a method for authenticating an element according to the present embodiment.

[0057] The controller 115 may obtain identification information of an element, based on a result of reading of an information code added to the element. Fig. 3 shows a capsule 130A, wherein an information code 134 has been added to an outer wall of the insertion part 133. The information code 134 stores identification information specific to the capsule 130A. The information code 134 may be a barcode or the like, instead of the two-dimensional code shown in Fig. 3. For example, an image sensor for reading the information code 134 is installed in an inner wall of the reception part 128 in the cartridge 120, and the information code 134 of the capsule 130A attached to the reception part 128 is read thereby. Thereafter, the controller 115 obtains identification information of the capsule 130A, based on a result of reading of the information code 134.

[0058] In a different example, the controller 115 may obtain identification information of an element, based on a result of reading of information stored in a storage medium attached to the element. Fig. 4 shows a capsule 130B, wherein a

storage medium 135 has been attached to an outer wall of the insertion part 133. For example, the storage medium 135 is an RF tag in the filed of an RFID (Radio Frequency Identifier) technique, and reading/writing of information therefrom/thereto by using short-range wireless communication (for example, NFC (Near Field Communication)) is possible. For example, a wireless communication device is installed in the power source 110 or the cartridge 120, and the wireless communication device receives identification information from the storage medium 135 of the capsule 130B attached to the reception part 128. Thereafter, the controller 115 obtains identification information of the capsule 130B, based on a result of reception from the storage medium 135.

[0059] According to the above-explained authentication method, the capsule 130 is uniquely identified. That is, the capsule 130 can be uniquely identified based on the above-explained identification information.

[0060] Regarding the capsule 130, a capsule 130 may be replaced before the end of its life, by a different capsule 130 providing a different kind of flavor, for the purpose that the different kind of flavor be tasted. Based on the above purpose, it is considered that replacement between capsules 130, which provide the same flavor, hardly occurs. Thus, it is also possible to state that it is sufficient if respective kinds of flavor provided by respective capsules 130 (hereinafter, this is also referred to as the kinds of capsules 130) could be identified, and the quantity of consumption of the contents with respect to each kind of flavor could be managed, even if respective capsules 130 are not uniquely identified. In the following description, a method for identifying the capsule 130 on a kind-of-flavor basis will be explained. That is, it is possible to identify the kind of flavor provided by a capsule 130, based on identification information explained below.

[0061] The controller 115 may obtain identification information of a capsule 130, based on a result of detection of the shape of the capsule 130. Fig. 5 shows a capsule 130C and a capsule 130D, wherein the shapes of the insertion parts 133 are made to be different to correspond to respective kinds of flavor. The insertion part 133 of the capsule 130C has a columnar shape; on the other hand, the insertion part 133 of the capsule 130D has a shape comprising a column and a truncated circular cone, wherein the diameter of the truncated circular cone becomes shorter in relation to the direction toward the end part. The shape of the capsule 130 is detected, for example, based on pressure applied to the inner wall of the reception part 128 or air pressure in a space formed by the inner wall of the reception part 128 and the outer wall of the insertion part 133, detected by a pressure sensor (for example, a microphone condenser) installed in the reception part 128. Thereafter, the controller 115 obtains identification information of the capsule 130, based on a result of detection of the shape of the capsule 130. In a different example, the shape of the capsule 130 may be detected by the sensor 113 (for example, a microphone condenser) included in the power source 110. For example, the power source 110 and the cartridge 120 are constructed to have a space for communication between the sensor 113 and the reception part 128, and the shape of the capsule 130 is detected based on air pressure in the space.

[0062] In a different example, the controller 115 may obtain identification information of a capsule 130, based on a result of detection of a component included in the capsule 130. The component included in the capsule 130 may be detected, for example, by a chemical sensor which is installed in the reception part 128 and can detect a chemical substance. Thereafter, the controller 115 obtains identification information of the capsule 130, based on a result of detection of the chemical substance. For example, the chemical substance may be a flavor component, the chemical sensor may be an odor sensor, and the controller 115 may obtain identification information of the capsule 130, based on a result of detection of the flavor component included in the flavor source 131 in the capsule 130. A flavor component (i.e., an odor) included in a flavor source 131 in a capsule 130 of each type is different from the flavor components included in others. For example, the flavor component included in the flavor source 131 is detected by an odor sensor installed in the reception part 128. It is natural that a chemical substance that can be detected by the chemical sensor is not limited to a flavor component, and the chemical substance may be a substance which does not have flavor. It should be reminded that a component included in the capsule 130 (for example, a flavor component included in the flavor source 131) may be detected by a sensor 113 (for example, a chemical sensor of an odor sensor) included in the power source 110. For example, the power source 110 and the cartridge 120 are constructed to have a space for communication between the sensor 113 and the reception part 128, and a component included in the capsule 130 is detected based on a chemical substance detected in the space.

[0063] It should be reminded that the method for authenticating the capsule 130 is not limited to any of the above-explained examples, and any authentication method can be adopted. Further, plural authentication methods may be combined and used.

(2) Management of Quantity-of-Consumption Parameter

[0064] With respect to each of plural elements which have been attached to the attaching part, the controller 115 controls a process for associating identification information of the element with a parameter representing the quantity of consumption of contents consumed for generating flavor-component-added gas (hereinafter, the parameter will also be referred to as a quantity-of-consumption parameter), and storing the identification information and the parameter in the storage. For example, after attaching of a capsule 130 to the inhaler 100, the controller 115 obtains identification information of the capsule 130, and, next, obtains a quantity-of-consumption parameter of the capsule 130 by referring

to the storage by using the obtained identification information. The quantity-of-consumption parameter represents the quantity of contents, which has already been consumed, in the capsule 130. Further, after a puff action is performed by a user, the controller 115 adds, to the obtained quantity-of-consumption parameter, a quantity-of-consumption parameter representing the quantity of consumption of contents consumed during the puff action, and stores the quantity-of-consumption parameter obtained as a result of above addition operation in the storage. In this manner, the controller 115 updates the quantity-of-consumption parameter stored in the storage, every time when a puff action is performed.

[0065] The quantity-of-consumption parameter may be an accumulated number of times of consumption of contents stored in an element. In other words, the quantity-of-consumption parameter may be an accumulated number of times of suction (the number of times of puffs) performed by a user.

[0066] The quantity-of-consumption parameter may be that representing a sum of quantities of consumption of contents of an element which have been consumed for generating flavor-component-added gas during the state that the element is being attached to a flavor component generation device and the state that the element is being attached to a different flavor component generation device. For example, it is supposed that a capsule 130 is attached to an inhaler 100, and detached therefrom after a puff action is performed, and, thereafter, the capsule 130 is attached to a different inhaler 100 and a puff action is performed. In the above case, a sum of quantity-of-consumption parameters, each of which relates to a suction action performed during the state that the capsule 130 is being attached to each of the inhalers 100, is stored in the storage. Thus, for example, even in the case that capsules 130 are exchanged between friends and puff actions are performed by them, consuming of contents through plural inhalers 100 can be traced, and the quantity-of-consumption parameters can be updated. In the above case, it is desirable that a storage medium be attached to an element as explained with reference to Fig. 4, a quantity-of-consumption parameter be stored in the storage medium, and the quantity-of-consumption parameter stored in the storage medium be updated every time when a puff action is performed. Thus, it becomes possible to easily trace consuming of contents through plural inhalers 100, even if a quantity-of-consumption parameter relating to inhalation actions performed during the state that an element is being attached to an inhaler 100 is not shared via communication or the like by the inhaler 100 and other inhalers 100.

[0067] An example of a table stored in the storage is shown in Table 1 below. In the example show in Table 1, an accumulated number of times of puffs per single capsule 130 is stored.

[Table 1]

[0068]

Table 1 Example of Table Stored in Storage

	Capsule A	Capsule B	Capsule C
Accumulated number of times of puffs	20	30	40

- Position of Storage for Storing Quantity-of-Consumption Parameter

[0069] The storage may be incorporated in the power source 110. That is, the quantity-of-consumption parameter may be stored in the storage 114.

[0070] The storage may be included in an external device connected to the inhaler 100 via a network. For example, the storage may be included in a server in a cloud. In the above case, the inhaler 100 updates the quantity-of-consumption parameter by performing communication with the server in the cloud, every time when a puff action is performed, for example. If reduction of the quantity of communication is taken into consideration, communication may be performed every time after a predetermined number of times of puff actions are completed.

[0071] The storage may be constructed as a storage medium which can be inserted/removed in/from the power source 110. A flash memory such as a card-type memory is an example of the above storage medium. There is an idea to carry a standby power source 110 for dealing with a battery depletion problem. Even in the case that a power source 110 is replaced due to battery depletion, the quantity-of-consumption parameter before and after replacement can be continuously managed by inserting the storage medium, which can be inserted/removed in/from a power source 110, in a power source 110 which is used after replacement.

[0072] The storage may be included in an element. For example, as explained with reference to Fig. 4, a storage medium 135 may be attached to an element, and a quantity-of-consumption parameter may be stored in the storage medium. In such a case, as explained above, it becomes possible to easily trace consuming of contents through plural inhalers 100.

(3) Processing Corresponding to Quantity-of-Consumption Parameter

[0073] The controller 115 controls processing corresponding to the quantity-of-consumption parameter of the capsule 130 attached to the inhaler 100. In more detail, the controller 115 judges whether the quantity-of-consumption parameter, that is stored in the storage in association with identification information of the capsule 130 attached to the inhaler 100, has reached a threshold value, and performs processing corresponding to a result of judgment.

[0074] The threshold value in the subject case is the value such that a value equal to or larger than the threshold value represents a state that the contents stored in the element may be depleted. For example, it is judged that the life has not yet reached the end thereof if the accumulated number of times of puffs is less than a threshold value for judging the end of life, and it is judged that the life has reached the end thereof if the accumulated number of times of puffs is equal to or larger than the threshold value for judging the end of life. That is, the threshold value is the accumulated number of times of puffs required for completely consuming contents stored in the element. The threshold value may be set to correspond to identification information of the element. In the following description, the above threshold value is also referred to as an end-of-life judging threshold value. Further, judgment for judging whether the quantity-of-consumption parameter has reached the end-of-life judging threshold value is also referred to as end-of-life judgment.

- Process in the Case That Quantity-of-Consumption Parameter Has Not Reached End-of-Life Judging Threshold Value

[0075] In the case that the quantity-of-consumption parameter has not reached the end-of-life judging threshold value (for example, in the case that the quantity-of-consumption parameter is less than the end-of-life judging threshold value), the controller 115 makes aerosol be generated, and updates the quantity-of-consumption parameter to correspond to generation of the aerosol. For example, the controller 115 performs supplying of electric power to the atomizer 122 (this corresponds to the gas generator) to make the atomizer 122 generate aerosol, and increments (+1) the accumulated number of times of puffs.

- First Process in the Case That Quantity-of-Consumption Parameter Has Reached End-of-Life Judging Threshold Value

[0076] In the case that the quantity-of-consumption parameter has reached the end-of-life judging threshold value (for example, in the case that the quantity-of-consumption parameter is equal to or larger than the end-of-life judging threshold value), the controller 115 does not make aerosol be generated. For example, the controller 115 stops supplying of electric power to the atomizer 122. Regarding a capsule 130, with respect to which the quantity-of-consumption parameter has reached the end-of-life judging threshold value (i.e., with respect to which the life has reached the end thereof, or that has been spent), no flavor component is added to aerosol even if the aerosol is generated. Regarding the above point, by stopping supplying of electric power to the atomizer 122, it becomes possible to prevent sucking of no-flavor-component-added aerosol by a user, and, at the same time, prevent wasteful consumption of aerosol sources and prevent wasteful consumption of electric power.

[0077] In the case that the quantity-of-consumption parameter has reached the end-of-life judging threshold value, the controller 115 may control a process for providing information that informs that timing of replacement of the capsule 130 has come. The controller 115 controls the notifier 111 to make it operate an LED to emit light having a predetermined light emitting pattern, a display device to display a predetermined image thereon, and/or a vibrator to vibrate it. Further, the controller 115 may transmit, to a different device such as a smart phone or the like, information for informing that timing of replacement of the capsule 130 has come, to thereby provide a user with the information via the different device. By providing information as explained above, it becomes possible to urge a user to replace the capsule 130 at appropriate timing.

[0078] In the case that the quantity-of-consumption parameter has reached the end-of-life judging threshold value, the controller 115 may control a process for dissolving a state that the capsule 130 is being attached to the reception part 128. The above point will be explained in detail with reference to Fig. 6. Fig. 6 is a figure for explaining an example of a process for dissolving a state that the capsule 130 is being attached to the reception part 128, according to the present embodiment. As shown in the top figure in Fig. 6, the insertion part 133 of the capsule 128 is being inserted in the reception part 128. The state that the suction opening part 132 is in contact with an edge part 128A of the reception part 128, such as that shown in the top figure in Fig. 6, is also referred to as an attached state. On the other hand, the state that the suction opening part 132 is separated from the edge part 128A of the reception part 128, such as that shown in the bottom figure in Fig. 6, is also referred to as a non-attached state. In the case that the quantity-of-consumption parameter has reached the end-of-life judging threshold value, a bottom part 128B of the reception part 128 slides in the direction toward the inner space of the reception part 128 as shown in the bottom figure in Fig. 6, and, as a result of the above motion, the capsule 130 is pushed toward the outside of the reception part 128. In this manner, the state that the capsule 130 is being attached to the reception part 128 is resolved. In this regard, sliding of the bottom part 128B of the reception part 128 is realized, for example, by an elastic member installed in the back side of the bottom

part 128B by making it exert elastic force in the direction toward the inner space of the reception part 128. By adopting the above construction, it becomes possible to force replacement of the capsule 130.

- Second Process in the Case That Quantity-of-Consumption Parameter Has Reached End-of-Life Judging Threshold Value

[0079] In the case that the quantity-of-consumption parameter has reached the end-of-life judging threshold value, the controller 115 may delete, from the storage, the identification information and the quantity-of-consumption parameter stored in relation to the capsule 130. Thus, it becomes possible to obtain a free space in the storage. In this regard, the controller 115 may delete, from the storage, the identification information and the quantity-of-consumption parameter stored in relation to the capsule 130, after a predetermined period of time has elapsed since the quantity-of-consumption parameter has reached the end-of-life judging threshold value. As a result, if the predetermined period of time has not yet elapsed, the first process in the case that the quantity-of-consumption parameter has reached the end-of-life judging threshold value, that is explained above, can be performed, even in the case that a spent capsule 130 is erroneously attached to the inhaler 100 by a user. It is desirable that the predetermined period of time, in this case, be set to a period of time, for example, approximately a week, that is sufficient as time that is to be spent by a user until the user discards a capsule 130 after complete consumption thereof.

[0080] In the case that the quantity-of-consumption parameter has reached the end-of-life judging threshold value, the controller 115 may associate identification information of the capsule 130 with information representing a state that the capsule 130 has been spent, and store the information in the storage. Thereafter, in the case that identification information of a capsule 130 attached to the inhaler 100 is stored, in the storage, in association with information representing a state that the capsule 130 has been spent, the first process in the case that the quantity-of-consumption parameter has reached the end-of-life judging threshold value, that is explained above, is performed. As a result, the first process in the case that the quantity-of-consumption parameter has reached the end-of-life judging threshold value, that is explained above, can be performed, even in the case that a spent capsule 130 is erroneously attached to the inhaler 100 by a user. Further, once a capsule 130 has been spent, the spent capsule 130 becomes unusable; so that unfair use such as reuse of a capsule 130 by dishonestly changing contents of the capsule 130 can be prevented.

- Other Matters

[0081] The controller 115 may control a process for providing information, that is based on a quantity-of-consumption parameter stored in the storage in association with identification information of a capsule 130 attached to the inhaler 100. For example, the controller 115 controls the notifier 111 to provide a user with information based on a quantity-of-consumption parameter. Information based on a quantity-of-consumption parameter, that can be considered, is a quantity-of-consumption parameter itself, or information representing a remaining quantity of contents calculated from a quantity-of-consumption parameter. For example, the former is an accumulated number of times of puffs (i.e., the number of times of puffs performed until the point in time), and the latter is a remaining number of times of puffs until the number reaches an end-of-life judging threshold value. As a result, a user can perform puff actions while sometimes checking the state of use of a capsule 130.

(4) Flow of Process

[0082] In the following description, an example of a flow of a process performed in the inhaler 100 will be explained with reference to Fig. 7. Fig. 7 is a flow chart showing an example of a flow of an aerosol generation process performed in the inhaler 100 according to the present embodiment.

[0083] As shown in Fig. 7, first, the controller 115 obtains identification information of a capsule 130 attached to the inhaler 100 (step S102). Next, the controller 115 obtains a quantity-of-consumption parameter that has been stored in the storage in association with the identification information of the capsule 130 attached to the inhaler 100 (step S104). The controller 115 stands ready to perform the process, while no puff action is being performed (step S106 / NO). On the other hand, in the case that a puff action is performed (step S106 / YES), the controller 115 judges whether the quantity-of-consumption parameter has reached an end-of-life judging threshold value (step S108). If it is judged that the quantity-of-consumption parameter has reached the end-of-life judging threshold value (step S108 / YES), the controller 115 does not make aerosol be generated (step S110). On the other hand, if it is judged that the quantity-of-consumption parameter has not yet reached the end-of-life judging threshold value (step S108 / NO), the controller 115 makes aerosol be generated (step S112). Thereafter, the controller 115 performs update of information by incrementing the quantity-of-consumption parameter stored in the storage (step S114).

« 4. Modification Examples »

(1) First Modification Example

[0084] In the above description, it is explained that a capsule 130 corresponds to an element; however, the present invention is not limited to such an example. For example, a cartridge 120 may correspond to an element. In such a case, the controller 115 corresponds to the flavor component generation control device, and other components in the power source 110 correspond to the flavor component generation device. Further, the aerosol source included in the reservoir 121 corresponds to the contents, the male connector 116 corresponds to the attaching part, and the aerosol corresponds to the gas. The flavor component generation control device may be include in the flavor component generation device, and, in such a case, the power source 110 corresponds to the flavor component generation device.

[0085] The technical characteristics in the case that the cartridge 120 corresponds to the element are similar to the technical characteristics in the case explained in relation to the above embodiment, specifically, in the case that the capsule 130 corresponds to the element. In the following description, some points, that should be stated especially, in the technical characteristics in the case that the cartridge 120 corresponds to the element will be explained specifically.

- Authentication

[0086] The controller 115 authenticates a cartridge 120 by performing a method similar to the above authentication method explained in relation to the capsule 130. For example, the controller 115 may obtain identification information of a cartridge 120, based on a result of reading of information code added to the cartridge 120. Alternatively, the controller 115 may obtain identification information of a cartridge 120, based on a result of reading of information stored in a storage medium attached to the cartridge 120. It should be reminded that an information code or a storage medium may be added to the female connector 127 of the cartridge 120, for example. Of course, the method for authenticating a cartridge 120 is not limited to the above-explained example, and any authentication method may be adopted.

- Management of Quantity-of-Consumption Parameter

[0087] The controller 115 manages a quantity-of-consumption parameter of a cartridge 120 by performing a method similar to the above quantity-of-consumption parameter management method explained in relation to the capsule 130. For example, the controller 115 controls a process, that relates to each of cartridges 120 which have been attached to the attaching part, for associating identification information of the cartridge 120 with a quantity-of-consumption parameter representing the quantity of consumption of the contents, which have been consumed for generating flavor-component-added gas, and storing the information and the parameter in the storage.

[0088] An example of a table stored in the storage in the present modification example is shown in Table 2 below. In the example shown in Table 2, an accumulated number of times of puffs with respect to each of cartridges 120 and capsules 130 is stored.

[Table 2]

[0089]

Table 2 Example of Table Stored in Storage

	Capsule A	Capsule B	Capsule C	Cartridge A	Cartridge B
Accumulated number of times of puffs	20	30	40	200	250

- Process Corresponding to Quantity-of-Consumption Parameter

[0090] The controller 115 controls the process corresponding to a quantity-of-consumption parameter of a cartridge 120 attached to the power source 110. Specifically, the controller 115 judges whether the quantity-of-consumption parameter, that is stored in the storage in association with identification information of a cartridge 120 attached to the power source 110, has reached an end-of-life judging threshold value, and performs a process corresponding to a result of the judgment. Details of the process corresponding to a result of the judgment are similar to those explained above.

(2) Second Modification Example

[0091] The present modification example is an example which takes aged deterioration of an element into consideration.

[0092] The controller 115 sets an end-of-life judging threshold value, based on the time elapsed since a point in time when a content of an element is first consumed. For example, the point in time when a content of an element is first consumed is a point in time when a puff action is first performed in the state that a capsule 130 is being attached to the inhaler 100. The controller 115 sets the end-of-life judging threshold value in such a manner that it becomes smaller as the elapsed time becomes longer. Aged deterioration of the cartridge 120 and the capsule 130 may progress more as the time elapsed since first use thereof becomes longer. Further, as aged deterioration progresses, the number of times of aerosol generation, that can be performed, and the number of times of actions for adding flavor components to the aerosol, that can be performed, may be reduced. Regarding the above point, by setting the end-of-life judging threshold value in such a manner that it becomes smaller as the elapsed time becomes longer, it becomes possible to judge an end of life of an element, with respect to which aged deterioration has progressed further, by using a smaller accumulated number of times of puffs.

[0093] For taking aged deterioration into consideration in judgment of an end of life, the controller 115 associates, with respect to each of elements which have been attached to the attaching part, identification information of the element with information relating to the time elapsed since the point in time when the element is first used and an end-of-life judging threshold value, and stores the information and the value in the storage. Regarding the information relating to the time elapsed since the point in time when the element is first used, the information may be information representing elapsed time itself, or information representing the time and date when element is first used. Further, regarding the end-of-life judging threshold value, an initial value thereof is stored first, and, thereafter, the value is updated to make it smaller as the time elapsed since the time of first use becomes longer. The controller 115 reads the end-of-life judging threshold value stored in the storage when performing end-of-life judgement, updates the end-of-life judging threshold value to correspond to the time elapsed since the time of first use, and so on.

[0094] An example of a table stored in the storage in the present modification example is shown in Table 3 below. In the example shown in Table 3, an accumulated number of times of puffs, the number of days elapsed since the time of first use, and an end-of-life judging threshold value with respect to each of cartridges 120 and capsules 130 is stored.

[Table 3]

[0095]

Table 3 Example of Table Stored in Storage

	Capsule A	Capsule B	Capsule C	Cartridge A	Cartridge B
Accumulated number of times of puffs	20	30	40	200	210
Time elapsed since the time of first use (day)	1	20	40	100	200
End-of-life judging threshold value	50	50	45	250	240

[0096] According to the example shown in Table 3, regarding Capsule C with respect to which the number of days elapsed since first use thereof is 30 or more than 30, the end-of-life judging threshold value has been updated from 50, that is the initial value, to 45. Further, regarding Cartridge B with respect to which the number of days elapsed since first use thereof is 150 or more than 150, the end-of-life judging threshold value has been updated from 250, that is the initial value, to 240.

[0097] The controller 115 may set an end-of-life judging threshold value, based on history of environment, such as humidity, temperature, air pressure, weather, and so on, surrounding an element. For example, based on history of environment surrounding an element, the controller 115 may set an end-of-life judging threshold value that takes the speed of progress of aged deterioration, that may vary among respective environments surrounding the element, into consideration. Specifically, the controller 115 increases the degree of reduction of an end-of-life judging threshold value per unit time in the case that an element is put in a high-temperature and high-humidity environment, and decreases the degree of reduction of the end-of-life judging threshold value per unit time in the case that the element is put in a low-temperature and dry environment. In a different example, the controller 115 increases the degree of reduction of an end-of-life judging threshold value per unit time in the case that an element is put in a low-pressure environment such as an environment in a mountain or the like. In a different example, the controller 115 increases the degree of reduction of an end-of-life judging threshold value per unit time in an environment wherein a strong wind blows so that flavor components leak out even if they are not sucked by a user. In this regard, information detected by the sensor 112 during

the state that an element is being attached to the inhaler 100 is stored, as history of environment surrounding the element, in the storage 114.

(3) Third Modification Example

[0098] Regarding the above embodiment, it is explained that the quantity-of-consumption parameter is the accumulated number of times of consumption of contents stored in an element; however, the present invention is not limited to such an example. The quantity-of-consumption parameter may be an accumulated length of time spent for consumption of contents stored in an element. In brief, in addition to the method for performing judgment based on the number of times of consumption of contents, the end of life of an element may be judged based on the length of time spent for consumption of contents (this corresponds to the length of time spent for suction by a user).

[0099] Aerosol is generated as a result that electric power is supplied to the atomizer 122, and, thereafter, flavor components are added to the aerosol; so that there is correspondence relation between the length of time spent for electric conduction to the atomizer 122 and the length of time spent for consumption of the aerosol source and the flavor components. Thus, a total length of time spent for electric conduction to the atomizer 122 (hereinafter, an aggregated conduction time) may be used as a quantity-of-consumption parameter. For example, the controller 115 may judge that the life of a capsule 130 has reached the end thereof in the case that the aggregated conduction time has reached 100 seconds, and may judge that the life of a cartridge 120 has reached the end thereof in the case that the aggregated conduction time has reached 500 seconds.

(4) Fourth Modification Example

[0100] The cartridge 120 may comprise a fuse in an electric circuit to which the atomizer 122 is connected. The fuse will be thermally cut when current having a value equal to or larger than a predetermined value flows through it. In such a case, the electric circuit, to which the atomizer 122 is connected, is opened, and it becomes impossible to supply electric power to the atomizer 122. When it is judged that the life of a cartridge 120 has reached the end thereof, the controller 115 may make the cartridge 120 unusable permanently, by controlling a process for thermally cutting the fuse by making large current flow through the fuse. As a result, unfair use such as reuse of a cartridge 120 by dishonestly changing contents (i.e., the aerosol source) of the cartridge 120 can be prevented.

(5) Fifth Modification Example

[0101] Regarding the above embodiment, an example wherein a single capsule 130 is attached to the inhaler 100 is explained; however, the present invention is not limited to such an example. For example, it may be possible to attach plural capsules 130 to the reception part 128. In such a case, the controller 115 makes a selected part of (i.e., one of or a plurality of) capsules 130, which are attached to the inhaler 100, contribute to generation of flavor-component-added gas that is to be sucked by a user. Selecting of the capsule(s) 130 may be performed by a user or may be performed by the controller 115. For example, the controller 115 allows aerosol, which is generated by the cartridge 120, pass through the one or plural capsules 130 only, wherein the one or plural capsules 130 are those selected by a user from the plural capsules 130 attached to the inhaler 100. That is, only the one or plural capsules 130 in the plural capsules 130 attached to the inhaler 100 may add flavor components to the aerosol. For performing such control, the cartridge 120 is provided with independent aerosol flow paths 124, wherein the number of the independent aerosol flow paths 124 corresponds to the number of attachable capsules 130, and opening/closing valves which can open/close the respective aerosol flow path 124; and the above control is realized by opening/closing the opening/closing valves. Opening/closing of the opening/closing valves may be performed by a user. In the above case, a user can easily enjoy plural kinds of flavor without changing the capsules 130. In this regard, with respect to the one or plural capsules 130 only, which has/have added flavor components to the aerosol, one or more processes corresponding to one or more quantity-of-consumption parameters is/are performed to update the one or more quantity-of-consumption parameters.

« 5. Conclusion »

[0102] An embodiment of the present invention has been explained in detail with reference to Figs. 1-7. As explained above, according to the present embodiment, a flavor component generation control device for controlling a flavor component generation device is provided, wherein the flavor component generation device comprises an attaching part to which an element is attached in an attachable/detachable manner, and the element is constructed to contribute to generation of flavor-component-added gas by consuming stored contents. Especially, the flavor component generation control device according to the present embodiment associates, with respect to each of plural capsules 130 which have been attached to the attaching part, identification information with a parameter representing the quantity of consumption

of the contents, which have been consumed for generating flavor-component-added gas, and stores the information and the parameter in a storage. Thus, the quantity of consumption of the contents, which have been consumed for generating flavor-component-added gas, can be managed on an element basis.

[0103] The case wherein an element is a capsule 130 will be explained. Even in the case that one capsule 130 is replaced by the other capsule 130 before contents of the one capsule 130 is completely consumed, management of the quantity of consumption of the capsule 130 which is being used after replacement is performed differently from management of the quantity of consumption of the capsule 130 which was used before replacement. Thus, it becomes possible to prevent lowering of the quality of inhalation experience, for example, due to an event that a user is urged to replace a capsule 130, which is being used after replacement, although contents thereof still remain. Accordingly, it becomes possible to urge a user to replace a capsule 130 at timing when the contents of the capsule 130, which is being used after replacement, is completely consumed. It is also possible to apply explanation similar to the above explanation to the case wherein an element is a cartridge 120.

[0104] In the above description, a preferred embodiment of the present invention has been explained in detail with reference to the attached figures; however, the present invention is not limited by the examples explained above. It is obvious to a person, who has ordinary skill in the technical field to which the present invention pertains, that it is possible to conceive of various kinds of modified examples or rectified examples within the scope of the technical idea disclosed in the claims; and it is understood that they are also those pertaining to the scope of the technique of the present invention.

[0105] Regarding the above embodiment, it is explained that the quantity-of-consumption parameter used for judgment of the end of life is a parameter that directly represents the quantity of consumption; however, the present invention is not limited to such an example. For example, the quantity-of-consumption parameter may be a parameter that indirectly represents the quantity of consumption, specifically, may be a parameter that represents a remaining quantity of contents stored in an element. For example, a parameter representing a remaining quantity of contents stored in an element is a remaining number of times of puffs that can be performed before the life reaches the end thereof, or the remaining length of time that can be spent for electric conduction before the end of life. The end-of-life judging threshold value in the above case is a value such that a value equal to or smaller than the threshold value represents a state that the contents stored in the element may be depleted, and the threshold value is zero, for example. For example, it is judged that the life has not yet reached the end thereof if the remaining number of times of puffs exceeds the end-of-life judging threshold value, and it is judged that the life has reached the end thereof if the remaining number of times of puffs is equal to or smaller than the end-of-life judging threshold value. In this regard, the initial value of the remaining quantity may be set based on identification information of an element. Further, the end-of-life judging threshold value may be updated to become larger gradually as aged deterioration progresses further.

[0106] Regarding the above embodiment, an example wherein the gas, to which flavor components generated by the flavor component generation device are to be added, is aerosol has been explained; however, the present invention is not limited to such an example. For example, the gas, to which flavor components generated by the flavor component generation device are to be added, may be invisible vapor.

[0107] It should be reminded that the inhaler 100 explained in this specification may be realized as a single device, or a device comprising a different device as a component thereof or comprising different devices as components constituting the device. For example, in the functional constructions in the inhaler 100 explained with reference to Fig. 1 and so on, the function of the controller 115 may be installed in an information processing device in a smart phone, a server, of the like which is connected to the inhaler 100 via a network or the like. In the above case, the inhaler 100 transmits various kinds of information, such as result of reading of an information code added to an element, result of detecting of a puff action, and so on, to the information processing device. Next, the information processing device authenticates the element based on the received information, updates the quantity-of-consumption parameter to make it correspond to puff action, and further makes judgment as to whether the quantity-of-consumption parameter has reached the end-of-life judging threshold value. Next, the information processing device generates control information corresponding to result of judgment as to whether the quantity-of-consumption parameter has reached the end-of-life judging threshold value (for example, an instruction of execution of the first process in the case that the quantity-of-consumption parameter has reached the end-of-life judging threshold value), and transmits the generated control information to the inhaler 100. Thereafter, the inhaler 100 executes the process specified in the control information received from the information processing device.

[0108] It should be reminded that the series of processes performed by the respective devices explained in the present specification may be realized by using any one of software, hardware, and a combination of software and hardware. Programs, that are components of the software, are stored in advance in a storage medium (a non-transitory medium: a non-transitory media) implemented in the inside or the outside of the respective devices, for example. Further, for example, each program is read into a RAM when it is to be executed by a computer, and is executed by a processor such as a CPU. The above storage medium is, for example, a magnetic disk, an optical disk, a magneto-optical disk, a flash memory, or the like. Further, the above-explained computer program may be delivered via a network without using a storage medium, for example.

[0109] Further, the processes explained by using the flow chart and the sequence diagram in the present specification may not necessarily be performed in the illustrated order. Some processing steps may be performed in a parallel manner. Further, some additional processing steps may be adopted, and some processing steps may be omitted.

REFERENCE SIGNS LIST

[0110]

100	Inhaler
110	First member, Power source
111	Notifier
112	Battery
113	Sensor
114	Storage
115	Controller
116	Male connector
120	Cartridge
120	Second member
121	Reservoir
122	Atomizer
123	Air taking-in flow path
124	Aerosol flow path
125	Suction opening part
127	Female connector
128	Reception part
128A	Edge part
128B	Bottom part
130	Third member, Capsule
131	Flavor source
132	Suction opening part
133	Insertion part
134	Information code
135	Storage medium

Claims

1. A flavor component generation control device for controlling a flavor component generation device comprising an attaching part to which an element, which is constructed to contribute to generation of flavor-component-added gas by consuming stored contents, is attached in an attachable/detachable manner; said the flavor component generation control device comprising
a controller which controls a process for associating, with respect to each of plural elements which have been attached to the attaching part, identification information of the element with a parameter representing a quantity of consumption of the contents, which have been consumed for generating the flavor-component-added gas, and storing the information and the parameter in a storage.

2. The flavor component generation control device as recited in Claim 1, wherein the controller controls, in the case that the parameter stored in association with the identification information of the element has reached a threshold value, a process for providing information that informs that timing of replacement of the element has come.

3. The flavor component generation control device as recited in Claim 1 or 2, wherein the controller controls, in the case that the parameter stored in association with the identification information of the element has reached a threshold value, a process for stopping supplying of electric power to a gas generation unit which generates gas to which a flavor component is added by the element.

4. The flavor component generation control device as recited in any one of Claims 1-3, wherein the controller controls, in the case that the parameter stored in association with the identification information of the element has reached a threshold value, a process for dissolving a state that the element is being attached to the attaching part.

5. The flavor component generation control device as recited in any one of Claims 1-4, wherein the controller controls, in the case that the parameter stored in association with the identification information of the element has reached a threshold value, a process for opening an electric circuit included in the element.

6. The flavor component generation control device as recited in any one of Claims 1-5, wherein the controller deletes, in the case that the parameter stored in association with the identification information of the element has reached a threshold value, the identification information and the parameter, that have been stored in relation to the element, from the storage.

7. The flavor component generation control device as recited in Claim 6, wherein the controller deletes the identification information and the parameter, that have been stored in relation to the element, from the storage after a predetermined period of time has elapsed since a point in time when the parameter, that has been stored in association with the identification information of the element, has reached the threshold value.

8. The flavor component generation control device as recited in any one of Claims 1-7, wherein the controller associates, in the case that the parameter stored in association with the identification information of the element has reached a threshold value, the identification information of the element with information representing a state that the element has been spent, and makes the information be stored in the storage.

9. The flavor component generation control device as recited in any one of Claims 2-8, wherein the controller sets the threshold value, based on the time elapsed since a point in time when the contents of the element is first consumed.

10. The flavor component generation control device as recited in Claim 9, wherein the controller sets the threshold value in such a manner that the value becomes smaller as the elapsed time becomes longer.

11. The flavor component generation control device as recited in Claim 9 or 10, wherein the controller controls the degree of reduction of the threshold value per unit time, based on history of environment surrounding the element.

12. The flavor component generation control device as recited in any one of Claims 1-11, wherein the controller obtains the identification information of the element, based on result of reading of an information code added to the element.

13. The flavor component generation control device as recited in any one of Claims 1-12, wherein the controller obtains the identification information of the element, based on result of reading of information stored in a storage medium attached to the element.

14. The flavor component generation control device as recited in any one of Claims 1-13, wherein the controller obtains the identification information of the element, based on result of detection of the shape of the element.

15. The flavor component generation control device as recited in any one of Claims 1-14, wherein the controller obtains the identification information of the element, based on result of detection of a component included in the element.

16. The flavor component generation control device as recited in any one of Claims 1-15, wherein the controller obtains the identification information of the element, based on result of detection of a flavor component included in a flavor source in the element.

17. The flavor component generation control device as recited in any one of Claims 1-16, wherein the element includes an aerosol source.

18. The flavor component generation control device as recited in any one of Claims 1-16, wherein the element includes a flavor source having a flavor component which is to be added to gas.

19. The flavor component generation control device as recited in any one of Claims 1-18, wherein the parameter is an accumulated number of times of consumption of the contents.

20. The flavor component generation control device as recited in any one of Claims 1-18, wherein the parameter is accumulated length of time spent for consumption of the contents.

21. The flavor component generation control device as recited in any one of Claims 1-20, wherein the parameter rep-

resents a sum of quantities of consumption of the contents which have been consumed for generating flavor-component-added gas during the state that the element is being attached to the flavor component generation device and the state that the element is being attached to a different flavor component generation device.

22. The flavor component generation control device as recited in any one of Claims 1-21, wherein the storage is included in an external device which is connected to the flavor component generation control device via a network.

23. The flavor component generation control device as recited in any one of Claims 1-21, wherein the storage is included in the element.

24. The flavor component generation control device as recited in any one of Claims 1-23, wherein

plurality elements can be attached to the attaching part, and
the controller makes a selected part of the elements in the plural elements, which are being attached to the attaching part, contribute to the generation of the flavor-component-added gas.

25. A flavor component generation device, comprising:

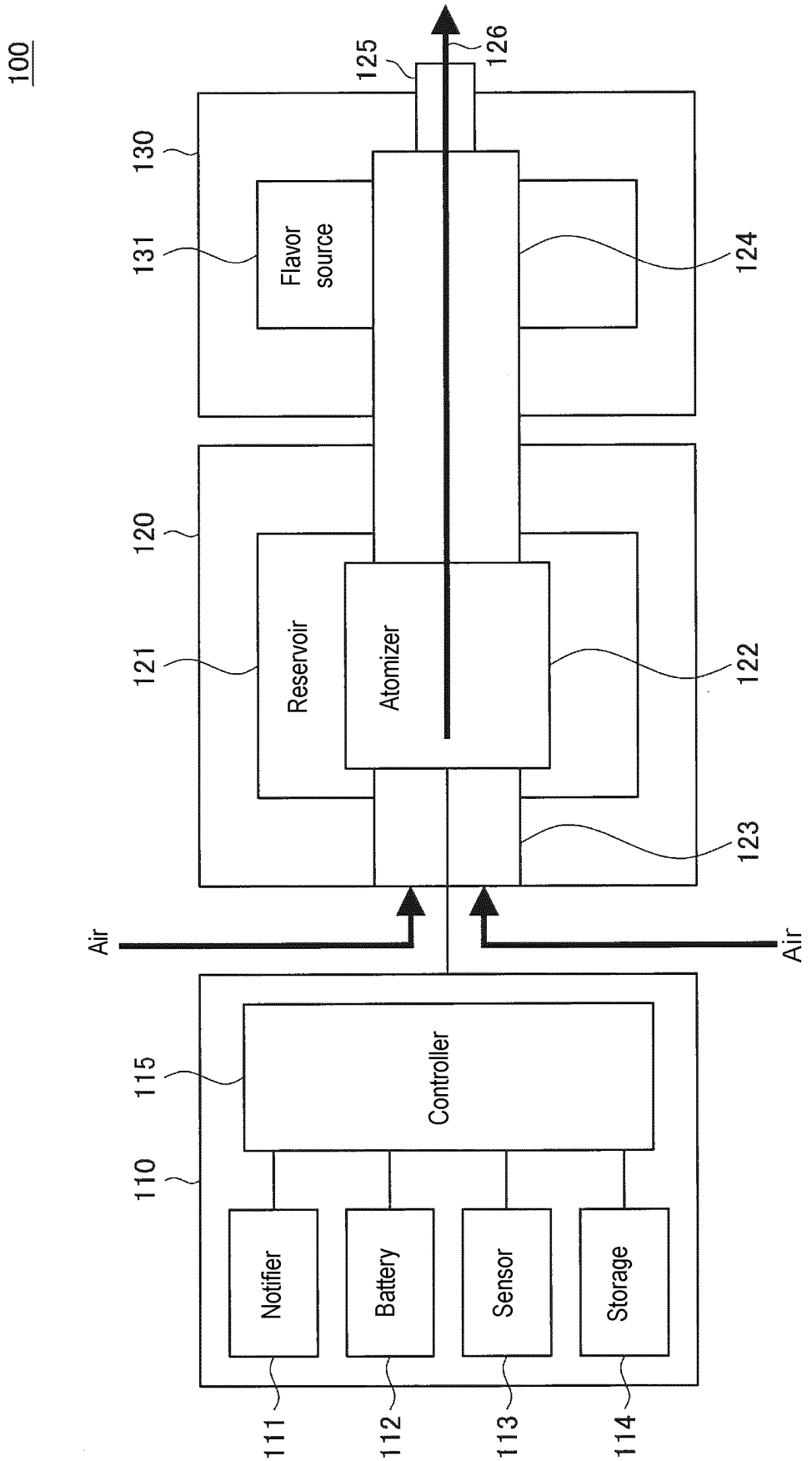
an attaching part to which an element is attached in an attachable/detachable manner, wherein the element is constructed to contribute to generation of flavor-component-added gas by consuming stored contents, and
a controller which controls a process for associating, with respect to each of plural elements which have been attached to the attaching part, identification information of the element with a parameter representing the quantity of consumption of the contents, which have been consumed for generating the flavor-component-added gas, and storing the information and the parameter in a storage.

26. A control method for controlling a flavor component generation device which comprises an attaching part to which an element is attached in an attachable/detachable manner, wherein the element is constructed to contribute to generation of flavor-component-added gas by consuming stored contents, the control method including:

associating, with respect to each of plural elements which have been attached to the attaching part, identification information of the element with a parameter representing the quantity of consumption of the contents, which have been consumed for generating the flavor-component-added gas; and
storing the information and the parameter in a storage.

27. A program which makes a computer, which controls a flavor component generation device which comprises an attaching part to which an element, which is constructed to contribute to generation of flavor-component-added gas by consuming stored contents, is attached in an attachable/detachable manner, function as:
a controller which controls a process for associating, with respect to each of plural elements which have been attached to the attaching part, identification information of the element with a parameter representing the quantity of consumption of the contents, which have been consumed for generating the flavor-component-added gas, and storing the information and the parameter in a storage.

Fig. 1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125
126
130
131
Flavor source
124
120
121
Reservoir
Atomizer
122
123
Air
Air
115
Controller
110
Notifier
Battery
Sensor
Storage
111
112
113
114

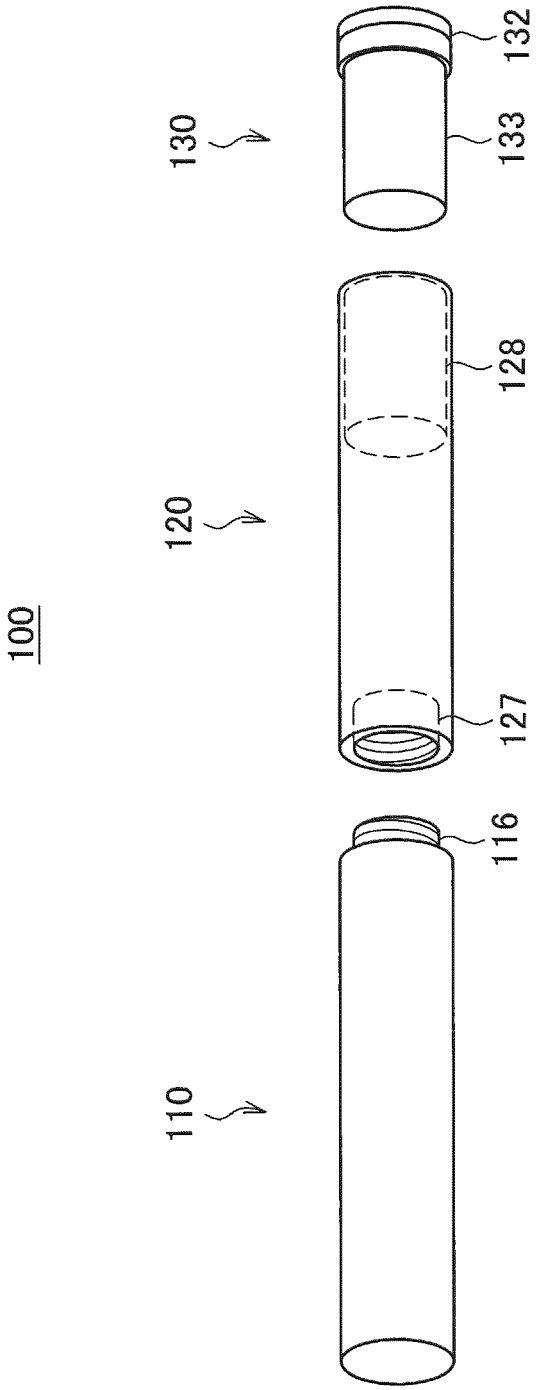


Fig. 2

Fig. 3

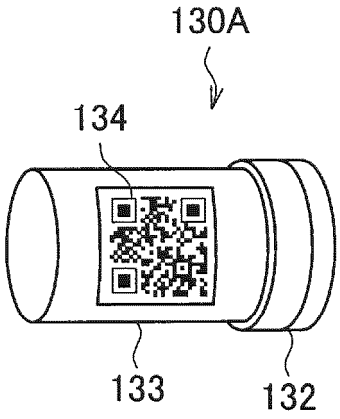


Fig. 4

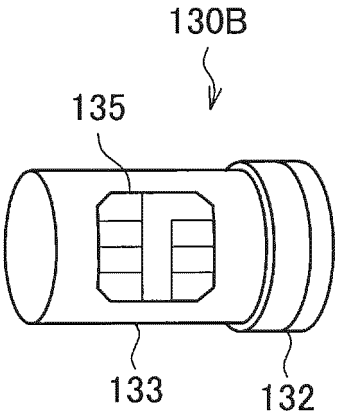


Fig.5

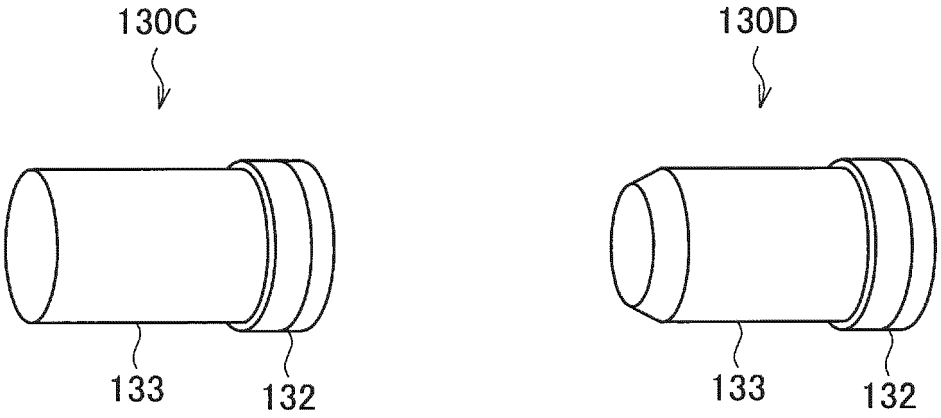


Fig. 6

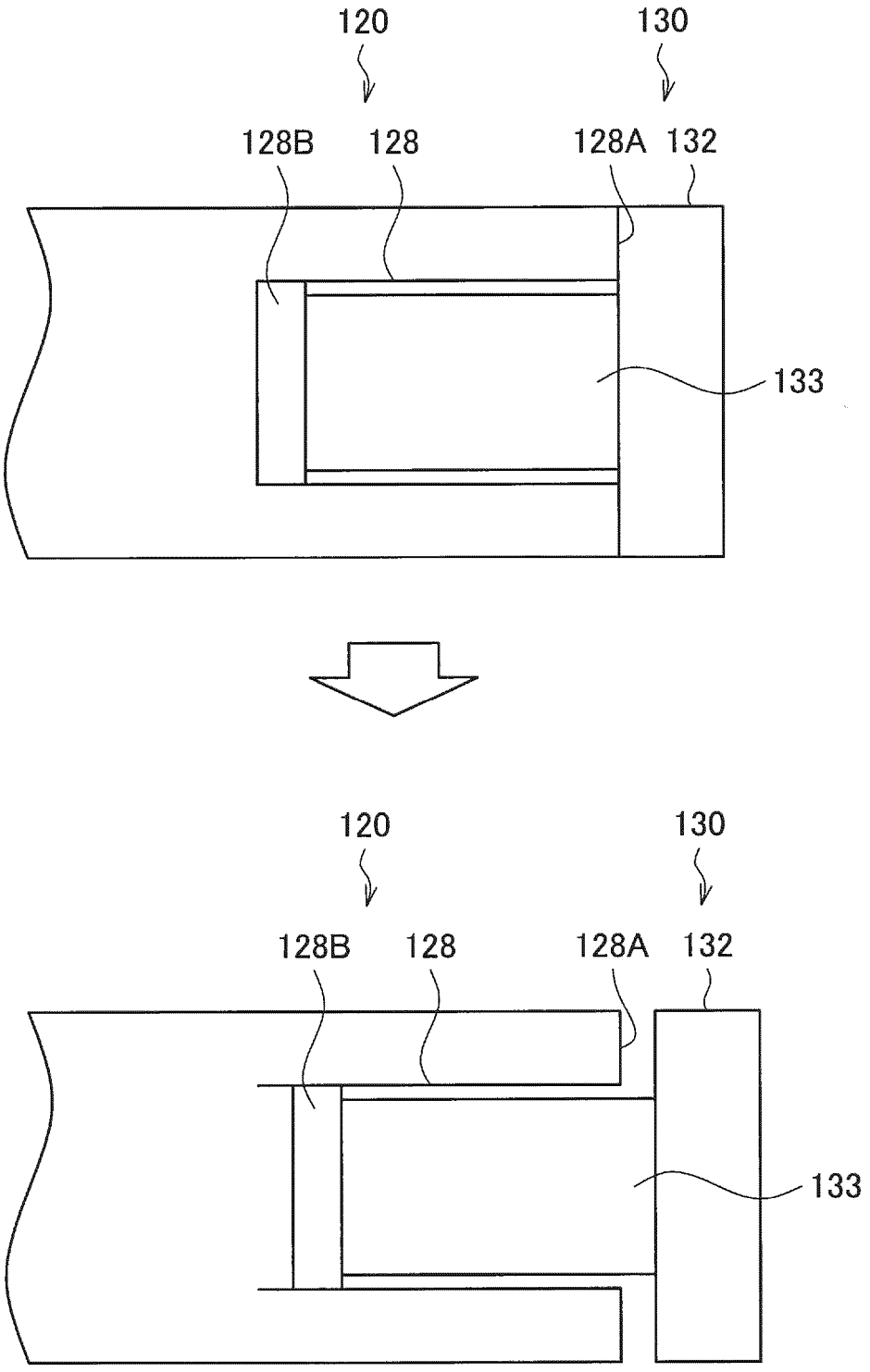
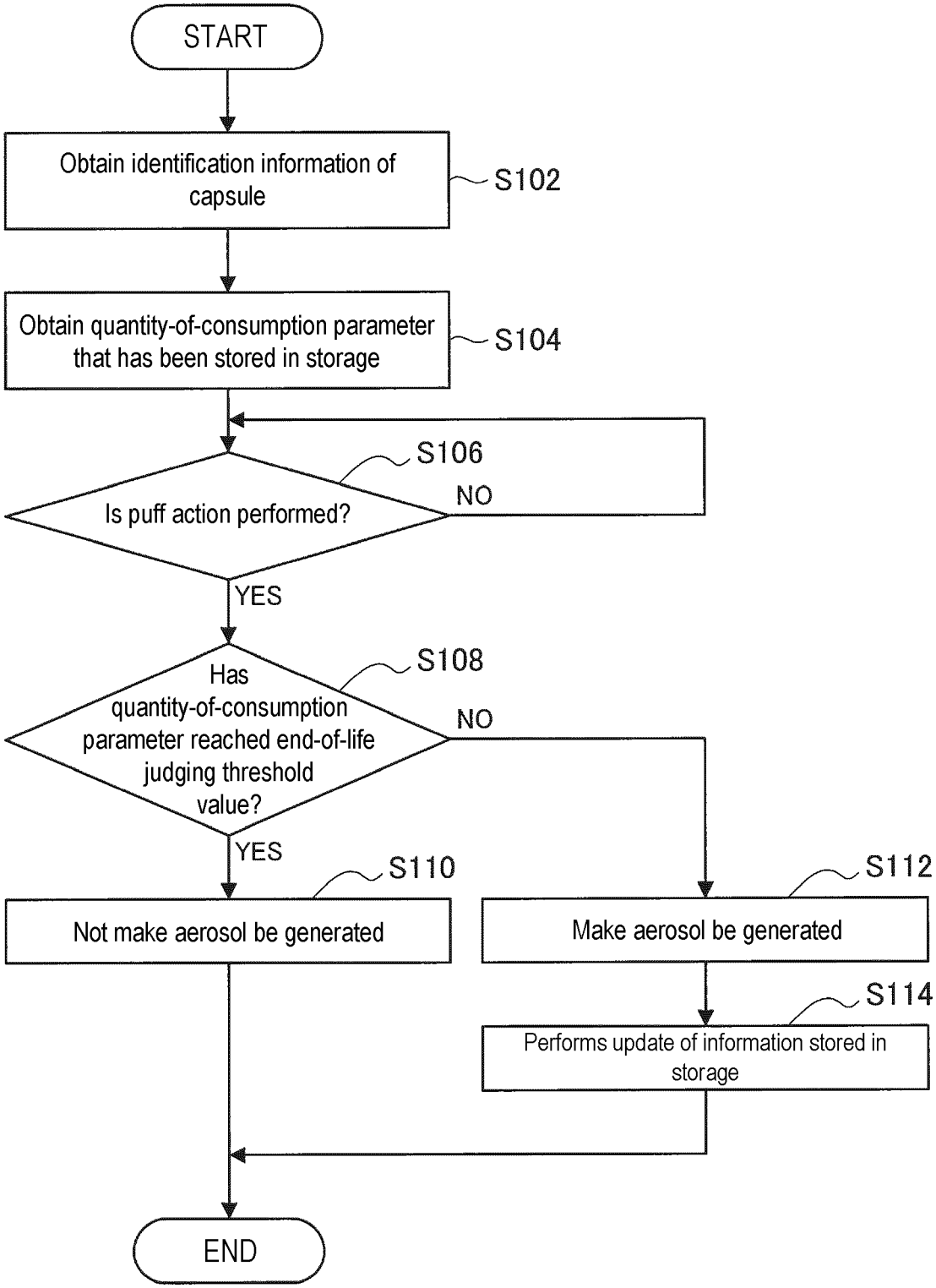


Fig. 7


START
Obtain identification information of capsule
S102
Obtain quantity-of-consumption parameter that has been stored in storage
S104
S106
Is puff action performed?
NO
YES
S108
Has quantity-of-consumption parameter reached end-of-life judging threshold value?
NO
YES
S110
Not make aerosol be generated
S112
Make aerosol be generated
S114
Performs update of information stored in storage
END

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2019/007673

A. CLASSIFICATION OF SUBJECT MATTER
Int. Cl. A24F47/00(2006.01)i

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int. Cl. A24F47/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Published examined utility model applications of Japan 1922-1996
Published unexamined utility model applications of Japan 1971-2019
Registered utility model specifications of Japan 1996-2019
Published registered utility model applications of Japan 1994-2019

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 Y A	WO 2017/141358 A1 (JAPAN TOBACCO INC.) 24 August 2017, paragraphs [0050], [0060]-[0062], [0109] & US 2018/0352863 A1, paragraphs [0062], [0072]-[0074] & EP 3400815 A1 & CA 3013420 A1 & CN 108601404 A & KR 10-2018-0111880 A & EA 201891849 A	1-3, 5, 25-27 6-10, 12-20, 22-24 4, 11, 21
Y	US 2017/0258136 A1 (ALTRIA CLIENT SERVICES LLC) 14 September 2017, paragraph [0124] & CN 108697157 A & KR 10-2018-0121518 A	6-10, 12-20, 22-24
Y	JP 2016-214258 A (ROIC INC.) 22 December 2016, paragraph [0045] & US 2011/0265806 A1, paragraph [0064] & CN 104839892 A	9-10, 12-20, 22-24

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

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"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
08.04.2019	16.04.2019

Name and mailing address of the ISA/	Authorized officer
Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan	Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2019/007673

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2017/057286 A1 (JAPAN TOBACCO INC.) 06 April 2017, paragraph [0106], fig. 8 & US 2018/0220711 A1, paragraph [0121], fig. 8 & EP 3348154 A1 & KR 10-2018-0044409 A & CN 108135271 A	12-20, 22-24
Y	JP 2017-501682 A (PHILIP MORRIS PRODUCTS S.A.) 19 January 2017, paragraph [0095] & US 2016/0302488 A1, paragraph [0100] & WO 2015/082560 A1 & EP 3076812 A1 & KR 10-2016-0111902 A & CN 106170215 A	15-20, 22-24

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REFERENCES CITED IN THE DESCRIPTION

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