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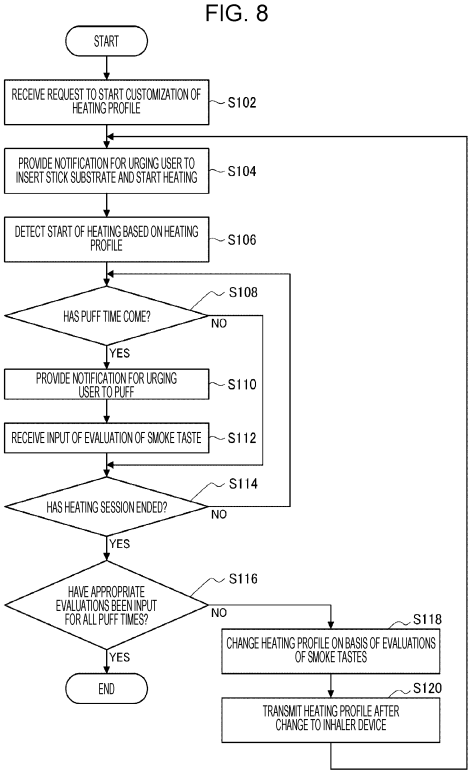
(54) **INFORMATION PROCESSING DEVICE, INFORMATION PROCESSING METHOD, AND PROGRAM**

(57) [Problem] To provide a customization system with which a user can easily achieve their desired smoke flavor.

[Solution] This information processing device is used by an aerosol generating device that generates aerosols by heating an aerosol source included in a substrate. The information processing device includes a control unit that changes control information in accordance with an evaluation which is input with respect to aerosols generated using the control information which stipulates the chronological change of a parameter related to the temperature for heating the aerosol sources.

FIG. 8



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Description

Technical Field

[0001] The present invention relates to an information processing device, an information processing method, and a program.

Background Art

[0002] Inhaler devices that generate a substance to be inhaled by users, such as electronic cigarettes and nebulizers, are widely used. An inhaler device generates an aerosol with a flavor component, for example, using a substrate including an aerosol source for generating an aerosol and a flavor source for imparting a flavor component to the generated aerosol. A user can taste a flavor by inhaling the aerosol with the flavor component generated by the inhaler device. Inhalation of an aerosol by the user will be referred to as a "puff" or a "puff action" hereinafter.

[0003] A preference for a flavor (hereinafter also referred to as a smoke taste) tasted during a puff differs between users. Heating temperature of an aerosol source, which directly affects the smoke taste, therefore, is preferably customizable by a user. The following Patent Literature 1 discloses a technique for enabling a user to customize heating temperature of an aerosol source.

Citation List

Patent Literature

[0004] Patent Literature 1: WO 2019/104227 A1

Summary of Invention

Technical Problem

[0005] The technique disclosed in the above Patent Literature 1, however, has a problem in that it is not clear how the heating temperature of the aerosol source affects the smoke taste.

[0006] The present invention, therefore, has been conceived in view of the above problem, and aims to provide a mechanism capable of easily achieving smoke tastes desired by a user.

Solution to Problem

[0007] In order to solve the above problem, an aspect of the present invention provides an information processing device including a controller that changes control information, which is used by an aerosol generation device that generates an aerosol by heating an aerosol source included in a substrate and which defines temporal changes in a parameter relating to heating temperature of the aerosol source, in accordance with an evaluation input for the aerosol generated using the control information.

[0008] The information processing device may further include an inputter that receives an input of the evaluation at one or more of a plurality of times included in a period of time when the aerosol is generated using the control information.

[0009] The controller may sequentially change the parameter in chronological order for the one or more times at which inappropriate evaluations have been input.

[0010] The controller may select the one or more times at which the inappropriate evaluations have been input as times for which the parameter is to be changed and repeat a first process, which includes a change of the parameter until appropriate evaluations are input at the times for which the parameter is to be changed, while switching, in chronological order, a time for which the parameter is to be changed between the times at which the inappropriate evaluations have been input.

[0011] The first process may include repetition of a change, based on the inappropriate evaluations, of the parameter for the time for which the parameter is to be changed, control of the aerosol generation device for generating the aerosol on a basis of the control information after the change, and reception of an input of an evaluation of the aerosol generated using the control information after the change until an appropriate evaluation is input at the time for which the parameter is to be changed.

[0012] The controller may classify a plurality of times included in a period of time when the aerosol is generated using the control information into a plurality of groups each including one or more of the plurality of times, select one or more groups including the times at which the inappropriate evaluations have been input as groups for which the parameter is to be

changed, and repeat a second process, which includes a change of the parameter at the one or more times included in the groups for which the parameter is to be changed until appropriate evaluations are input at all the times, while switching, in chronological order, a group for which the parameter is to be changed between the one or more groups including the times at which the inappropriate evaluations have been input.

[0013] The second process may include repetition of a change, in accordance with the inappropriate evaluations, of the parameter at the one or more times included in the group for which the parameter is to be changed, control of the aerosol generation device for generating the aerosol on a basis of the control information after the change, and reception of an input of an evaluation of the aerosol generated using the control information after the change until appropriate evaluations are input at all the times included in the group for which the parameter is to be changed.

[0014] The change, in accordance with the inappropriate evaluations, of the parameter at the one or more times included in the group for which the parameter is to be changed may include a change, based on a statistical value of the evaluations at the one or more times included in the group for which the parameter is to be changed, of the parameter at the one or more times included in the group for which the parameter is to be changed.

[0015] The change, in accordance with the inappropriate evaluations, of the parameter at the one or more times included in the group for which the parameter is to be changed may include a change, based on a relative relationship between the evaluations at the one or more times included in the group for which the parameter is to be changed, of the parameter at the one or more times included in the group for which the parameter is to be changed.

[0016] The controller may classify, on a basis of a number of times belonging to the group, the plurality of times included in the period of time when the aerosol is generated using the control information into the plurality of groups.

[0017] The controller may classify, on a basis of temporal changes in the parameter or temporal changes in the evaluation, the plurality of times included in the period of time when the aerosol is generated using the control information into the plurality of groups

[0018] The controller may change the parameter at, among the plurality of times included in the period of time when the aerosol is generated using the control information, a second time, which is later than a first time, for which the parameter has been changed, in accordance with the change of the parameter at the first time.

[0019] The controller may change the parameter within a limited range.

[0020] The controller may change the parameter in a limited period of time in the period of time when the aerosol is generated using the control information.

[0021] The controller may change, in accordance with the change of the parameter, length of the period of time when the aerosol is generated using the control information.

[0022] In addition, in order to solve the above problem, another aspect of the present invention provides an information processing method including changing control information, which is used by an aerosol generation device that generates an aerosol by heating an aerosol source included in a substrate and which defines temporal changes in a parameter relating to heating temperature of the aerosol source, in accordance with an evaluation input for the aerosol generated using the control information.

[0023] In addition, in order to solve the above problem, another aspect of the present invention provides program for causing a computer to function as a controller that changes control information, which is used by an aerosol generation device that generates an aerosol by heating an aerosol source included in a substrate and which defines temporal changes in a parameter relating to heating temperature of the aerosol source, in accordance with an evaluation input for the aerosol generated using the control information.

Advantageous Effects of Invention

[0024] As described above, according to the present invention, a customization mechanism capable of easily achieving smoke tastes desired by a user is provided.

Brief Description of Drawings

[0025]

[Fig. 1] Fig. 1 is a diagram for describing a configuration example of a system according to an embodiment.

[Fig. 2] Fig. 2 is a schematic diagram schematically illustrating a configuration example of an inhaler device according to the present embodiment.

[Fig. 3] Fig. 3 is a block diagram illustrating a configuration example of a terminal device according to the present embodiment.

[Fig. 4] Fig. 4 is a graph schematically illustrating an example of a heating profile.

[Fig. 5] Fig. 5 is a graph schematically illustrating an example of customization of the heating profile.

[Fig. 6] Fig. 6 is a graph schematically illustrating another example of the customization of the heating profile.

[Fig. 7] Fig. 7 is a graph schematically illustrating another example of the customization of the heating profile.

[Fig. 8] Fig. 8 is a flowchart illustrating an example of a procedure of a process for customizing a heating profile performed by the terminal device according to the present embodiment.

Description of Embodiments

[0026] A preferred embodiment of the present invention will be described in detail hereinafter with reference to the accompanying drawings. Structural elements having substantially the same functional configuration will be given the same reference numerals herein and in the drawings, and redundant description thereof is omitted.

<1. Configuration example>

(1) System configuration example

[0027] Fig. 1 is a diagram for describing a configuration example of a system 1 according to an embodiment. As illustrated in Fig. 1, the system 1 includes an inhaler device 100 and a terminal device 200.

[0028] The inhaler device 100 is a device that generates a substance to be inhaled by a user. It is assumed in the following description that the substance generated by the inhaler device 100 is an aerosol. Alternatively, the substance generated by the inhaler device may be a gas. The inhaler device 100 generates the aerosol using a stick substrate 150. The stick substrate 150 is an example of a substrate including an aerosol source. The inhaler device 100 is an example of an aerosol generation device that generates an aerosol by heating an aerosol source included in a substrate.

[0029] The terminal device 200 is an information processing device that performs various types of information processing relating to the inhaler device 100. The user of the inhaler device 100 uses the terminal device 200. The terminal device 200 may be any device such as a smartphone, a tablet terminal, a wearable device, or a personal computer (PC). Alternatively, the terminal device 200 may be a charger for charging the inhaler device 100.

[0030] The terminal device 200 is used to change settings of the inhaler device 100. For example, the terminal device 200 receives a user operation for changing the settings of the inhaler device 100 and changes the settings of the inhaler device 100.

(2) Configuration example of inhaler device

[0031] Fig. 2 is a schematic diagram schematically illustrating a configuration example of the inhaler device according to the present embodiment. As illustrated in Fig. 2, the inhaler device 100 includes a power supply 111, a sensor 112, a notifier 113, a memory 114, a communicator 115, a controller 116, a heater 121, a container 140, and a heat insulator 144.

[0032] The power supply 111 stores electric power. The power supply 111 supplies electric power to the structural elements of the inhaler device 100 under the control of the controller 116. The power supply 111 may be a rechargeable battery such as a lithium ion secondary battery.

[0033] The sensor 112 acquires various items of information regarding the inhaler device 100. In an example, the sensor 112 may be a pressure sensor such as a condenser microphone, a flow sensor, or a temperature sensor, and acquire a value generated in accordance with the user's inhalation. In another example, the sensor 112 may be an input device that receives information input by the user, such as a button or a switch.

[0034] The notifier 113 provides information for the user. The notifier 113 may be a light-emitting device that emits light, a display device that displays an image, a sound output device that outputs sound, or a vibration device that vibrates.

[0035] The memory 114 stores various items of information for operation of the inhaler device 100. The memory 114 may be a non-volatile storage medium such as flash memory.

[0036] The communicator 115 is a communication interface capable of communication in conformity with any wired or wireless communication standard. Such a communication standard may be, for example, Wi-Fi (registered trademark), Bluetooth (registered trademark), near-field communication (NFC), or a standard using a low-power wide-area network (LPWA).

[0037] The controller 116 functions as an arithmetic processing unit and a control circuit, and controls the overall operations of the inhaler device 100 in accordance with various programs. The controller 116 is achieved by an electronic

circuit such as a central processing unit (CPU) or a microprocessor, for example.

[0038] The container 140 has an internal space 141, and holds the stick substrate 150 in a manner partially accommodated in the internal space 141. The container 140 has an opening 142 that allows the internal space 141 to communicate with outside. The container 140 accommodates the stick substrate 150 that is inserted into the internal space 141 through the opening 142. For example, the container 140 may be a tubular body having the opening 142 and a bottom 143 on its ends, and may define the pillar-shaped internal space 141. The container 140 connects with an airflow path that supplies air to the internal space 141. For example, a side surface of the inhaler device 100B has an air inlet hole that is an inlet of air into the airflow path. For example, the bottom 143 has an air outlet hole that is an outlet of the air from the airflow path to the internal space 141.

[0039] The stick substrate 150 includes a substrate 151 and an inhalation port 152. The substrate 151 includes an aerosol source. For example, the aerosol source may be a liquid such as polyhydric alcohol or water. Examples of the polyhydric alcohol include glycerine and propylene glycol. The aerosol source may include the flavor component that is either derived from tobacco or not derived from tobacco. For the inhaler device 100 that is a medical inhaler such as a nebulizer, the aerosol source may include a medicine. In this configuration example, the aerosol source is not limited to a liquid, and may be a solid, instead. The stick substrate 150 held by the container 140 includes the substrate 151 at least partially accommodated in the internal space 141 and the inhalation port 152 at least partially protruding from the opening 142. When the user inhales with the inhalation port 152 protruding from the opening 142 in his/her mouth, air flows into the internal space 141 through the airflow path (not illustrated), and the air and an aerosol generated from the substrate 151 reach inside the mouth of the user.

[0040] The heater 121 heats the aerosol source to atomize the aerosol source and generate the aerosol. In the example illustrated in Fig. 2, the heater 121 has a film-like shape and surrounds the outer circumference of the container 140. Subsequently, heat produced from the heater 121 heats the substrate 151 of the stick substrate 150 from the outer circumference, generating the aerosol. The heater 121 produces heat when receiving electric power from the power supply 111. In an example, the electric power may be supplied in response to the sensor 112 detecting a start of the user's inhalation and/or an input of predetermined information. Subsequently, the supply of the electric power may be stopped in response to the sensor 112 detecting an end of the user's inhalation and/or an input of predetermined information.

[0041] The heat insulator 144 prevents heat from transferring from the heater 121 to the other structural elements. For example, the heat insulator 144 may be a vacuum heat insulator, an aerogel heat insulator, or the like.

[0042] The configuration example of the inhaler device 100 has been described above. It is needless to say that the inhaler device 100 is not limited to the above configuration, and may be configured in various ways as exemplified below.

[0043] In an example, the heater 121 may have a blade-like shape, and may be disposed so that the heater 121 protrudes from the bottom 143 of the container 140 toward the internal space 141. In this case, the heater 121 having the blade-like shape is inserted into the substrate 151 of the stick substrate 150 and heats the substrate 151 of the stick substrate 150 from its inside. In another example, the heater 121 may be disposed so that the heater 121 covers the bottom 143 of the container 140. In still another example, the heater 121 may be implemented as a combination of two or more selected from a first heater that covers the outer circumference of the container 140, a second heater having the blade-like shape, and a third heater that covers the bottom 143 of the container 140.

[0044] In another example, the container 140 may include an opening/closing mechanism that at least partially opens and closes an outer shell defining the internal space 141. Examples of the opening/closing mechanism include a hinge. In addition, the container 140 may sandwich the stick substrate 150 inserted into the internal space 141 by opening and closing the outer shell. In this case, the heater 121 may be provided at the sandwiching position of the container 140 and produce heat while pressing the stick substrate 150.

[0045] In addition, means for atomizing the aerosol source is not limited to the heating by the heater 121. For example, the means for atomizing the aerosol source may be induction heating, instead. In this case, the inhaler device 100 includes at least an electromagnetic induction source, such as a coil, that generates a magnetic field instead of the heater 121. The inhaler device 100 may be provided with a susceptor that produces heat through induction heating, or the stick substrate 150 may include the susceptor.

[0046] The inhaler device 100 generates the aerosol to be inhaled by the user by operating in conjunction with the stick substrate 150. A combination of the inhaler device 100 and the stick substrate 150, therefore, may be regarded as an aerosol generation system.

(3) Configuration example of terminal device

[0047] Fig. 3 is a block diagram illustrating a configuration example of the terminal device 200 according to the present embodiment. As illustrated in Fig. 3, the terminal device 200 includes an inputter 210, an outputter 220, a detector 230, a communicator 240, a memory 250, and a controller 260.

[0048] The inputter 210 has a function of receiving inputs of various items of information. The inputter 210 may include an input device that receives inputs of information from the user. The input device may be, for example, buttons, a keyboard, a

touch panel, a microphone, or the like. The inputter 210 may also include various sensors including an image sensor.

[0049] The outputter 220 has a function of outputting information. The outputter 220 may include an output device that outputs information for the user. The output device may be, for example, a display device that displays information, a light-emitting device that emits light, a vibration device that vibrates, a sound output device that outputs sound, or the like. An example of the display device is a display. An example of the light-emitting device is a light-emitting diode (LED). An example of the vibration device is an eccentric motor. An example of the sound output device is a speaker. The outputter 220 provides information for the user by outputting information input from the controller 260.

[0050] The detector 230 has a function of detecting information regarding the terminal device 200. The detector 230 may detect positional information regarding the terminal device 200. For example, the detector 230 receives a global navigation satellite system (GNSS) signal from a GNSS satellite (e.g., a global positioning system (GPS) signal from a GPS satellite) and detects positional information regarding a device including latitude and longitude. The detector 230 may detect movement of the terminal device 200. For example, the detector 230 includes a gyro sensor and an acceleration sensor and detects angular velocity and acceleration.

[0051] The communicator 240 is a communication interface for communicating information between the terminal device 200 and other devices. The communicator 240 performs communication in conformity with any wired or wireless communication standard. Such a communication standard may be, for example, universal serial bus (USB), Wi-Fi (registered trademark), Bluetooth (registered trademark), near-field communication (NFC), or a standard using a low-power wide-area network (LPWA).

[0052] The memory 250 stores various items of information. The memory 250 is achieved, for example, by a nonvolatile storage medium such as a flash memory.

[0053] The controller 260 functions as an arithmetic processing unit and a control circuit, and controls the overall operations of the terminal device 200 in accordance with various programs. The controller 260 is achieved by, for example, an electronic circuit such as a central processing unit (CPU) or a microprocessor. The controller 260 may also include a read-only memory (ROM) storing programs to be used, operation parameters, and the like and a random-access memory (RAM) that temporarily stores parameters which change as appropriate and the like. The terminal device 200 performs various types of processing under the control of the controller 260. Examples of the processing controlled by the controller 260 include the processing of information input using the inputter 210, the outputting of information from the outputter 220, the detection of information by the detector 230, the communication of information by the communicator 240, and the storing and the reading of information by the memory 250. The controller 260 also controls other types of processing performed by the terminal device 200 including inputting of information to each structural element, processing based on information output from each structural elements, and the like.

[0054] The functions of the controller 260 may be achieved using an application. The application may be preinstalled or downloaded. Alternatively, the functions of the controller 260 may be achieved by progressive web Apps (PWAs).

<2. Technical features>

(1) Heating profile

[0055] The controller 116 controls the operation of the heater 121 on the basis of a heating profile. The control of the operation of the heater 121 is achieved by controlling the supply of power from the power supply 111 to the heater 121. The heater 121 heats the stick substrate 150 using the power supplied from the power supply 111.

[0056] The heating profile is control information for controlling heating temperature of the aerosol source. The heating profile defines a parameter relating to the heating temperature of the aerosol source. An example of the heating temperature of the aerosol source is temperature of the heater 121. An example of the parameter relating to the heating temperature of the aerosol source is a target value of the temperature (hereinafter also referred to as a target temperature) of the heater 121. The temperature of the heater 121 may be controlled in such a way as to change in accordance with time elapsed since a start of heating. In this case, the heating profile includes information that defines temporal changes in the target temperature. In another example, the heating profile can include a parameter that defines a method for supplying power to the heater 121 (hereinafter referred to as a power supply parameter). The power supply parameter includes, for example, a voltage applied to the heater 121, on/off of the supply of power to the heater 121, a feedback control method to be employed, or the like. On/off of the supply of power to the heater 121 may be regarded as on/off of the heater 121.

[0057] The controller 116 controls the operation of the heater 121 such that the temperature (hereinafter also referred as an actual temperature) of the heater 121 changes in the same manner as the target temperature defined by the heating profile. The heating profile is typically designed in such a way as to optimize the flavor tasted by the user when the user inhales the aerosol generated from the stick substrate 150. By controlling the operation of the heater 121 on the basis of the heating profile, therefore, the flavor tasted by the user can be optimized.

[0058] The control of the temperature of the heater 121 can be achieved through, for example, known feedback control. The feedback control may be, for example, a proportional-integral-differential (PID) controller. The controller 116 can

supply the power from the power supply 111 to the heater 121 in a form of a pulse based on pulse width modulation (PWM) or pulse frequency modulation (PFM). In this case, the controller 116 can control the temperature of the heater 121 by adjusting a duty ratio of the power pulse or frequency in the feedback control. Alternatively, the controller 116 may perform simple on/off control in the feedback control. For example, the controller 116 may cause the heater 121 to produce heat until the actual temperature reaches the target temperature, stop producing heat when the actual temperature reaches the target temperature, and resume the heating when the actual temperature falls below the target temperature.

[0059] The temperature of the heater 121 can be quantified by, for example, measuring or estimating an electrical resistance of the heater 121 (more specifically, a heating resistor included in the heater 121). This is because the electrical resistance of the heating resistor changes in accordance with the temperature. The electrical resistance of the heating resistor can be estimated by measuring a decrease in voltage of the heating resistor. The decrease in the voltage of the heating resistor can be measured by a voltage sensor that measures a potential difference applied to the heating resistor. In another example, the temperature of the heater 121 can be measured by a temperature sensor, such as a thermistor, provided near the heater 121.

[0060] A period of time from a start to an end of a process for generating the aerosol using the stick substrate 150 will be referred to as a heating session hereinafter. In other words, the heating session is a period of time in which the supply of power to the heater 121 is controlled on the basis of the heating profile. The start of the heating session is a time when heating based on the heating profile starts. The end of the heating session is a time when a sufficient amount of aerosol is no longer generated. The heating session includes a preheating period in a first half and a puffable period in a second half. The puffable period is a period when a sufficient amount of aerosol is assumed to be generated. The preheating period is a period from a start of heating until the puffable period starts. Heating performed in the preheating period will also be referred to as preheating.

[0061] The notifier 113 may provide, for the user, information indicating a time when the preheating will end. For example, the notifier 113 provides information indicating an end of the preheating before the preheating ends and provides information indicating that the preheating has ended when the preheating has ended. The provision of information for the user can be performed, for example, through lighting of the LED, vibration, or the like. The user can puff immediately after the end of the preheating on the basis of the provision of information.

[0062] Similarly, the notifier 113 may provide, for the user, information indicating a time when the puffable period will end. For example, the notifier 113 provides information indicating an end of the puffable period before the puffable period ends and provides information indicating that the puffable period has ended when the puffable period has ended. The provision of information for the user can be performed, for example, through lighting of the LED, vibration, or the like. The user can puff until the puffable period ends on the basis of the provision of information.

[0063] An example of the heating profile will be described with reference to Fig. 4. Fig. 4 is a graph schematically illustrating an example of the heating profile. A horizontal axis of a graph 20A represents time (seconds). A vertical axis of the graph 20A represents the target temperature. A line 21A indicates temporal changes in the target temperature. As illustrated in Fig. 4, the target temperature may sharply increase to around 300°C after a start of heating, decrease to around 230°C, and then increase to around 260°C again. When the heating based on the heating profile is performed, the temperature of the heater 121 sharply increases to around 300°C after the start of the heating, decreases to around 230°C, and then increases to around 260°C again.

[0064] In the example illustrated in Fig. 4, the heating session is a duration of about 325 seconds after the start of the heating. In the heating session, the preheating period lasts 20 seconds after the start of the heating, and the puffable period starts 20 seconds after the start of the heating.

(2) Customization of heating profile

[0065] The controller 260 changes a heating profile used by the inhaler device 100 in accordance with evaluations input for an aerosol generated using the heating profile. The evaluations that can be input include an appropriate evaluation, which indicates that a smoke taste is appropriate, and an inappropriate evaluation, which indicates that a smoke taste is inappropriate. The inappropriate evaluation that can be input may be a weak evaluation, which indicates that a smoke taste is weak, or a strong evaluation, which indicates that a smoke taste is strong. In an example, the controller 260 need not change the heating profile if the appropriate evaluation is input. In another example, the controller 260 may increase the target temperature if the weak evaluation is input. In this case, the smoke taste can be made stronger. In another example, the controller 260 may decrease the target temperature if the strong evaluation is input. In this case, the smoke taste can be made weaker. With this configuration, the user can automatically generate a heating profile for delivering a desired smoke taste just by evaluating the smoke taste without directly specifying the target temperature.

[0066] The inputter 210 receives an input of an evaluation at each of at least one of a plurality of times included in a heating session. An example of a time at which the inputter 210 receives an input of an evaluation is a time of a puff (hereinafter also referred to as a puff time). For example, the user inputs an evaluation in accordance with a smoke taste each time the user puffs. With this configuration, each time a puff time comes, that is, each time the user puffs, the user can

customize the heating profile for delivering a desired smoke taste just by evaluating a smoke taste.

[0067] In an example, the outputter 220 may display a screen for requesting the user to input an evaluation of a smoke taste each time a puff time comes in a heating session. The user may then input an evaluation to the inputter 210 in accordance with the request. With this configuration, the user can intuitively customize a heating profile while puffing.

[0068] The puff times may be defined in advance. In this case, each time a puff time comes, the outputter 220 may output a screen for urging the user to puff. Alternatively, the puff times need not be defined in advance. In this case, each time the inhaler device 100 detects a puff by the user, the outputter 220 may display a screen for requesting the user to input an evaluation of a smoke taste.

[0069] The controller 260 may sequentially change, in chronological order, target temperatures at one or more puff times at which inappropriate evaluations have been input. A change in the target temperature at a certain puff time can affect not only a smoke taste at the puff time but also smoke tastes at later puff times. This is because the remaining amount of the aerosol source and the temperature of the heater 121 can change at the later puff times. By sequentially changing target temperatures at different puff times in chronological order, therefore, a heating profile can be efficiently customized by preventing rework.

- Change of target temperatures in units of puff times

[0070] The controller 260 may change target temperatures in units of puff times. In this case, the controller 260 selects puff times at which inappropriate evaluations have been input as puff times for which target temperatures are to be changed. The controller 260 then performs, for each of the puff times for which target temperatures are to be changed, a first process including a change of a target temperature until an appropriate evaluation is input. The controller 260, however, repeats, in chronological order, the first process for the one or more puff times at which the inappropriate evaluations have been input while switching a puff time for which a target temperature is to be changed. When the first process has been performed for all the puff times at which the inappropriate evaluations have been input, appropriate evaluations are input at all the puff times included in the heating session. As a result, a heating profile capable of delivering appropriate smoke tastes to the user at all puff times can be generated.

[0071] The first process includes repetition of a change of a target temperature for a puff time for which the target temperature is to be changed based on the inappropriate evaluations, control of the inhaler device 100 for generating an aerosol on the basis of a heating profile after the change, and reception of an input of an evaluation of an aerosol generated using the heating profile after the change until an appropriate evaluation is input at the puff time. That is, a change of a target temperature for a puff time for which the target temperature is to be changed, heating based on a heating profile after the change, and inputting of an evaluation are repeated until an appropriate evaluation is input at the puff time for which the target temperature is to be changed. With this configuration, a heating profile can be customized by trial and error in units of puff times in such a way as to deliver desired smoke tastes.

[0072] When changing, on the basis of an inappropriate evaluation, a target temperature at a puff time for which the target temperature is to be changed, the controller 260 may increase the target temperature at the puff time if the evaluation at the puff time is the weak evaluation. In addition, when changing, on the basis of an inappropriate evaluation, a target temperature at a puff time for which the target temperature is to be changed, the controller 260 may decrease the target temperature at the puff time if the evaluation at the puff time is the strong evaluation.

[0073] In addition, when controlling the inhaler device 100 such that the inhaler device 100 generates the aerosol on the basis of a heating profile after a change, the controller 260 may control the communicator 240 such that the communicator 240 transmits information indicating the heating profile after the change to the inhaler device 100. The information indicating the heating profile after the change may be the heating profile after the change or information indicating a difference in the heating profile before and after the change. As a result, the inhaler device 100 can perform next and later heating on the basis of the heating profile after the change.

[0074] In addition, when receiving an input of an evaluation of an aerosol generated using a heating profile after a change, the controller 260 may control the outputter 220 such that the outputter 220 outputs information for urging the user to replace the stick substrate 150 and perform heating. Furthermore, after the heating based on the heating profile after the change is performed, the controller 260 may control, each time a puff time comes, the outputter 220 such that the outputter 220 outputs information for urging the user to puff and input an evaluation.

[0075] A specific example where the heating profile illustrated in Fig. 4 is customized in units of puff times will be described hereinafter with reference to Fig. 5.

[0076] Fig. 5 is a graph schematically illustrating an example of the customization of the heating profile. A horizontal axis of a graph 20B represents time (seconds). A vertical axis of the graph 20B represents the target temperature. The line 21A indicates the temporal changes in the target temperature before the customization. A line 21B indicates temporal changes in the target temperature after the customization.

[0077] In the example illustrated in Fig. 5, a total of nine puff times are defined in advance. Each time a predefined puff time comes while the inhaler device 100 is performing the heating based on the heating profile indicated by the line 21A, the

terminal device 200 urges the user to puff, and receives an input of an evaluation of a smoke taste. In the figure, "OK" indicates the appropriate evaluation, "W" indicates the appropriate evaluation, and "S" indicates the strong evaluation. In the example illustrated in Fig. 5, weak evaluations have been input at first, second, seventh, eighth, and nineth puff times, strong evaluations have been input at fourth and fifth puff times, and appropriate evaluations have been input at third and sixth puff times.

[0078] The controller 260, therefore, selects the first puff time, which is the earliest puff time for which the weak or strong evaluation has been input, as a puff time for which a target temperature is to be changed. Since the weak evaluation is input at the first puff time, the controller 260 increases the target temperature at the first puff time as indicated by the line 21B in Fig. 5. As a result, the smoke taste can be made stronger at the first puff time. As a result of this customization, an appropriate evaluation is expected to be input at the first puff time in next heating.

- Change of target temperatures in units of groups

[0079] The controller 260 may change target temperatures in units of groups. In this case, the controller 260 classifies a plurality of puff times included in a heating session into a plurality of groups (hereinafter referred to as puff groups) each including one or more puff times. Next, the controller 260 selects puff groups including puff times at which inappropriate evaluations have been input as puff groups for which target temperatures are to be changed. The controller 260 then performs a second process including a change of target temperatures until appropriate evaluations are input at all puff times included in a puff group for which the target temperatures are to be changed. The controller 260, however, repeats, in chronological order, the second process for the one or more puff groups including puff times at which inappropriate evaluations have been input while switching a puff group for which target temperatures are to be changed. When the second process has been performed for all the puff groups for which the inappropriate evaluations have been input, appropriate evaluations are input for all the puff groups included in the heating session. As a result, a heating profile capable of delivering appropriate smoke tastes to the user at all puff times can be generated.

[0080] The second process includes repetition of a change, based on the inappropriate evaluations, of a target temperature for each of one or more puff times included in a puff group for which the target temperatures are to be changed and reception of an input of an evaluation of an aerosol generated using the heating profile after the change until appropriate evaluations are input at all the puff times included in the puff group. That is, a change of a target temperature for a puff group for which target temperatures are to be changed, heating based on a heating profile after the change, and inputting of an evaluation are repeated until appropriate evaluations are input at all puff times included in the puff group for which the target temperatures are to be changed. With this configuration, a heating profile can be customized by trial and error in units of puff groups in such a way as to deliver desired smoke tastes.

[0081] The change, in accordance with inappropriate evaluations, of target temperatures at one or more puff times included in a puff group for which the target temperatures are to be changed may include a change, based on a statistical value of the evaluations at the one or more puff times included in the puff group for which the target temperatures are to be changed, of the target temperatures at the one or more puff times included in the puff group for which the target temperatures are to be changed. That is, the controller 260 may uniformly apply the change of the target temperatures based on the statistical value of the evaluations for the puff group for which the target temperatures are to be changed to all puff times included in the puff group. A median, an average, or the like may be employed as the statistical value. When a puff group for which target temperatures are to be changed includes many puff times for which weak evaluations have been input, for example, the target temperatures can be uniformly increased at all puff times included in the puff group. With this configuration, target temperatures at more puff times can be changed at once than when target temperatures are changed in units of puff times. A heating profile, therefore, can be efficiently customized.

[0082] The change, in accordance with inappropriate evaluations, of target temperatures at one or more puff times included in a puff group for which the target temperatures are to be changed may include a change, based on a relative relationship between the evaluations at the one or more puff times included in the puff group for which the target temperatures are to be changed, of the target temperatures at the one or more puff times included in the puff group. That is, the controller 260 may individually adjust, on the basis of the relative relationship between the evaluations for the puff group for which the target temperatures are to be changed, the target temperature at each of the puff times included in the puff group. For example, there is a case where a puff group for which target temperatures are to be changed includes a puff time at which a weak evaluation has been input and a puff time at which a strong evaluation has been input. In this case, the controller 260 may increase a target temperature at the puff time at which the weak evaluation has been input and decrease a target temperature at the puff time at which the strong evaluation has been input while applying the above-described uniform change based on a statistical value. With this configuration, customization that better suits evaluations input by the user can be performed than when target temperatures are uniformly changed on the basis of a statistical value of evaluations in a puff group.

[0083] Various methods for classifying puff times into puff groups are conceivable.

[0084] In an example, the controller 260 may classify a plurality of puff times included in a heating session into a plurality

of puff groups on the basis of the number of puff times belonging to each puff group. More specifically, the controller 260 may classify puff times into puff groups while including a certain number of puff times in each puff group.

[0085] In another example, the controller 260 may classify a plurality of puff times included in a heating session into a plurality of puff groups on the basis of temporal changes in the target temperature. More specifically, the controller 260 may generate a puff group for puff times included in a period of time for which similar trends in temporal changes in the target temperature are observed, such as an increase in, maintenance of, or a decrease in the target temperature. In other words, the controller 260 may divide a plurality of puff times included in a heating session at positions where a trend in temporal changes in the target temperature changes. With this configuration, target temperatures at puff times included in a period of time for which similar temporal changes in the target temperature are observed can be collectively changed, a heating profile can be customized more efficiently.

[0086] In another example, the controller 260 may classify a plurality of puff times included in a heating session into a plurality of puff groups on the basis of temporal changes in the evaluation. More specifically, the controller 260 may generate a puff group for a plurality of puff times at which temporally successive evaluations are similar to one another, such as an input of successive weak evaluations or an input of successive strong evaluations. In other words, the controller 260 may divide a plurality of puff times included in a heating session at positions where a trend in temporal changes in the evaluation changes. With this configuration, since target temperatures at puff times at which similar evaluations have been input can be collectively changed, a heating profile can be customized more efficiently.

[0087] A specific example where the heating profile illustrated in Fig. 4 is customized in units of puff groups will be described hereinafter with reference to Fig. 6.

[0088] Fig. 6 is a graph schematically illustrating another example of the customization of the heating profile. A horizontal axis of a graph 20C represents time (seconds), and a vertical axis of the graph 20C represents the target temperature. The line 21A indicates the temporal changes in the targe temperature before the customization. A line 21C indicates temporal changes in the target temperature after the customization.

[0089] In the example illustrated in Fig. 6, a total of nine puff times are defined in advance. The total of nine puff times are classified into three puff groups each including three puff times. Each time a predefined puff time comes while the inhaler device 100 is performing the heating based on the heating profile indicated by the line 21A, the terminal device 200 urges the user to puff and receives an input of an evaluation of a smoke taste. In the example illustrated in Fig. 6, weak evaluations have been input at first, second, seventh, eighth, and nineth puff times, strong evaluations have been input at fourth and fifth puff times, and appropriate evaluations have been input at third and sixth puff times.

[0090] The controller 260, therefore, selects a first puff group, which is the earliest puff group including a puff time at which a weak or strong evaluation has been input, as a puff group for which target temperatures are to be changed. In the first puff group, weak evaluations have been input at first and second puff times, and an appropriate evaluation has been input at a third puff time. The controller 260, therefore, uniformly increases target temperatures at the first to third puff times on the basis of a weak evaluation, which is a median. In addition, the controller 260 further increases the target temperatures at the first and second puff times on the basis of relative evaluations within the puff group. As a result, the controller 260 greatly increases the target temperatures at the first and second puff times and slightly increases the target temperature at the third puff time as indicated by the line 21C in Fig. 6. As a result, smoke tastes in the first puff group can be generally made stronger while smoke tastes at the puff times at which the weak evaluations have been input can be made even stronger. As a result of this customization, appropriate evaluations are expected to be input for the first puff group in next heating.

- Change of Later Target Temperature Based on Change of Earlier Target Temperature

[0091] The controller 260 may change, on the basis of a change of a target temperature at, among a plurality of puff times included in a heating session, a first puff time, a target temperature at a second puff time later than the first puff time, for which a target temperature has been changed. In an example, the controller 260 may apply the same change as that of the target temperature at the first puff time to the target temperature at the second puff time. A relationship between the change of the target temperature at the first puff time and the change of the target temperature at the second puff time is desirably learned as necessary and defined as a function or the like. With this configuration, a target temperature at a later puff time can be automatically changed in consideration of an effect of a change in a target temperature at an earlier puff time. As a result, a heating profile can be customized more efficiently.

[0092] A change of a target temperature at a later puff time based on a change of a target temperature at an earlier puff time can be applied to not only customization in units of puff times but also customization in units of puff groups. That is, the controller 260 may change target temperatures in a second puff group, which is later than a first puff group, for which target temperatures have been changed, in accordance with the change of the target temperatures for the first puff group among a plurality of puff times included in a heating session.

[0093] A specific example where, in the heating profile illustrated in Fig. 4, target temperatures in a later puff group are changed on the basis of a change of target temperatures in an earlier puff group will be described hereinafter with reference

to Fig. 7.

[0094] Fig. 7 is a graph schematically illustrating another example of the customization of the heating profile. A horizontal axis of a graph 20D represents time (seconds). A vertical axis of a graph 20D represents the targe temperature. The line 21A indicates the temporal changes in the target temperature before the customization. A line 21D indicates temporal changes in the target temperature after the customization.

[0095] In the example illustrated in Fig. 7, a total of nine puff times are defined in advance. Each time a predefined puff time comes while the inhaler device 100 is performing the heating based on the heating profile indicated by the line 21A, the terminal device 200 urges the user to puff and receives an input of an evaluation of a smoke taste. In the example illustrated in Fig. 6, weak evaluations have been input at first, second, seventh, eighth, and nineth puff times, strong evaluations have been input at fourth and fifth puff times, and appropriate evaluations have been input at third and sixth puff times.

[0096] The nine puff times are classified into three puff groups on the basis of temporal changes in the evaluation. That is, a first puff group includes the first and second puff times, at which the weak evaluations have been input. A second puff group includes third to fifth puff times, at which the appropriate evaluation and the strong evaluations have been input. A third puff group includes sixth to ninth puff times, at which the appropriate evaluation and the weak evaluations have been input. The following Table 1 shows an example of a method for calculating a change of a target temperature in the example illustrated in Fig. 7. The change of a target temperature will be described hereinafter with reference to Fig. 7 and Table 1.

[Table 1]

Table 1. Example of method for calculating change of target temperature

Puff group	Evaluation	Amount of change based on evaluation	Amount of change in previous puff group	Change to be applied
1	Weak evaluation	+10°C	-	+10°C
2	Appropriate evaluation - Strong evaluation	-10°C	+10°C	0
3	Appropriate evaluation - Weak evaluation	+10°C	0°C	+10°C

[0097] The controller 260 selects the first puff group, which is the earliest puff group including a puff time at which a weak or strong evaluation has been input, as a puff group for which target temperatures are to be changed. In the first puff group, weak evaluations have been input at the first and second puff times. The amount of change in the target temperature based on the evaluations for the first puff group, therefore, is +10°C. The controller 260, therefore, uniformly increases the target temperatures at the puff times belonging to the first puff group by 10°C as indicated by Table 1 and the line 21D in Fig. 7.

[0098] In the second puff group, strong evaluations have been input at the fourth and fifth puff times. The amount of change in the target temperature based on the evaluations for the second puff group, therefore, is -10°C. The amount of change in the target temperature in the first puff group, which is a previous puff group, on the other hand, is +10°C. The sum of the amount of change in the target temperature based on the evaluations for the second puff group and the amount of change in the target temperature based on the evaluations for the previous first puff group is 0°C. The controller 260, therefore, does not change the target temperatures at the puff times belonging to the second puff group as indicated by Table 1 and the line 21D in Fig. 7.

[0099] In the third puff group, weak evaluations have been input at the seventh to ninth puff times. The amount of change in the target temperature based on the evaluations for the third puff group, therefore, is +10°C. The amount of change in the target temperature for the second puff group, which is a previous puff group, on the other hand, is 0°C. The sum of the amount of change in the target temperature based on the evaluations for the third puff group and the amount of change in the target temperature based on the evaluations for the previous second puff group is +10°C. The controller 260, therefore, uniformly increases the target temperatures at the puff times belonging to the third puff group by 10°C as indicated by Table 1 and the line 21D in Fig. 7.

[0100] As a result of this customization, appropriate evaluations are expected to be input for the first puff group in next heating. Furthermore, appropriate evaluations are expected to be input for the second and third puff groups, too.

- Limitation on customization

[0101] The controller 260 may change a target temperature within a limited range. That is, a range of settable target temperatures may be limited. The controller 260 may then set a target temperature within the range of settable target temperatures. The range of settable target temperatures may change in accordance with time elapsed since a start of heating. For example, the range of settable target temperatures may be different between the preheating period and the puffable period. In an example, the range of settable target temperatures in the preheating period may be limited to a range

of a lowest temperature at which an aerosol can be generated to a highest temperature tolerated in terms of heat resistance of the inhaler device 100. The range of settable target temperatures in the puffable period may be limited to a range within which an aerosol can be appropriately generated. With this configuration, an event where quality of user experience deteriorates due to inappropriate target temperatures can be prevented.

[0102] The controller 260 may change target temperatures in a limited period of time in a heating session. That is, a period of time when target temperatures can be changed may be limited. The controller 260 may then change target temperatures in the period of time when target temperatures can be changed. The period of time when target temperatures can be changed may be limited to, for example, at least a part of the puffable period. With this configuration, an event where quality of user experience deteriorates due to target temperatures changed at inappropriate times can be prevented.

- Change of length of heating session

[0103] The controller 260 may change length of a heating session in accordance with a change of a target temperature. In an example, the controller 260 may reduce the length of a heating session when a target temperature has been increased. This is because the aerosol source runs out faster as the target temperature increases. In another example, the controller 260 may increase the length of a heating session when a target temperature has been decreased. This is because the aerosol source runs out more slowly as the target temperature decreases. The length of a heating session may be determined on the basis of a function, a parameter map, or the like defined by target temperatures, time, energy consumed by the heater 121, and the like. With this configuration, the aerosol source included in the stick substrate 150 can be consumed properly.

[0104] The controller 260 may change puff times in accordance with a change in the length of a heating session. In an example, the controller 260 may set puff times by dividing the puffable period by the number of puff times defined in advance. In another example, the controller 260 may increase the number of puff times as the length of a heating session increases, and decrease the number of puff times as the length of a heating session decreases.

- Procedure of process

[0105] A procedure of a process for customizing a heating profile according to the present embodiment will be described hereinafter with reference to Fig. 8. Fig. 8 is a flowchart illustrating an example of a procedure of a process for customizing a heating profile performed by the terminal device 200 according to the present embodiment.

[0106] As illustrated in Fig. 8, first, the inputter 210 receives a request to start customization of a heating profile (step S102).

[0107] Next, the controller 260 controls the outputter 220 such that the outputter 220 provides a notification for urging the user to insert the stick substrate 150 and start heating (step S104). For example, the outputter 220 may display a screen for urging the user to insert (replace, at a second time or later) the stick substrate 150 and start heating.

[0108] Next, the controller 260 detects a start of heating based on a heating profile (step S106). For example, the inhaler device 100 may transmit information indicating that heating has started to the terminal device 200 when the heating based on the heating profile has started. Upon receiving the information, the controller 260 can detect the start of the heating based on the heating profile.

[0109] Next, the controller 260 determines whether a puff time has come (step S108). In an example, the controller 260 determines, on the basis of time elapsed since the start of the heating, whether a predefined puff time has come.

[0110] If the controller 260 determines that a puff time has not come (NO in step S108), the process proceeds to step S114.

[0111] If determining that a puff time has come (YES in step S108), the controller 260 controls the outputter 220 such that the outputter 220 provides a notification for urging the user to puff (step S110). For example, the outputter 220 may display a screen for urging the user to puff.

[0112] Next, the inputter 210 receives an input of an evaluation of a smoke taste (step S112). For example, the outputter 220 displays an input screen for receiving an input of an appropriate evaluation, a weak evaluation, or a strong evaluation. The inputter 210 then receives an input to the input screen. The process then proceeds to step S114.

[0113] In step S114, the controller 260 determines whether the heating session has ended (step S114). For example, the inhaler device 100 may transmit information indicating that the heating session has ended to the terminal device 200 when the heating based on the heating profile has ended. Upon receiving the information, the controller 260 can detect the end of the heating session.

[0114] If the controller 260 determines that the heating session has not ended (NO in step S114), the process returns to step S108.

[0115] If determining that the heating session has ended (YES in step S114), on the other hand, the controller 260 determines whether appropriate evaluations have been input at all puff times included in the heating session (step S116).

[0116] If determining that there is a puff time at which an inappropriate evaluation has been input (NO in step S116), the

controller 260 changes the heating profile on the basis of evaluations input during the heating session (step S118). For example, the controller 260 selects the earliest puff time at which an inappropriate evaluation has been input as a puff time for which a target temperature is to be changed, and changes the target temperature at the puff time on the basis of an input evaluation.

[0117] Next, the controller 260 controls the communicator 115 such that the communicator 115 transmits the heating profile after the change to the inhaler device 100 (step S120). As a result, the inhaler device 100 can perform heating based on the heating profile after the change in next and later heating.

[0118] If the controller 260 determines that appropriate evaluations have been input at all the puff times included in the heating session (YES in step S116), the process ends. In this case, the inhaler device 100 can deliver appropriate smoke tastes to the user at all the puff times in next and later heating.

<3. Supplementary information>

[0119] Although a preferred embodiment of the present invention has been described in detail with reference to the accompanying drawings, the present invention is not limited to this example. It is clear that those who have ordinary knowledge in a technical field to which the present invention pertains can conceive various examples of alterations or modifications within the scope of the technical idea described in the claims, and it is understood that these also naturally belong to the technical scope of the present invention.

[0120] The change of target temperatures in units of puff times, the change of target temperatures in units of puff groups, and the change of a later target temperature based on a change of an earlier target temperature described in the above embodiment may be combined together as appropriate. For example, the change of target temperatures in units of puff groups and the change of a later target temperature based on a change of an earlier target temperature may be performed at an initial stage of customization, and the change of target temperatures in units of puff times may be performed after some customization has been done.

[0121] Although an example where the heater 121 is implemented as a heating resistor and produces heat using electrical resistance has been described in the above embodiment, the present invention is not limited to this example. For example, the heater 121 may include an electromagnetic induction source that generates a magnetic field, such as a coil, and a susceptor that produces heat through induction heating, and the susceptor may heat the stick substrate 150, instead. In this case, the controller 116 applies an alternating current to the electromagnetic induction source to generate an alternating magnetic field, and heats the susceptor by applying the alternating magnetic field to the susceptor. In this case, the heating temperature of the aerosol source, which is controlled on the basis of a heating profile, is temperature of the susceptor. The temperature of the susceptor can be estimated on the basis of an electrical resistance of the electromagnetic induction source.

[0122] Although an example where the parameter relating to the heating temperature of the aerosol source defined in a heating profile is the target temperature of the heater 121 has been described in the above embodiment, the present invention is not limited to this example. The parameter relating to the heating temperature of the aerosol source may be the electrical resistance of the heater 121, instead of the temperature of the heater 121 described in the above embodiment. When the inhaler device 100 includes an electromagnetic induction source instead of the heater 121, the parameter relating to the heating temperature of the aerosol source defined in a heating profile may be target values of the temperature of the susceptor or the electrical resistance of the electromagnetic induction source.

[0123] Although an example where the inhaler device 100 heats the stick substrate 150 to generate an aerosol has been described in the above embodiment, the present invention is not limited to this example. The inhaler device 100 may be an aerosol generation device of a so-called liquid atomization type, which generates an aerosol by heating and atomizing an aerosol source as a liquid, instead. The present invention can be applied to aerosol generation devices of the liquid atomization type.

[0124] Each device described herein may be achieved as an independent device, or part or the entirety thereof may be achieved as separate devices. For example, the controller 260 of the terminal device 200 may be included in an apparatus, such as a server, connected to the terminal device 200 over a network or the like. That is, the customization of a heating profile may be performed by a cloud server on the basis of a user operation input to the terminal device 200.

[0125] It is to be noted that the process by each device described herein may be achieved by software, hardware, or a combination of software and hardware. A program constituting software is stored in advance, for example, in a storage medium (more specifically, a non-transitory computer-readable storage medium) provided inside or outside each device. When executed by a computer that controls each device described herein, for example, each program is loaded into a RAM and executed by a processing circuit such as CPU. The storage medium is, for example, a magnetic disk, an optical disc, a magneto-optical disk, a flash memory, or the like. In addition, the computer program may be distributed over a network, instead, without using a storage medium. In addition, the computer may be an integrated circuit for a specific application such as an ASIC, a general-purpose processor that executes a function by reading a software program, a computer on a server used for cloud computing, or the like. In addition, the process by each device described herein may be performed by

a plurality of computers in a distributed manner.

[0126] In addition, the process described herein with reference to the flowchart and the sequence diagram need not necessarily be performed in the illustrated order. Some processing steps may be performed in parallel with each other, instead. Additional processing steps may also be employed, or some processing steps may be omitted.

[0127] The following configurations also belong to the technical scope of the present invention.

(1) An information processing device including:
a controller that changes control information, which is used by an aerosol generation device that generates an aerosol by heating an aerosol source included in a substrate and which defines temporal changes in a parameter relating to heating temperature of the aerosol source, in accordance with an evaluation input for the aerosol generated using the control information.

(2) The information processing device according to (1), further including:
an inputter that receives an input of the evaluation at one or more of a plurality of times included in a period of time when the aerosol is generated using the control information.

(3) The information processing device according to (2),
in which the controller sequentially changes the parameter in chronological order for the one or more times at which inappropriate evaluations have been input.

(4) The information processing device according to (3),
in which the controller selects the one or more times at which the inappropriate evaluations have been input as times for which the parameter is to be changed and repeats a first process, which includes a change of the parameter until appropriate evaluations are input at the times for which the parameter is to be changed, while switching, in chronological order, a time for which the parameter is to be changed between the one or more times at which the inappropriate evaluations have been input.

(5) The information processing device according to (4),
in which the first process includes repetition of a change, based on the inappropriate evaluations, of the parameter for the time for which the parameter is to be changed, control of the aerosol generation device for generating the aerosol on a basis of the control information after the change, and reception of an input of an evaluation of the aerosol generated using the control information after the change until an appropriate evaluation is input at the time for which the parameter is to be changed.

(6) The information processing device according to (3),
in which the controller classifies a plurality of times included in a period of time when the aerosol is generated using the control information into a plurality of groups each including one or more of the plurality of times, selects one or more groups including the one or more times at which the inappropriate evaluations have been input as groups for which the parameter is to be changed, and repeats a second process, which includes a change of the parameter at the one or more times included in the groups for which the parameter is to be changed until appropriate evaluations are input at all the times, while switching, in chronological order, a group for which the parameter is to be changed between the one or more groups including the times at which the inappropriate evaluations have been input.

(7) The information processing device according to (6),
in which the second process includes repetition of a change, in accordance with the inappropriate evaluations, of the parameter at the one or more times included in the group for which the parameter is to be changed, control of the aerosol generation device for generating the aerosol on a basis of the control information after the change, and reception of an input of an evaluation of the aerosol generated using the control information after the change until appropriate evaluations are input at all the times included in the group for which the parameter is to be changed.

(8) The information processing device according to (7),
in which the change, in accordance with the inappropriate evaluations, of the parameter at the one or more times included in the group for which the parameter is to be changed includes a change, based on a statistical value of the evaluations at the one or more times included in the group for which the parameter is to be changed, of the parameter at the one or more times included in the group for which the parameter is to be changed.

(9) The information processing device according to (7) or (8),
in which the change, in accordance with the inappropriate evaluations, of the parameter at the one or more times included in the group for which the parameter is to be changed includes a change, based on a relative relationship between the evaluations at the one or more times included in the group for which the parameter is to be changed, of the parameter at the one or more times included in the group for which the parameter is to be changed.

(10) The information processing device according to any of (6) to (9),
in which the controller classifies, on a basis of a number of times belonging to the group, the plurality of times included in the period of time when the aerosol is generated using the control information into the plurality of groups.

(11) The information processing device according to any of (6) to (9),
in which the controller classifies, on a basis of temporal changes in the parameter or temporal changes in the

evaluation, the plurality of times included in the period of time when the aerosol is generated using the control information into the plurality of groups.

(12) The information processing device according to any of (2) to (11),

in which the controller changes the parameter at, among the plurality of times included in the period of time when the aerosol is generated using the control information, a second time, which is later than a first time, for which the parameter has been changed, in accordance with the change of the parameter at the first time.

(13) The information processing device according to any of (1) to (12),

in which the controller changes the parameter within a limited range.

(14) The information processing device according to any of (1) to (13),

in which the controller changes the parameter in a limited period of time in the period of time when the aerosol is generated using the control information.

(15) The information processing device according to any of (1) to (14),

in which the controller changes, in accordance with the change of the parameter, length of the period of time when the aerosol is generated using the control information.

(16) An information processing method including:

changing control information, which is used by an aerosol generation device that generates an aerosol by heating an aerosol source included in a substrate and which defines temporal changes in a parameter relating to heating temperature of the aerosol source, in accordance with an evaluation input for the aerosol generated using the control information.

(17) A program for causing a computer to function as:

a controller that changes control information, which is used by an aerosol generation device that generates an aerosol by heating an aerosol source included in a substrate and which defines temporal changes in a parameter relating to heating temperature of the aerosol source, in accordance with an evaluation input for the aerosol generated using the control information. Reference Signs List

[0128]

1 system

100 inhaler device

111 power supply

112 sensor

113 notifier

114 memory

115 communicator

116 controller

121 heater

140 container

141 internal space

142 opening

143 bottom

144 heat insulator

150 stick substrate

151 substrate

152 inhalation port

200 terminal device

210 inputter

220 outputter

230 detector

240 communicator

250 memory

260 controller

Claims

1. An information processing device comprising:
a controller that changes control information, which is used by an aerosol generation device that generates an aerosol by heating an aerosol source included in a substrate and which defines temporal changes in a parameter relating to heating temperature of the aerosol source, in accordance with an evaluation input for the aerosol generated using the control information.

2. The information processing device according to claim 1, further comprising:
an inputter that receives an input of the evaluation at one or more of a plurality of times included in a period of time when the aerosol is generated using the control information.

3. The information processing device according to claim 2,
wherein the controller sequentially changes the parameter in chronological order for the one or more times at which inappropriate evaluations have been input.

4. The information processing device according to claim 3,
wherein the controller selects the one or more times at which the inappropriate evaluations have been input as times for which the parameter is to be changed and repeats a first process, which includes a change of the parameter until appropriate evaluations are input at the times for which the parameter is to be changed, while switching, in chronological order, a time for which the parameter is to be changed between the one or more times at which the inappropriate evaluations have been input.

5. The information processing device according to claim 4,
wherein the first process includes repetition of a change, based on the inappropriate evaluations, of the parameter for the time for which the parameter is to be changed, control of the aerosol generation device for generating the aerosol on a basis of the control information after the change, and reception of an input of an evaluation of the aerosol generated using the control information after the change until an appropriate evaluation is input at the time for which the parameter is to be changed.

6. The information processing device according to claim 3,
wherein the controller classifies a plurality of times included in a period of time when the aerosol is generated using the control information into a plurality of groups each including one or more of the plurality of times, selects one or more groups including the one or more times at which the inappropriate evaluations have been input as groups for which the parameter is to be changed, and repeats a second process, which includes a change of the parameter at the one or more times included in the groups for which the parameter is to be changed until appropriate evaluations are input at all the times, while switching, in chronological order, a group for which the parameter is to be changed between the one or more groups including the times at which the inappropriate evaluations have been input.

7. The information processing device according to claim 6,
wherein the second process includes repetition of a change, in accordance with the inappropriate evaluations, of the parameter at the one or more times included in the group for which the parameter is to be changed, control of the

aerosol generation device for generating the aerosol on a basis of the control information after the change, and reception of an input of an evaluation of the aerosol generated using the control information after the change until appropriate evaluations are input at all the times included in the group for which the parameter is to be changed.

8. The information processing device according to claim 7,
wherein the change, in accordance with the inappropriate evaluations, of the parameter at the one or more times included in the group for which the parameter is to be changed includes a change, based on a statistical value of the evaluations at the one or more times included in the group for which the parameter is to be changed, of the parameter at the one or more times included in the group for which the parameter is to be changed.

9. The information processing device according to claim 7 or 8,
wherein the change, in accordance with the inappropriate evaluations, of the parameter at the one or more times included in the group for which the parameter is to be changed includes a change, based on a relative relationship between the evaluations at the one or more times included in the group for which the parameter is to be changed, of the parameter at the one or more times included in the group for which the parameter is to be changed.

10. The information processing device according to any of claims 6 to 9,
wherein the controller classifies, on a basis of a number of times belonging to the group, the plurality of times included in the period of time when the aerosol is generated using the control information into the plurality of groups.

11. The information processing device according to any of claims 6 to 9,
wherein the controller classifies, on a basis of temporal changes in the parameter or temporal changes in the evaluation, the plurality of times included in the period of time when the aerosol is generated using the control information into the plurality of groups.

12. The information processing device according to any of claims 2 to 11,
wherein the controller changes the parameter at, among the plurality of times included in the period of time when the aerosol is generated using the control information, a second time, which is later than a first time, for which the parameter has been changed, in accordance with the change of the parameter at the first time.

13. The information processing device according to any of claims 1 to 12,
wherein the controller changes the parameter within a limited range.

14. The information processing device according to any of claims 1 to 13,
wherein the controller changes the parameter in a limited period of time in the period of time when the aerosol is generated using the control information.

15. The information processing device according to any of claims 1 to 14,
wherein the controller changes, in accordance with the change of the parameter, length of the period of time when the aerosol is generated using the control information.

16. An information processing method comprising:
changing control information, which is used by an aerosol generation device that generates an aerosol by heating an aerosol source included in a substrate and which defines temporal changes in a parameter relating to heating temperature of the aerosol source, in accordance with an evaluation input for the aerosol generated using the control information.

17. A program for causing a computer to function as:
a controller that changes control information, which is used by an aerosol generation device that generates an aerosol by heating an aerosol source included in a substrate and which defines temporal changes in a parameter relating to heating temperature of the aerosol source, in accordance with an evaluation input for the aerosol generated using the control information.

FIG. 1

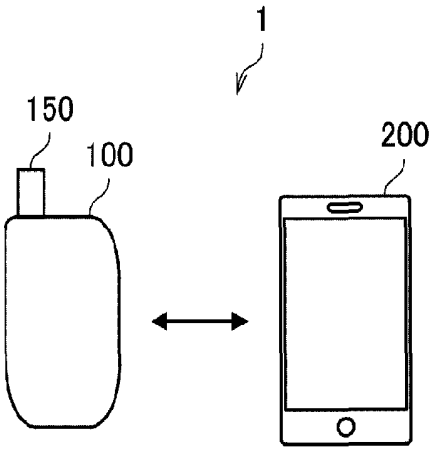

1
150
100
200

FIG. 2

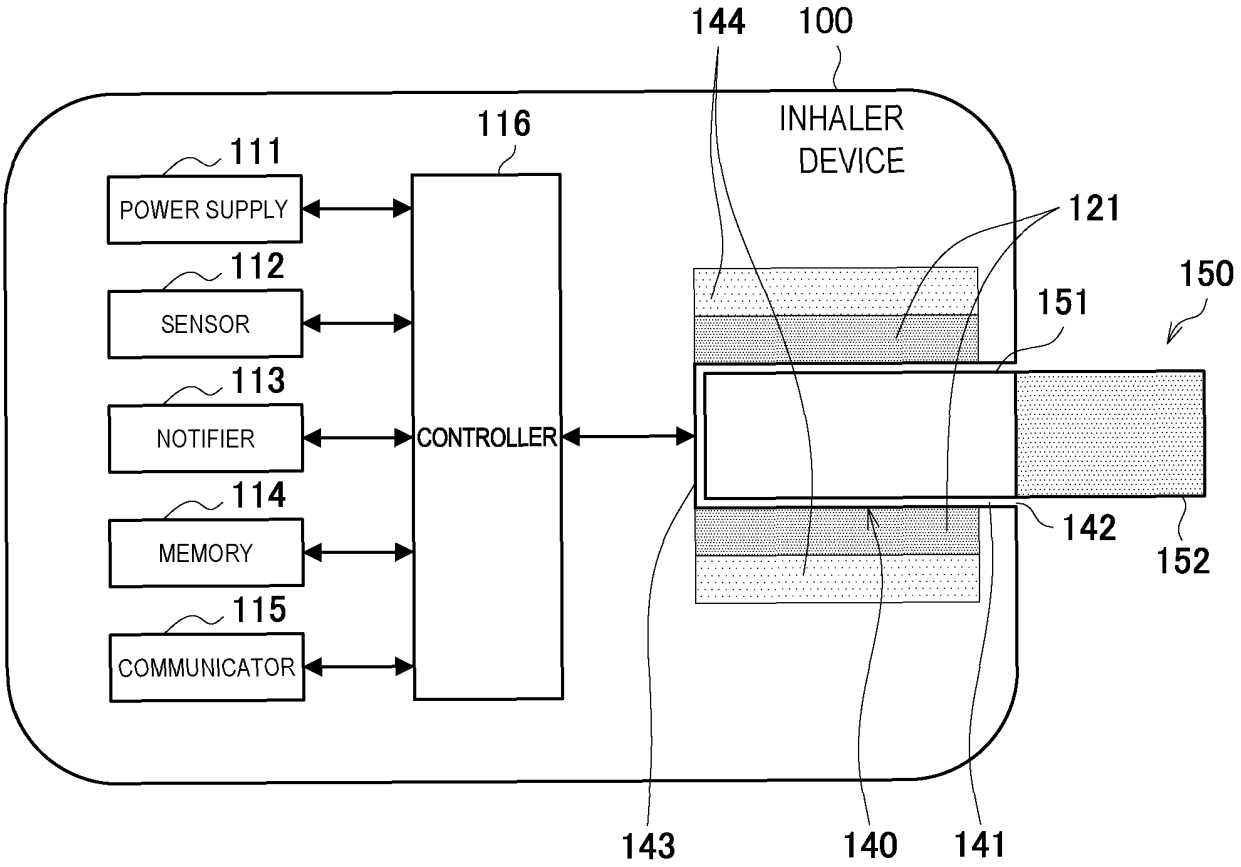

144
100
INHALER DEVICE
116
111
POWER SUPPLY
112
SENSOR
113
NOTIFIER
114
MEMORY
115
COMMUNICATOR
CONTROLLER
121
150
151
142
152
143
140
141

FIG. 3

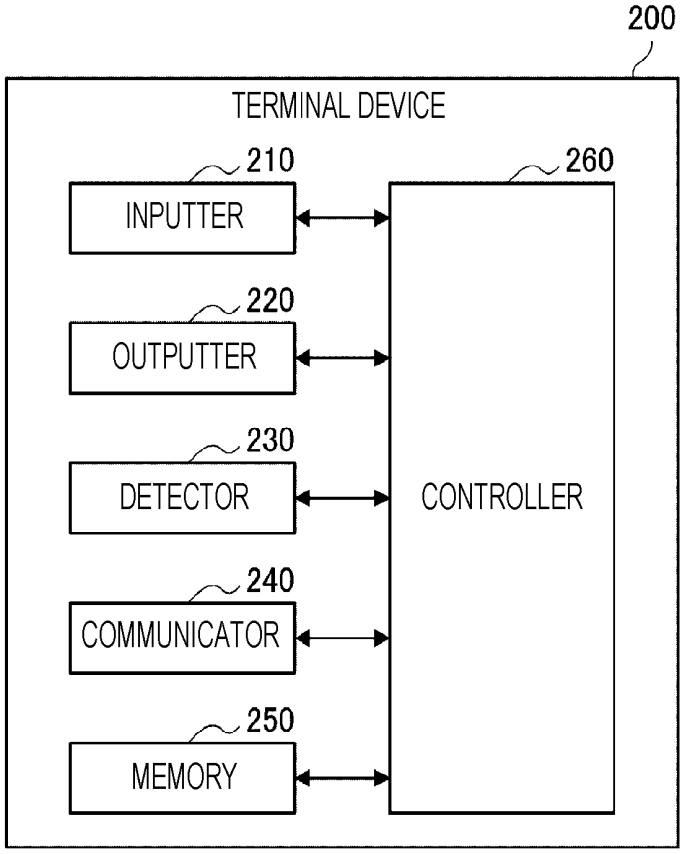

200
TERMINAL DEVICE
210
INPUTTER
220
OUTPUTTER
230
DETECTOR
240
COMMUNICATOR
250
MEMORY
260
CONTROLLER

FIG. 4

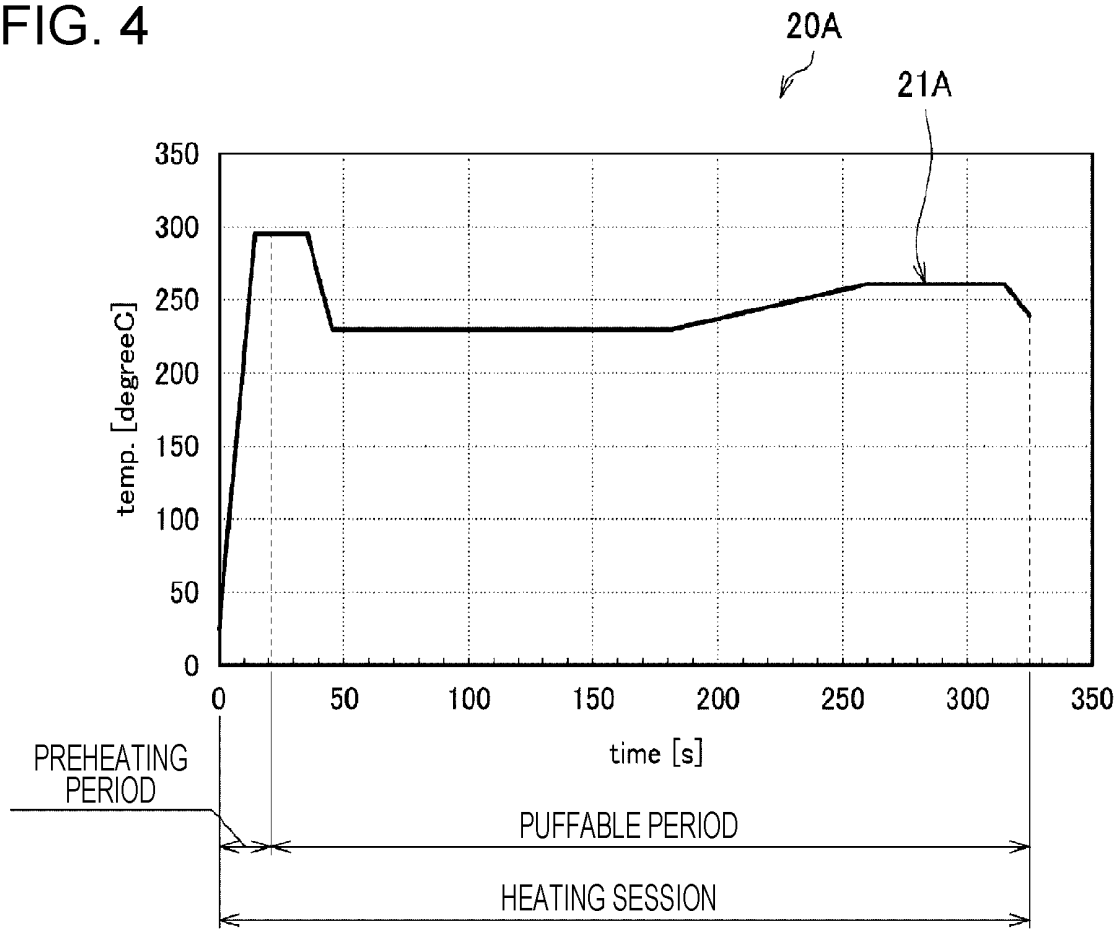
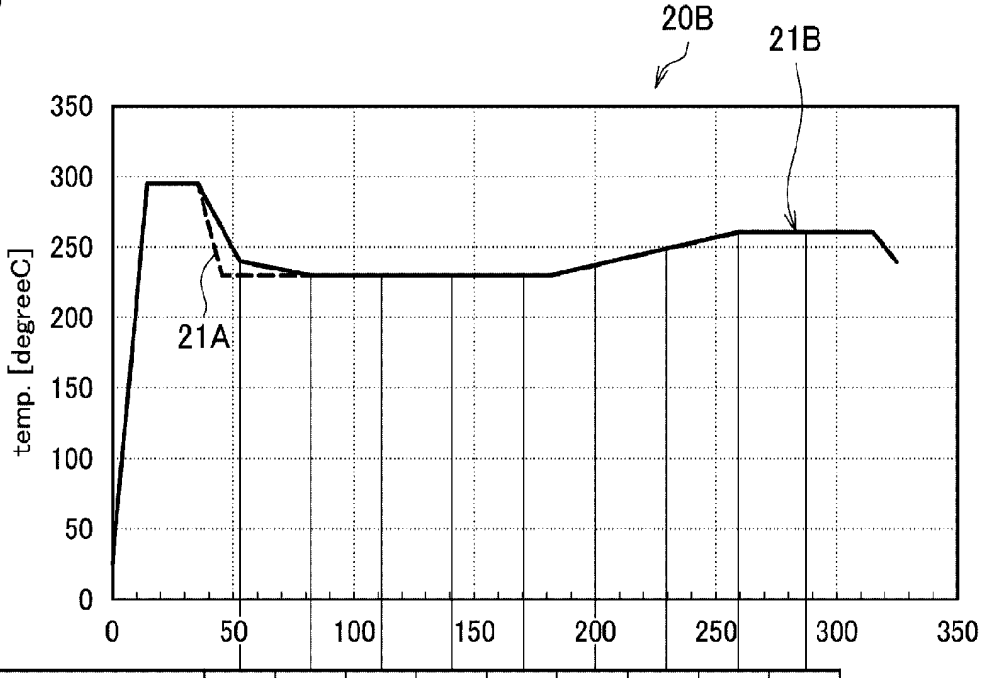
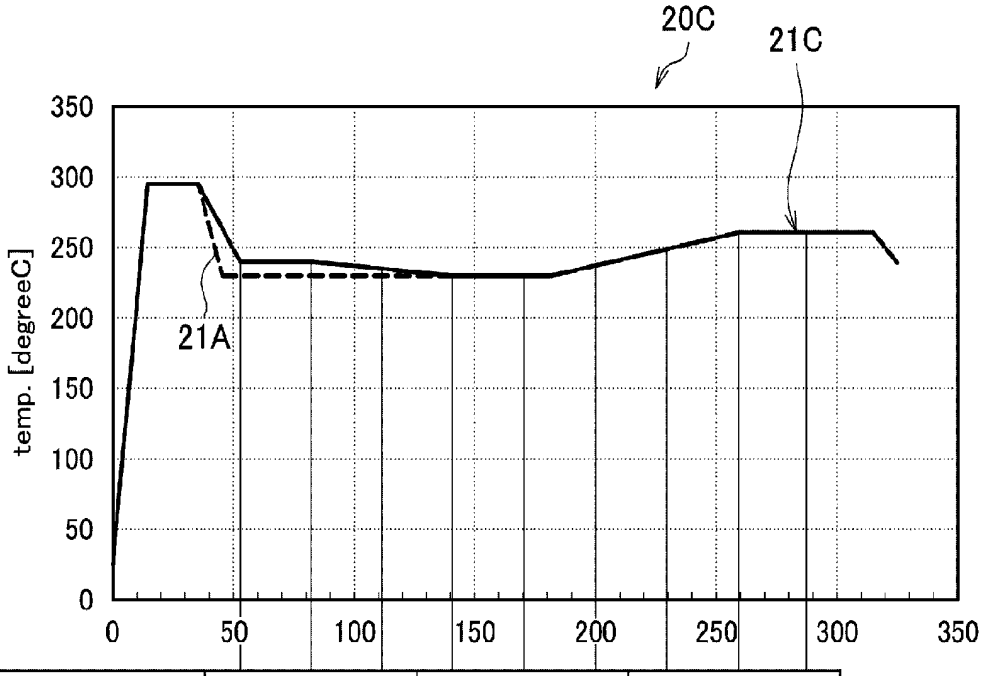

20A
21A
temp. [degreeC]
350
300
250
200
150
100
50
0
0
50
100
150
200
250
300
350
time [s]
PREHEATING PERIOD
PUFFABLE PERIOD
HEATING SESSION

FIG. 5



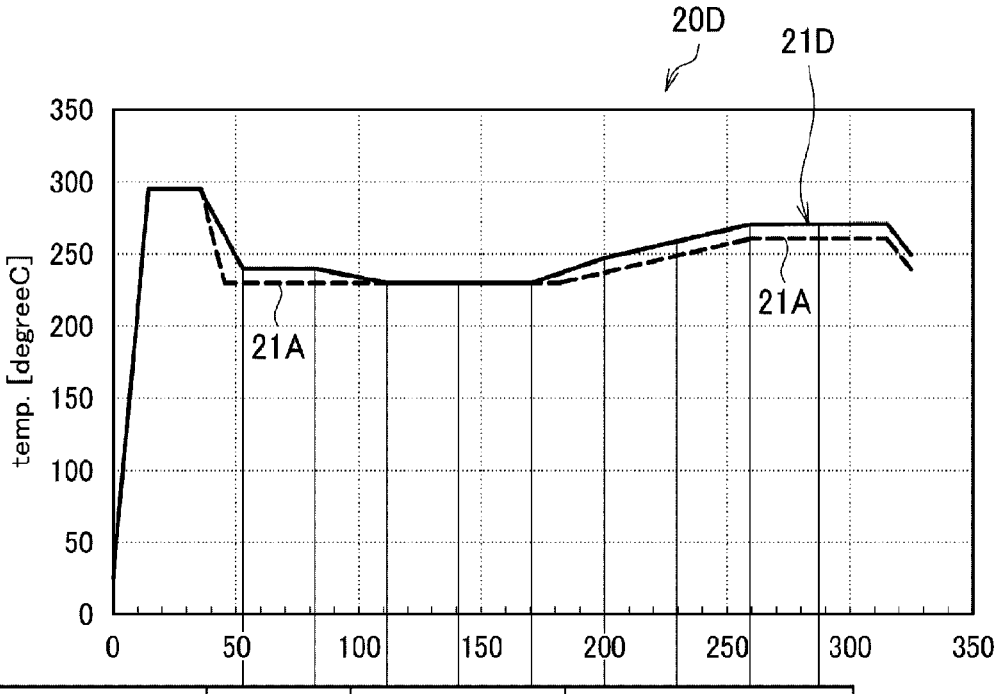
PUFF TIME	1	2	3	4	5	6	7	8	9
USER EVALUATION	W	W	OK	S	S	OK	W	W	W

FIG. 6



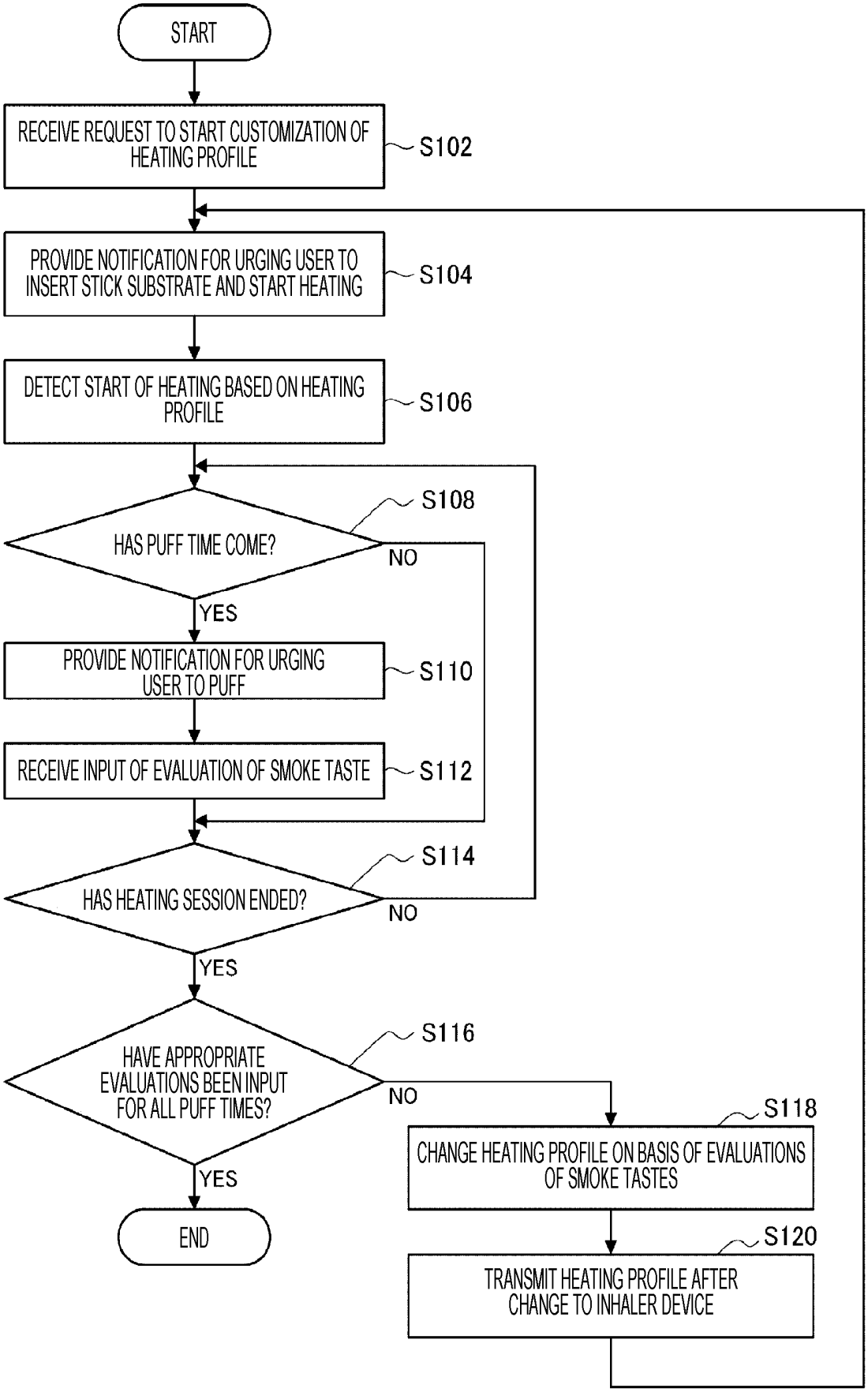
PUFF GROUP	1			2			3		
PUFF TIME	1	2	3	4	5	6	7	8	9
USER EVALUATION	W	W	OK	S	S	OK	W	W	W

FIG. 7



PUFF GROUP	1		2			3			
PUFF TIME	1	2	3	4	5	6	7	8	9
USER EVALUATION	W	W	OK	S	S	OK	W	W	W

FIG. 8


START
RECEIVE REQUEST TO START CUSTOMIZATION OF HEATING PROFILE
S102
PROVIDE NOTIFICATION FOR URGING USER TO INSERT STICK SUBSTRATE AND START HEATING
S104
DETECT START OF HEATING BASED ON HEATING PROFILE
S106
S108
HAS PUFF TIME COME?
NO
YES
PROVIDE NOTIFICATION FOR URGING USER TO PUFF
S110
RECEIVE INPUT OF EVALUATION OF SMOKE TASTE
S112
S114
HAS HEATING SESSION ENDED?
NO
YES
S116
HAVE APPROPRIATE EVALUATIONS BEEN INPUT FOR ALL PUFF TIMES?
NO
YES
S118
CHANGE HEATING PROFILE ON BASIS OF EVALUATIONS OF SMOKE TASTES
S120
TRANSMIT HEATING PROFILE AFTER CHANGE TO INHALER DEVICE
END

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2022/013536

A. CLASSIFICATION OF SUBJECT MATTER

A24F 40/57(2020.01)i
FI: A24F40/57

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)

A24F40/57

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 1971-2022
Registered utility model specifications of Japan 1996-2022
Published registered utility model applications of Japan 1994-2022

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.
Y	US 2020/0329775 A1 (THE KANVAS COMPANY INC.) 22 October 2020 (2020-10-22) fig. 8J1	1-2, 13-17
A		3-12
Y	KR 10-2021-0071048 A (NICOVENTURES TRADING LTD.) 15 June 2021 (2021-06-15) paragraphs [0086], [0087], [0092], [0093]	1-2, 13-17
A		3-12
Y	US 2019/0289915 A1 (NATIONAL CONCESSIONS GROUP INC.) 26 September 2019 (2019-09-26) fig. 12	1-2, 13-17
A		3-12

☐ 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
"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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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
13 April 2022	**26 April 2022**

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

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2022/013536

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
US 2020/0329775 A1	22 October 2020	(Family: none)	
KR 10-2021-0071048 A	15 June 2021	US 2021/0392957 A1 paragraphs [0092], [0093], [0098], [0099] WO 2020/095019 A1	
US 2019/0289915 A1	26 September 2019	WO 2019/183537 A1	

Form PCT/ISA/210 (patent family annex) (January 2015)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2019104227 A1 **[0004]**