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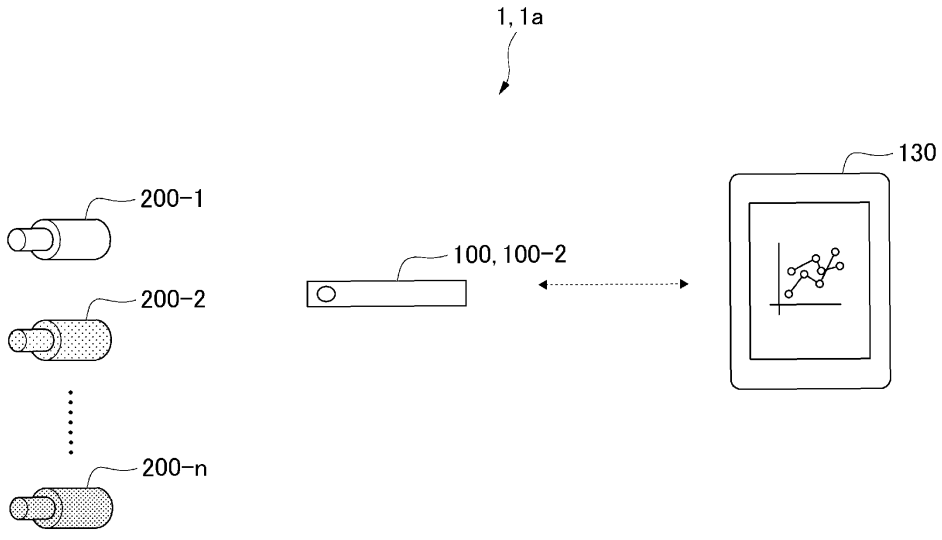
(54) **SUCTION SYSTEM, ACCESSORY UNIT, SUCTION DEVICE, CONTROL METHOD, AND PROGRAM**

(57) A suction system according to one aspect of the present application comprises a suction device that has a power source, and a plurality of accessory units that are detachably attached to the suction device and that provide functions to the suction device, wherein the suction device is capable of executing functions respectively provided by the plurality of accessory units in response to the attachment of the plurality of accessory units.

FIG. 1




EP 4 245 174 A1

## Description

Technical Field

**[0001]** The present invention relates to an inhalation system, an accessory unit, an inhaler device, a control method, and a program.

Background Art

**[0002]** In recent years, techniques for incorporating sensor functions and communication functions into accessories that can be attached to reduced-risk products (RRP) devices have been developed (e.g., refer to Patent Literature 1 and 2). Here, reduced-risk products are defined as products that can reduce health risks associated with smoking, unlike conventional cigarettes. Reduced-risk products include electronic cigarettes and heated cigarettes.

**[0003]** Patent Literature 1, for example, discloses a sensor that can be removably attached to an RRP device and that transmits sensor data to an external apparatus. Patent Literature 2, for example, discloses an RRP device that transmits certain data using a communication mechanism removably attached to a tip of the RRP device.

Citation List

Patent Literature

**[0004]**

Patent Literature 1: International Publication No. WO 2019/129548
Patent Literature 2: International Publication No. WO 2018/215629

Summary of Invention

Technical Problem

**[0005]** The above-described techniques, however, assume that one accessory unit is attached to an inhaler device such as a device. A function that can be added to the device, therefore, is limited to a function of the accessory unit.

**[0006]** The present invention has been made in view of the aforementioned point and aims to provide an inhalation system, an accessory unit, an inhaler device, a control method, and a program capable of increasing functions of an inhaler device.

Solution to Problem

**[0007]** According to an embodiment of the present invention, an inhalation system including an inhaler device including a power supply and a heater and a plurality of accessory units that are removably attached to the inhaler device and that provide functions for the inhaler device is provided. The inhaler device is configured to perform the functions provided by each of the plurality of accessory units in response to attachment of the plurality of accessory units.

**[0008]** In the embodiment, one of the plurality of accessory units may include an information collection function provision accessory unit that provides a function of collecting information.

**[0009]** In the embodiment, the information collection function provision accessory unit may include a data collection sensor that collects various types of data.

**[0010]** In the embodiment, the data collection sensor may include at least one of a smoking data collection sensor capable of collecting smoking data, a biosensor capable of obtaining biological data, or a positional information collection sensor capable of collecting positional information.

**[0011]** In the embodiment, the information collection function provision accessory unit may include a communication module that provides a communication function.

**[0012]** In the embodiment, each of a plurality of the communication modules may be capable of performing communication using a different communication method.

**[0013]** In the embodiment, one of the plurality of accessory units may further include an operation provision accessory unit that provides a certain operation.

**[0014]** In the embodiment, the operation provision accessory unit may include at least one of a function of generating a sound, a function of generating light, a function of generating a scent, a vibration function, or a display function.

**[0015]** In the embodiment, the inhaler device may obtain information for identifying functions of the attached accessory units and change a processing mode of the inhaler device on a basis of the obtained information for identifying the functions provided by the accessory units.

**[0016]** According to another embodiment of the present invention, an accessory unit that is one of a plurality of accessory units providing functions for an inhaler device is provided. In a case where the accessory unit is attached to the inhaler device, the accessory unit provides the corresponding function for the inhaler device.

**[0017]** According to another embodiment of the present invention, an inhaler device including a power supply, a heater, and a controller configured to perform functions provided by each of a plurality of accessory units is provided. The controller is configured to perform the functions provided by each of the plurality of accessory units in response to attachment of the plurality of accessory units.

**[0018]** According to another embodiment of the present invention, a control method performed by an inhalation system including a step of, using an inhaler device including a power supply and a heater, detecting attachment of a plurality of accessory units, a step of, using the plurality of accessory units, providing functions

for the inhaler device, and a step of, using the inhaler device, enabling the functions provided by the plurality of accessory units is provided.

**[0019]** According to another embodiment of the present invention, a program for causing a computer of an inhaler device to perform a process including a step of detecting attachment of a plurality of accessory units and a step of enabling functions provided by the plurality of accessory units is provided.

Advantageous Effects of Invention

**[0020]** According to the embodiments of the present invention, an inhalation system, an accessory unit, an inhaler device, a control method, and a program capable of increasing functions of an inhaler device can be provided.

Brief Description of Drawings

**[0021]**

[FIG. 1] FIG. 1 is a diagram illustrating an example of an inhalation system according to the present embodiment.
[FIG. 2] FIG. 2 is a diagram illustrating a first configuration example of an inhaler device according to the present embodiment.
[FIG. 3] FIG. 3 is a diagram illustrating a second configuration example of the inhaler device according to the present embodiment.
[FIG. 4] FIG. 4 is a diagram illustrating a third configuration example of the inhaler device according to the present embodiment.
[FIG. 5] FIG. 5 is a diagram illustrating a first configuration example of an accessory unit according to the present embodiment.
[FIG. 6] FIG. 6 is a diagram illustrating a second configuration example of the accessory unit according to the present embodiment.
[FIG. 7] FIG. 7 is a diagram illustrating a third configuration example of the accessory unit according to the present embodiment.
[FIG. 8] FIG. 8 is a diagram schematically illustrating a configuration example of attachment of accessory units to the inhaler device according to the present embodiment.
[FIG. 9] FIG. 9 is a diagram illustrating a first example of operations performed by the inhalation system according to the present embodiment.
[FIG. 10] FIG. 10 is a diagram illustrating a second example of the operations performed by the inhalation system according to the present embodiment.
[FIG. 11] FIG. 11 is a diagram illustrating a third example of the operations performed by the inhalation system according to the present embodiment.
[FIG. 12] FIG. 12 is a diagram illustrating a fourth example of the operations performed by the inhalation system according to the present embodiment.
[FIG. 13] FIG. 13 is a diagram illustrating a first configuration example of a device according to a modification of the embodiment.
[FIG. 14] FIG. 14 is a diagram illustrating a second configuration example of the inhaler device according to the modification of the embodiment.
[FIG. 15] FIG. 15 is a diagram illustrating a third configuration example of the inhaler device according to the modification of the embodiment.
[FIG. 16] FIG. 16 is a diagram schematically illustrating a configuration example of attachment of an accessory unit to the inhaler device according to the modification of the embodiment.
[FIG. 17] FIG. 17 is a diagram illustrating a first example of operations performed by an inhalation system according to the modification of the embodiment.
[FIG. 18] FIG. 18 is a diagram illustrating a second example of the operations performed by the inhalation system according to the modification of the embodiment.
[FIG. 19] FIG. 19 is a diagram illustrating a third example of the operations performed by the inhalation system according to the modification of the embodiment.
[FIG. 20] FIG. 20 is a diagram illustrating a fourth example of the operations performed by the inhalation system according to the modification of the embodiment.

Description of Embodiments

**[0022]** Next, an inhalation system, an accessory, an inhaler device, a control method, and a program according to the present embodiment will be described with reference to the drawings. The embodiment that will be described hereinafter is an example, and embodiments to which the present invention is applied are not limited to the following embodiment.

**[0023]** Throughout the drawings for describing the embodiment, elements having the same functions are given the same reference numerals, and repeated description thereof is omitted.

**[0024]** "On the basis of XX" in the present disclosure means "at least on the basis of XX" and includes a case where elements other than XX are also used as a basis. "On the basis of XX" is not limited to a case where XX is directly used and includes a case where XX subjected to an arithmetic operation or processing is used as a basis. "XX" may be any element (e.g., any information).

(Embodiment)

(Inhalation System)

**[0025]** The inhalation system according to an embodiment of the present invention will be described with reference to the drawings.

**[0026]** FIG. 1 is a diagram illustrating an example of the inhalation system according to the present embodiment. An inhalation system 1 according to the present embodiment includes an inhaler device 100 and accessory units 200-1 to 200-n (n is an integer larger than zero). One or a plurality of the accessory units 200-1 to 200-n are attached to the inhaler device 100.

**[0027]** An example of the inhaler device 100 is a reduced-risk products (RRP) device. An RRP is defined as a product that can reduce health risks associated with smoking. The inhaler device 100 includes a power supply and a heater.

**[0028]** Each of the accessory units 200-1 to 200-n is removably attached to the inhaler device 100. Each of the accessory units 200-1 to 200-n provides a function for the inhaler device 100 when attached to the inhaler device 100.

**[0029]** Any of the accessory units 200-1 to 200-n will be referred to as an accessory unit 200 hereinafter.

**[0030]** FIG. 1 illustrates a terminal apparatus 130 in addition to the inhaler device 100 and the accessory units 200-1 to 200-n. The terminal apparatus 130 communicates with the inhaler device 100 and/or the accessory unit 200 having a communication function. The inhaler device 100 and the accessory unit 200 will be described in detail hereinafter.

«1. Configuration Example of Inhaler Device»

**[0031]** The inhaler device 100 can execute a function provided by the accessory unit 200 when the accessory unit 200 is attached thereto.

**[0032]** FIG. 2 is a diagram illustrating a first configuration example of the inhaler device according to the present embodiment. As illustrated in FIG. 2, an inhaler device 100A in this configuration example includes a power supply unit 110. The power supply unit 110 includes a power supply 111, a sensor 112, a notifier 113, a memory 114, and a controller 116. An example of the power supply unit 110 may include an air inlet hole, an airflow path, and an air outlet hole. With this configuration, an aerosol (smoke) can pass through the air inlet hole, the airflow path, and the air outlet hole.

**[0033]** The power supply 111 accumulates power. The power supply 111 supplies power to the components of the inhaler device 100A under control of the controller 116. The power supply 111 can be achieved, for example, by a rechargeable battery such as a lithium-ion secondary battery. The power supply 111 may be connected to an external power supply by USB (universal serial bus) cable or the like and charged. Alternatively, the power supply 111 may be charged using a wireless power transmission technique without being connected to an inhaler device that transmits power. In other examples, only the power supply 111 may be removable from the inhaler device 100A or replaceable by a new power supply 111.

**[0034]** When one or a plurality of accessory units 200 are attached to the inhaler device 100A, the power supply 111 supplies power to each of the one or plurality of accessory units 200. The power supply 111 supplies power to the one or plurality of accessory units 200 connected to the inhaler device 100A under control of the controller 116.

**[0035]** The sensor 112 obtains various pieces of information regarding the inhaler device 100A. The sensor 112 also detects one or a plurality of accessory units 200 attached to the inhaler device 100A. More specifically, the sensor 112 detects one or a plurality of accessory units 200 electrically connected to the inhaler device 100A. The sensor 112 obtains various pieces of information from each of the one or plurality of accessory units 200 connected to the inhaler device 100A. The sensor 112 then outputs the obtained pieces of information to the controller 116.

**[0036]** In an example, the sensor 112 is achieved by a pressure sensor such as a microphone condenser, a flowrate sensor, a temperature sensor, or the like. When the sensor 112 detects a value associated with inhalation by the user, the sensor 112 outputs information indicating the inhalation by the user to the controller 116.

**[0037]** In another example, the sensor 112 is achieved by an input device, such as a button or a switch, that receives an input of information from the user. The sensor 112 can include a button for requesting a start and a stop of generation of an aerosol and a button for inputting information for identifying functions of the one or plurality of accessory units 200. The sensor 112 then outputs the information input by the user to the controller 116.

**[0038]** The notifier 113 notifies the user of information. In an example, the notifier 113 is achieved by a light emission device such as an LED (light-emitting diode). In this case, the notifier 113 emits light in different light emission patterns when the power supply 111 needs to be charged, when the power supply 111 is being charged, and when an abnormality has occurred in the inhaler device 100A. The light emission patterns are a concept including color and timings of turning on and off. The notifier 113 may be achieved by a display device that displays images, a sound output device that outputs sounds, a vibration device that vibrates, or the like in addition to, or instead of, the light emission device.

**[0039]** The memory 114 stores various pieces of information for operating the inhaler device 100A. The memory 114 is achieved, for example, by a nonvolatile storage medium such as a flash memory. An example of the information stored in the memory 114 is information regarding an OS (operating system) of the inhaler device 100A, such as how the controller 116 controls the various components. Another example of the information stored in the memory 114 is information regarding inhalation by the user, such as the number of times of inhalation, times of inhalations, and an accumulated inhalation time period.

**[0040]** The controller 116 functions as an arithmetic processing device and a control device and controls the whole operation of the inhaler device 100A and the whole

operation of the accessory unit 200 connected to the inhaler device 100A in accordance with various programs. The controller 116 is achieved, for example, by an electronic circuit such a CPU (central processing unit) or a microprocessor. The controller 116 may also include a ROM (read-only memory) storing the programs to be used, operation parameters, and the like and a RAM (random-access memory) that temporarily stores parameters and the like that change as necessary. The inhaler device 100A and the accessory unit 200 connected to the inhaler device 100A perform various types of processing under control of the controller 116.

**[0041]** The supply of power from the power supply 111 to the other components, the charging of the power supply 111, the detection of information by the sensor 112, the notification of information by the notifier 113, the storing and reading of information by the memory 114, and the communication of information by the communicator 115 are examples of processing controlled by the controller 116.

**[0042]** The controller 116 also controls other types of processing performed by the inhaler device 100A, such as inputting of information to the components and processing based on information output from the components. The controller 116 also controls the detection of the accessory unit 200 by the sensor 112, obtainment of information for identifying a function of the accessory unit 200 based on detection of the accessory unit 200, a change to a processing mode based on obtained information for identifying a function of the accessory unit 200, and processing based on a result of the change to the processing mode. The controller 116 performs processing on the basis of an address of the inhaler device 100A and an address (IP address) of the accessory unit 200.

**[0043]** An example of the information for identifying the function of the accessory unit 200 is, when the accessory unit 200 includes a puff sensor, information indicating the puff sensor.

**[0044]** An example of the change to (setting of) the processing mode based on information for identifying a function of the accessory unit 200 and the processing based on a result of the change to the processing mode is, when the accessory unit 200 includes a puff sensor, a change (setting) of the processing mode to a smoking mode and waiting in a state where processing for storing information indicating detection of a puff in the memory 114 of the inhaler device 100 can be performed. When the sensor 112 of the inhaler device 100 then obtains information indicating detection of a puff from the accessory unit 200, the controller 116 starts processing for obtaining the information indicating the detection of the puff received by the sensor 112 and storing the obtained information indicating the detection of the puff in the memory 114.

**[0045]** Another example of the change to the processing mode based on obtained information for identifying a function of the accessory unit 200 and the processing based on a result of the change to the processing mode is, when the accessory unit 200 includes a sound output device (audio unit), a change of the processing mode to an operation mode and waiting in a state where processing for outputting audio information under a certain condition can be performed. When audio information to be output then arises, the controller 116 in the inhaler device 100 outputs the audio information to the accessory unit 200.

**[0046]** The inhaler device 100A includes a cartridge 220-1. The cartridge 220-1 produces a substance to be inhaled by the user. It is assumed in the following description that the substance produced by the cartridge 220-1 is an aerosol. Alternatively, the substance produced by the cartridge 220-1 may be a gas, instead. The inhalation, by the user, of the substance produced by the cartridge 220-1 will also be simply referred to as "inhalation" or a "puff" hereinafter. An example of components of the cartridge 220-1 will be described hereinafter.

**[0047]** The cartridge 220-1 includes a heater 221-1, a liquid guide 222-1, and a liquid storage 223-1.

**[0048]** The liquid storage 223-1 stores an aerosol source. The aerosol source is atomized through heating to generate an aerosol. The aerosol source is, for example, a liquid such as polyhydric alcohol, which may be glycerin or propylene glycol, or water. The aerosol source may also include a tobacco material or an extract from a tobacco material that emits a flavor component through heating. The aerosol source may also include nicotine. When the inhaler device 100A is used as a medical inhaler such as a nebulizer, the aerosol source may include a medicine to be inhaled by a patient.

**[0049]** The liquid guide 222-1 guides the aerosol source, which is the liquid stored in the liquid storage 223-1, from the liquid storage 223-1 and holds the aerosol source. The liquid guide 222-1 is, for example, a wick formed by twining a fiber material such as glass fiber or another porous material such as a porous ceramic. The liquid guide 222-1 is in liquid connection to the liquid storage 223-1. The aerosol source stored in the liquid storage 223-1, therefore, is spread throughout the liquid guide 222-1 by a capillary effect.

**[0050]** The heater 221-1 heats the aerosol source to atomize the aerosol source and generate the aerosol. The heater 221-1 is composed of any material, such as a metal or a polyimide, in any shape, such as a coil, a film, or a blade. The heater 221-1 is provided close to the liquid guide 222-1. In the example illustrated in FIG. 2, the heater 221-1 includes a metal coil wound around the liquid guide 222-1. When the heater 221-1 produces heat, therefore, the aerosol source held by the liquid guide 222-1 is heated and atomized to generate the aerosol. The heater 221-1 produces heat when receiving power from the power supply 111. In an example, the power may be supplied to generate the aerosol while the sensor 112 is detecting the user's inhalation in the inhaler device 100A. In another example, the power may be supplied to generate the aerosol when the sensor 112 detects a certain user input (e.g., pressing of a button for

requesting a start and a stop of generation of the aerosol) in the inhaler device 100A. Subsequently, the supply of the power may be stopped when the sensor 112 detects a certain user input (e.g., subsequent pressing of the button for requesting a start and a stop of generation of the aerosol).

**[0051]** An airflow path 180A is a flow path of air to be inhaled by the user. The airflow path 180A has a tubular structure including an air inlet hole 181A, which is an inlet of air into the airflow path 180A, and an air outlet hole 182A, which is an outlet of air from the airflow path 180A, as two ends. As the user inhales, air flows into the airflow path 180A from the air inlet hole 181A and flows out of the airflow path 180A from the air outlet hole 182A. The air outlet hole 182A is provided in a mouthpiece 224A.

**[0052]** The liquid guide 222-1 is provided in the airflow path 180A. The aerosol generated by the heater 221-1 mixes with the air flowing from the air inlet hole 181A. As the user inhales, the mixture fluid of the aerosol and the air is conveyed to the air outlet hole 182A as indicated by an arrow 190A.

**[0053]** The mouthpiece 224A is a member held in the user's mouth during inhalation. The mouthpiece 224A includes the air outlet hole 182A of the airflow path 180A. When the user inhales with the mouthpiece 224A held in his/her mouth, the mixture fluid of the aerosol and the air conveyed through the airflow path 180A enters the user's oral cavity.

**[0054]** FIG. 3 is a diagram illustrating a second configuration example of the inhaler device according to the present embodiment. As illustrated in FIG. 3, an inhaler device 100B in this configuration example includes a power supply unit 110. The power supply unit 110 includes a power supply 111, a sensor 112, a notifier 113, a memory 114, and a controller 116.

**[0055]** The inhaler device 100B includes a cartridge 220-2. The cartridge 220-2 produces a substance to be inhaled by the user. It is assumed in the following description that the substance produced by the cartridge 220-2 is an aerosol. Alternatively, the substance produced by the cartridge 220-2 may be a gas, instead. The inhalation, by the user, of the substance produced by the cartridge 220-2 will also be simply referred to as "inhalation" or a "puff" hereinafter. An example of components of the cartridge 220-2 will be described hereinafter.

**[0056]** The cartridge 220-2 includes a heater 221-2, a liquid guide 222-2, and a liquid storage 223-2.

**[0057]** The liquid storage 223-2 stores an aerosol source. The aerosol source is atomized through heating to generate an aerosol. The aerosol source is, for example, a liquid such as polyhydric alcohol, which may be glycerin or propylene glycol, or water. The aerosol source may also include a tobacco material or an extract from a tobacco material that emits a flavor component through heating. The aerosol source may also include nicotine. When the inhaler device 100B is used as a medical inhaler such as a nebulizer, the aerosol source may include a medicine to be inhaled by a patient.

**[0058]** The liquid guide 222-2 guides the aerosol source, which is the liquid stored in the liquid storage 223-2, from the liquid storage 223-2 and holds the aerosol source. The liquid guide 222-2 is, for example, a wick formed by twining a fiber material such as glass fiber or another porous material such as a porous ceramic. The liquid guide 222-2 is in liquid connection to the liquid storage 223-2. The aerosol source stored in the liquid storage 223-2, therefore, is spread throughout the liquid guide 222-2 by a capillary effect.

**[0059]** The heater 221-2 heats the aerosol source to atomize the aerosol source and generate the aerosol. The heater 221-2 is composed of any material, such as a metal or a polyimide, in any shape, such as a coil, a film, or a blade. The heater 221-2 is provided close to the liquid guide 222-2. In the example illustrated in FIG. 3, the heater 221-2 includes a metal coil wound around the liquid guide 222-2. When the heater 221-2 produces heat, therefore, the aerosol source held by the liquid guide 222-2 is heated and atomized to generate the aerosol. The heater 221-2 produces heat when receiving power from the power supply 111. In an example, the power may be supplied to generate the aerosol while the sensor 112 is detecting the user's inhalation in the inhaler device 100B. In another example, the power may be supplied to generate the aerosol when the sensor 112 detects a certain user input (e.g., pressing of a button for requesting a start and a stop of generation of the aerosol) in the inhaler device 100B. Subsequently, the supply of the power may be stopped when the sensor 112 detects a certain user input (e.g., subsequent pressing of the button for requesting a start and a stop of generation of the aerosol).

**[0060]** The inhaler device 100B includes a flavor imparting cartridge 230-2. The flavor imparting cartridge 230-2 includes a flavor source 231-2 and a mouthpiece 224B. In the cartridge 220-2 and the flavor imparting cartridge 230-2, an airflow path 180B is formed. The components will be sequentially described hereinafter.

**[0061]** The flavor source 231-2 is a component for imparting a flavor component to an aerosol. The flavor source 231-2 may be a material derived from tobacco, such as shredded tobacco or a processed material obtained by forming a tobacco raw material into grains, a sheet, or powder. Alternatively, the flavor source 231-2 may include a material that is not derived from tobacco, such as a material made by use of a plant other than tobacco (e.g., mint, an herb, etc.). In an example, the flavor source 231-2 may include a flavor component such as menthol. The flavor source 231-2 may be contained in a container such as a capsule.

**[0062]** An airflow path 180B is a flow path of air to be inhaled by the user. The airflow path 180B has a tubular structure including an air inlet hole 181B, which is an inlet of air into the airflow path 180B, and an air outlet hole 182B, which is an outlet of air from the airflow path 180B, as two ends. As the user inhales, air flows into the airflow path 180B from the air inlet hole 181B and flows out of

the airflow path 180B from the air outlet hole 182B. In an example, the air inlet hole 181B may be a gap caused between the power supply unit 110 and the cartridge 220-2 when the cartridge 220-2 is attached to the power supply unit 110. The air outlet hole 182B is provided in the mouthpiece 224B.

**[0063]** In addition to the liquid guide 222-2, the flavor source 231-2 is provided in the airflow path 180B downstream of the liquid guide 222-2 (a side closer to the air outlet hole 182B). The aerosol generated by the heater 221-2 is mixed with air flowing from the air inlet hole 181B. As the user inhales, the mixture fluid of the aerosol and the air passes through the flavor source 231-2 and is conveyed to the air outlet hole 182B as indicated by an arrow 190B. When the mixture fluid of the aerosol and the air passes through the flavor source 231-2, the flavor component included in the flavor source 231-2 is imparted to the aerosol.

**[0064]** The mouthpiece 224B is a member held in the user's mouth during inhalation. The mouthpiece 224B includes the air outlet hole 182B of the airflow path 180B. When the user inhales with the mouthpiece 224B held in his/her mouth, the mixture fluid of the aerosol and the air conveyed through the airflow path 180B enters the user's oral cavity.

**[0065]** FIG. 4 is a diagram illustrating a third configuration example of the inhaler device according to the present embodiment. As illustrated in FIG. 4, an inhaler device 100C in this configuration example includes a power supply 111, a sensor 112, a notifier 113, a memory 114, a controller 116, a heater 221-3, a holder 240-3, and a heat insulator 244-3. The inhaler device 100C in the third configuration example produces a substance to be inhaled by the user. It is assumed in the following description that the substance produced by the inhaler device 100C is an aerosol. The inhaler device 100C produces the aerosol by heating a substrate including an aerosol source from the outside of the substrate. Alternatively, the substance produced by the inhaler device 100C may be a gas. The inhalation, by the user, of the substance produced by the inhaler device 100C will also be simply referred to as "inhalation" or a "puff" hereinafter. An example of components of the inhaler device 100C will be described hereinafter.

**[0066]** The user inhales, using the inhaler device 100C, with a stick substrate 250-3 held in the holder 240-3.

**[0067]** The holder 240-3 has an internal space 241-3 and holds the stick substrate 250-3 with the stick substrate 250-3 partly stored the internal space 241-3. The holder 240-3 has an opening 242-3 connecting the internal space 241-3 to the outside and holds the stick substrate 250-3 inserted into the internal space 241-3 through the opening 242-3. For example, the holder 240-3 has a tubular shape whose base is the opening 242-3 and a bottom 243-3 and defines the pillar-shaped internal space 241-3. The holder 240-3 may be configured such that an inner diameter thereof is smaller than an outer diameter of the stick substrate 250-3 in at least a part of the tubular shape in a height direction and hold the stick substrate 250-3 by compressing the stick substrate 250-3 inserted into the internal space 241-3 from the periphery. The holder 240-3 also has a function of defining a path of air flowing through the stick substrate 250-3. For example, the bottom 243-3 has an air inlet hole, from which air flows into such the path. An air outlet hole, from which air flows out of the path, on the other hand, is the opening 242-3.

**[0068]** The stick substrate 250-3 is a member having a shape of a stick. The stick substrate 250-3 includes a substrate 251-3 and an inhalation port 252-3.

**[0069]** The substrate 251-3 includes an aerosol source. The aerosol source is heated and atomized to generate an aerosol. The aerosol source may be a material derived from tobacco, such as shredded tobacco or a processed material obtained by forming a tobacco raw material into grains, a sheet, or powder. Alternatively, the aerosol source may include a material that is not derived from tobacco, such as a material made by use of a plant other than tobacco (e.g., mint, an herb, etc.). In an example, the aerosol source may include a flavor component such as menthol. When the inhaler device 100C is used as a medical inhaler such as a nebulizer, the aerosol source may include a medicine to be inhaled by a patient. The aerosol source is not limited to a solid, and may be, for example, a liquid such as polyhydric alcohol, which may be glycerin or propylene glycol, or water. The substrate 251-3 is at least partly stored in the internal space 241-3 of the holder 240-3 with the stick substrate 250-3 held by the holder 240-3.

**[0070]** The inhalation port 252-3 is a member held in the user's mouth during inhalation. The inhalation port 252-3 at least partly protrudes from the opening 242-3 with the stick substrate 250-3 held by the holder 240-3. When the user inhales with the inhalation port 252-3 protruding from the opening 242-3 held in his/her mouth, air flows into the holder 240-3 through an air inlet hole, which is not illustrated. The flowing air passes through the internal space 241-3 of the holder 240-3, that is, the substrate 251-3, and reaches the inside of the user's mouth along with the aerosol generated by the substrate 251-3.

**[0071]** The heater 221-3 heats the aerosol source to atomize the aerosol source and generate the aerosol. The heater 221-3 is composed of any material, such as a metal or a polyimide. The heater 221-3 is formed as a film, for example, and disposed in such a way as to cover an outer circumference of the holder 240-3. When the heater 221-3 produces heat, therefore, the aerosol source is heated and atomized from an outer circumference of the stick substrate 250-3 to generate the aerosol. The heater 221-3 produces heat when receiving power from the power supply 111. In an example, the power may be supplied to generate the aerosol when the sensor 112 has detected a certain user input in the inhaler device 100C. The user can inhale when temperature of the stick substrate 250-3 heated by the heater 221-3 reaches a certain value. When the sensor 112 then detects a certain

user input in the inhaler device 100C, the supply of power may be stopped. In another example, while the sensor 112 is detecting inhalation by the user in the inhaler device 100C, power may be supplied to generate the aerosol.

**[0072]** The heat insulator 244-3 prevents heat from transferring from the heater part 221-3 to the other components of the inhaler device 100C. The heat insulator 244-3 is disposed in such a way as to cover at least an outer circumference of the heater 221-3. For example, the heat insulator 244-3 is composed of a vacuum heat insulator, an aerogel heat insulator, or the like. The vacuum heat insulator is a heat insulator in which glass wool, silica (silicon powder), or the like is wrapped in a resin film to achieve a high-vacuum state so that gas thermal conductivity becomes as close to zero as possible.

«2. Configuration Example of Accessory Unit»

**[0073]** The accessory unit 200 is a device that increases the functions of the inhaler device 100 when attached to the inhaler device 100. An information collection function, an operation function, and a communication function will be described as examples of a function provided by the accessory unit 200 for the inhaler device 100.

(1) First Configuration Example

**[0074]** FIG. 5 is a diagram illustrating a first configuration example of the accessory unit according to the present embodiment. As illustrated in FIG. 5, an accessory unit 200-1 in this configuration example includes an electrode mechanism 201-1, a communicator 202-1, a sensor 203-1, and a controller 210-1 . The first configuration example of the accessory unit provides the information collection function for the inhaler device 100. An example of the accessory unit 200-1 may include an air inlet hole, an airflow path, and an air outlet hole. With this configuration, when the accessory unit 200-1 is attached to the inhaler device 100, an aerosol (smoke) can pass through the air inlet hole, the airflow path, and the air outlet hole.

**[0075]** When the accessory unit 200-1 is attached to the inhaler device 100 directly or through another accessory unit 200, the power supply 111 of the inhaler device 100 supplies power to the electrode mechanism 201-1 directly or through the other accessory unit 200. In the inhaler device 100, the power supply 111 supplies power to the components of the accessory unit 200-1 under control of the controller 116.

**[0076]** When the accessory unit 200-1 is connected to the inhaler device 100 directly or through another accessory unit 200 and yet another accessory unit 200 is also attached to the inhaler device 100, the electrode mechanism 201-1 supplies power supplied from the power supply 111 of the inhaler device 100 directly or through the other accessory unit 200 to the yet other accessory unit 200. In the inhaler device 100, the power supply 111 supplies power to the components of the accessory unit 200-1 under control of the controller 116.

**[0077]** The communicator 202-1 is a communication interface capable of performing communication in accordance with any wired or wireless communication standard. The communication standard may be, for example, Wi-Fi (registered trademark), Bluetooth (registered trademark), near-field communication (NFC), LPWA (low-power, wide-area), or the like. The communicator 202-1 communicates with another accessory unit 200 bidirectionally. The communicator 202-1 also communicates with the terminal apparatus 130 bidirectionally. For example, the communicator 202-1 obtains data detected by the sensor 203-1 and transmits the obtained data to the terminal apparatus 130. The communicator 202-1 also receives control information transmitted from the terminal apparatus 130. The controller 210-1 obtains the control information received by the communicator 202-1 and performs control on the basis of the obtained control information. The communicator 202-1 may communicate information with the device 100 by electrically or physically connecting to the device 100 through a terminal or the electrode mechanism 201-1, for example, and communicating with the device 100 in accordance with any wired communication standard. Alternatively, the communicator 202-1 may communicate information with the device 100 by communicating with the device 100 in accordance with any wireless communication standard.

**[0078]** The sensor 203-1 is achieved by a sensor capable of obtaining smoking data, such as a puff sensor or a fluid sensor, a biosensor capable of obtaining biological data, such as a saliva sensor, a pulse sensor, a heartrate monitor, or a blood pressure sensor, an acceleration sensor, or the like. The sensor 203-1 detects behavior of the inhaler device 100 and behavior of another accessory unit 200.

**[0079]** An example of the puff sensor is a sensor for detecting inhalation by the user. The puff sensor may be a sensor of any type for detecting inhalation by the user, such as a flow rate sensor, a flow velocity sensor, or a pressure sensor. Alternatively, the puff sensor may be a button to be pressed to allow the user to inhale. Alternatively, the puff sensor may be, for example, an inhalation sensor. The puff sensor may detect inhalation by the user using a flavor inhaler or the like. Alternatively, the puff sensor may be an airflow sensor and detect airflow caused by inhalation by the user.

**[0080]** An example of the fluid sensor may include a (infrared or visible) light emitter, a detector, a rotating disc with a window, a stator, and a holder. The disc may include a slanted window for converting airflow into rotational thrust. The airflow rotates the disc. Rotation speed of the disc depends on the airflow. The fluid sensor may detect rotation speed using frequency of light pulses from the light emitter received by the detector. In another embodiment, the disc includes a reflection surface. The light emitter and the detector are provided on the same sur-

face of a front plate. When the disc rotates, the detector finds pulses reflected from the surface of the disc. In another embodiment, an axis of the disc has an angle of 90° relative to the airflow like a water wheel.

**[0081]** An example of the saliva sensor is an electrochemical sensor. The electrochemical sensor includes a mouse and nose molecular sensitive coating provided on a transducer, and the transducer translates selective binding of mouse and nose molecules on the coating into signals or changes in signals. For example, binding of mouse and nose molecules can result in a change in frequency, current, or voltage that can correlate with the amount of mouse and nose molecules present in saliva or breath of a smoker. A change in mass of the coating results in a change in resonant frequency of the transducer, which is translated into a proportional electrical signal.

**[0082]** The controller 210-1 functions as an arithmetic processing device and a control device and controls the whole operation of the accessory unit 200-1 in accordance with various programs. The controller 210-1 is achieved, for example, by an electronic circuit such as a CPU or a microprocessor. The controller 210-1 operates on power supplied from the electrode mechanism 201-1 and controls the communicator 202-1 and the sensor 203-1.

**[0083]** A configuration example of the accessory unit 200-1 has been described. It is needless to say that the configuration of the accessory unit 200-1 is not limited to that described above, and one of various configurations that will be described hereinafter may be employed, instead.

**[0084]** In an example, the accessory unit 200-1 may further include a positional information obtaining section. For example, the positional information obtaining section obtains positional information that can be obtained from a satellite navigation system such as a global positioning system (GPS) and/or another satellite navigation system, a positioning service that can be provided by a cellular network, or a wireless local area network (WLAN) access point. In this case, the communicator 202-1 transmits a result of positioning obtained by the positional information obtaining section to the terminal apparatus 130.

**[0085]** In an example, the accessory unit 200-1 need not include the communicator 202-1.

**[0086]** In an example, the accessory unit 200-1 may further include a sound recognition function section capable of recognizing a sound uttered by the user. For example, the sound recognition function section recognizes a sound uttered by the user and transmits, to the device 100 through the communicator 202-1, a request for processing based on the sound. The controller 116 of the device 100 controls each of the functions of the device in accordance with the request for the processing based on the sound uttered by the user received from the accessory unit 200-1.

**[0087]** For example, the accessory unit 200-1, which is the sound recognition function section, recognizes a sound uttered by the user, "Start heating", and transmits, to the device 100, information for requesting a start of heating of a heater. The controller 116 of the device 100 then, on the basis of the received information for requesting heating of a heater, starts heating of a heater included in the device 100 or transmits, to another accessory unit, a control signal for starting heating of a heater included in the other accessory unit 200.

**[0088]** In another example, the accessory unit 200-1, which is the sound recognition function section, may recognize a sound uttered by the user, "Increase (or reduce) vapor", and transmit, to the device 100, information for requesting control of a heater for increasing (or reducing) vapor. The controller 116 of the inhaler device 100 then, on the basis of the information for requesting control of a heater, controls the heater included in the device 100 such that vapor will be increased (or reduced) or transmits, to another accessory unit, a control signal for controlling a heater included in the other accessory unit 200 such that vapor will be increased (or decreased).

**[0089]** In another example, the accessory unit 200-1, which is the sound recognition function section, may recognize a sound uttered by the user, "Glow", and transmit, to the device 100, information for requesting the notifier 113, which is the light emission device such as an LED, to light up. In another example, the accessory unit 200-1, which is the sound recognition function section, may recognize a sound uttered by the user, "Play music", and transmit, to the device 100, information for requesting outputting of music. The controller 116 of the device 100 may transmit, to another accessory unit 200 that is a sound output device (audio unit) on the basis of the information for requesting outputting of music, a control signal for requesting outputting of music.

(2) Second Configuration Example

**[0090]** FIG. 6 is a diagram illustrating a second configuration example of the accessory unit according to the present embodiment. As illustrated in FIG. 6, an accessory unit 200-2 in this configuration example includes an electrode mechanism 201-2, a communicator 202-2, a notifier 204-2, and a controller 210-2. In the second configuration example of the accessory unit, an operation function is provided for the inhaler device 100. An example of the accessory unit 200-2 may include an air inlet hole, an airflow path, and an air outlet hole. With this configuration, when the accessory unit 200-2 is attached to the inhaler device 100, an aerosol (smoke) can pass through the air inlet hole, the airflow path, and the air outlet hole.

**[0091]** When the accessory unit 200-2 is attached to the inhaler device 100 directly or through another accessory unit 200, the power supply 111 of the inhaler device 100 supplies power to the electrode mechanism 201-2 directly or through the other accessory unit 200. In the inhaler device 100, the power supply 111 supplies power to the components of the accessory unit 200-2 under

control of the controller 116.

**[0092]** When the accessory unit 200-2 is connected to the inhaler device 100 directly or through another accessory unit 200 and yet another accessory unit 200 is also attached to the inhaler device 100, the electrode mechanism 201-2 supplies power supplied from the power supply 111 of the inhaler device 100 directly or through the other accessory unit 200 to the yet other accessory unit 200. In the inhaler device 100, the power supply 111 supplies power to the components of the accessory unit 200-2 under control of the controller 116.

**[0093]** The communicator 202-2 is a communication interface capable of performing communication in accordance with any wired or wireless communication standard. The communication standard may be, for example, Wi-Fi (registered trademark), Bluetooth (registered trademark), near-field communication, LPWA, or the like. The communicator 202-2 communicates with another accessory unit 200 bidirectionally. The communicator 202-2 also communicates with the terminal apparatus 130 bidirectionally. The communicator 202-2 receives control information transmitted from the terminal apparatus 130. The controller 210-2 obtains the control information received by the communicator 202-2 and performs control on the basis of the obtained control information. The communicator 202-2 may communicate information with the device 100 by electrically or physically connecting to the device 100 through a terminal or the electrode mechanism 202-2, for example, and communicating with the device 100 in accordance with any wired communication standard. Alternatively, the communicator 202-2 may communicate information with the device 100 by communicating with the device 100 in accordance with any wireless communication standard.

**[0094]** The notifier 204-2 notifies the user of information. The notifier 204-2 is achieved, for example, by a sound output device that generates a voice or a sound, a light emission device that emits light, a scent generation device that generates a scent, or the like. An example of the sound output device is a speaker that provides information for the user using a voice or a sound. An example of the light emission device may be an LED (light-emitting diode) that emits light of a certain color, namely a blue LED, for example, and a certain change may be emission of light of a certain color such as blue. The certain color is not limited to blue, and may be any color. The certain change may be a change in the color or intensity of emitted light based on strength of inhalation detected by the sensor 112 in the inhaler device 100. The light emission device is not limited to an LED, and may be a light source that has another configuration and that emits light of the certain color.

**[0095]** An example of the scent generation device may be one that generates a scent when attached to the notifier 204-2 or one to which a formulated scent is transmitted, that receives the transmitted formulated scent, and that outputs the formulated scent.

**[0096]** The controller 210-2 functions as an arithmetic processing device and a control device and controls the whole operation of the accessory unit 200-2 in accordance with various programs. The controller 210-2 is achieved, for example, by an electronic circuit such as a CPU or a microprocessor. The controller 210-2 controls the communicator 202-2 and the notifier 204-2.

**[0097]** A configuration example of the accessory unit 200-2 has been described. It is needless to say that the configuration of the accessory unit 200-2 is not limited to that described above, and one of various configurations described hereinafter may be employed, instead. In an example, the accessory unit 200-2 may also include a vibration device that vibrates and/or a display device. In this case, when time remaining in one use becomes a certain period of time or when the number of times of inhalation remaining becomes a certain value, one or both of the vibration device and the display device output a notification.

**[0098]** An example of the vibration device is a vibrator that provides information for the user through vibration. An example of the display device may be a liquid crystal display, an organic EL (electro luminescence) display, or the like. The controller 210-2 causes the display device to display information obtained by the inhaler device 100 and/or another accessory unit 200. As a result, information can be provided for the user. Such information may include, for example, various pieces of information regarding a battery and, more specifically, can include a remaining battery charge level, information that warns of a low battery charge level, information that prompts the user to charge the battery, time required to charge the battery, information indicating battery degradation, the number of battery charges (per day, per week, per month, etc.), time elapsed since a last battery charge, and the like.

**[0099]** The notifier 204-2 may present such information to the user by displaying a banner or a pop-up window on the display device. Alternatively, the notifier 204-2 may present such information to the user as a push notification from an application.

**[0100]** In an example, the accessory unit 200-2 need not include the communicator 202-2.

(3) Third Configuration Example

**[0101]** FIG. 7 is a diagram illustrating a third configuration example of the accessory unit according to the present embodiment. As illustrated in Fig. 7, an accessory unit 200-3 in this configuration example includes an electrode mechanism 201-3, a communicator 202-3, and a controller 210-3. The third configuration example of the accessory unit provides a communication function for the inhaler device 100. An example of the accessory unit 200-3 may include an air inlet hole, an airflow path, and an air outlet hole. With this configuration, when attached to the inhaler device 100, the accessory unit 200-3 can let an aerosol (smoke) pass through the air inlet hole, the airflow path, and the air outlet hole.

**[0102]** When the accessory unit 200-3 is attached to the inhaler device 100 directly or through another accessory unit 200, the power supply 111 of the inhaler device 100 supplies power to the electrode mechanism 201-3 directly or through the other accessory unit 200. In the inhaler device 100, the power supply 111 supplies power to the components of the accessory unit 200-3 under control of the controller 116.

**[0103]** When the accessory unit 200-3 is attached to the inhaler device 100 directly or through another accessory unit 200 and yet another accessory unit 200 is also attached to the inhaler device 100, the electrode mechanism 201-3 supplies power supplied from the power supply 111 of the inhaler device 100 directly or through the other accessory unit 200 to the yet other accessory unit 200. In the inhaler device 100, the power supply 111 supplies power to the components of the accessory unit 200-3 under control of the controller 116.

**[0104]** The communicator 202-3 is a communication interface capable of performing communication in accordance with any wired or wireless communication standard. The communication standard may be, for example, Wi-Fi (registered trademark), Bluetooth (registered trademark), near-field communication, LPWA, or the like. The communicator 202-3 communicates with another accessory unit 200 including a communicator 202 bidirectionally. The communicator 202-3 also communicates with the terminal apparatus 130 bidirectionally. For example, the communicator 202-3 receives data transmitted from another accessory unit 200 and transmits the received data to the terminal apparatus 130. The communicator 202-3 receives control information transmitted from the terminal apparatus 130. The controller 210-3 obtains the control information received by the communicator 202-3 and performs control on the basis of the obtained control information. The communicator 202-3 may communicate information with the device 100 by electrically or physically connecting to the device 100 through a terminal or the electrode mechanism 202-3, for example, and communicating with the device 100 in accordance with any wired communication standard. Alternatively, the communicator 202-3 may communicate information with the device 100 by communicating with the device 100 in accordance with any wireless communication standard.

**[0105]** The controller 210-3 functions as an arithmetic processing device and a control device and controls the whole operation of the accessory unit 200-3 in accordance with various programs. The controller 210-3 is achieved, for example, by an electronic circuit such as a CPU or a microprocessor. The controller 210-3 operates on power supplied from the electrode mechanism 201-3 and controls the communicator 202-3.

(Examples of Attachment of Plurality of Accessory Units)

**[0106]** FIG. 8 is a diagram schematically illustrating configuration examples of attachment of accessory units to an inhaler device according to the present embodiment. Here, a case where two accessory units 200 are attached to the inhaler device 100 will be described as an example. Three or more accessory units 200 may be attached to the inhaler device 100, instead.

**[0107]** In an example illustrated in FIG. 8(1), two accessory units 200-1 are attached to the inhaler device 100.

**[0108]** In a first example of this configuration example, a sensor 203-1 of one of the accessory units 200-1 is an odor sensor, and a sensor 203-1 of the other accessory unit 200-1 is a TOF (time-of-flight) sensor. When an odor is detected, a distance to the odor is measured. With this configuration, when attached to the inhaler device 100, the two accessory units 200-1 can add a function of measuring an environment to the inhaler device 100.

**[0109]** In a second example of this configuration example, the sensor 203-1 of one of the accessory units 200-1 is a saliva sensor, and the sensor 203-1 of the other accessory unit 200-1 is a pulse sensor. With this configuration, when attached to the inhaler device 100, the two accessory units 200-1 can add a function of measuring biological data to the inhaler device 100.

**[0110]** In an example illustrated in FIG. 8(2), an accessory unit 200-2 and an accessory unit 200-1 are attached to the inhaler device 100.

**[0111]** In a first example of this configuration example, a notifier 204-2 of the accessory unit 200-2 is at least one of a sound output device that generates sound, a light emitting device that emits light, or a vibration device that vibrates, and a sensor 203-1 of the accessory unit 200-1 is a biosensor. When a value measured by the biosensor becomes a certain value, at least one of the sound output device, the light emitting device, or the vibration device operates. With this configuration, when attached to the inhaler device 100, the accessory unit 200-2 and the accessory unit 200-1 can add a stress alert function to the inhaler device 100.

**[0112]** In a second example of this configuration example, the notifier 204-2 of the accessory unit 200-2 is a display device, and the accessory unit 200-1 includes a communicator 202-1. With this configuration, when attached to the inhaler device 100, the accessory unit 200-2 and the accessory unit 200-1 can add a function of displaying data to the inhaler device 100. The communicator 202-1 of the accessory unit 200-1 receives data and outputs the received data to the accessory unit 200-2. The communicator 202-2 of the accessory unit 200-2 receives the data transmitted from the accessory unit 200-1, and the display unit displays the data received by the communicator 202-2.

**[0113]** In an example illustrated in FIG. 8(3), two accessory units 200-2 are attached to the inhaler device 100.

**[0114]** In a first example of this configuration example, a notifier 204-2 of one of the accessory units 200-2 is a sound sensor, and a notifier 204-2 of the other accessory unit 200-2 is a light emitting device. When the sound sen-

sor detects a sound, the light emitting device emits light. With this configuration, when attached to the inhaler device 100, the two accessory units 200-2 can add, to the inhaler device 100, a function of a light stick that can be used in concerts and other performance events.

**[0115]** In a second example of this configuration example, the notifier 204-2 of one of the accessory unit 200-2 is a sound output device, and the notifier 204-2 of the other accessory unit 200-2 is a scent generator. In a certain case, the sound output device outputs a sound, and the scent generator generates a scent. With this configuration, when attached to the inhaler device 100, the two accessory units 200-2 can add a function of providing a relaxing environment to the inhaler device 100.

**[0116]** In an example illustrated in FIG. 8(4), an accessory unit 200-1 and an accessory unit 200-3 are attached to the inhaler device 100.

**[0117]** In a first example of this configuration example, the accessory unit 200-1 includes a positioning device, and the accessory unit 200-3 include a communicator 202-3. With this configuration, when attached to the inhaler device 100, the accessory unit 200-1 and the accessory unit 200-3 can add a function of measuring motion to the inhaler device 100. A result of positioning performed by the accessory unit 200-1 may be output to the accessory unit 200-3, and the communicator 202-3 of the other accessory unit 200-3 may transmit the result of the positioning output from the accessory unit 200-1 to the terminal apparatus 130.

**[0118]** When a plurality of accessory units 200 are attached to the inhaler device 100, the controller 116 provides a certain function, if any, that can be achieved by a combination of the plurality of accessory units 200 for the inhaler device 100.

**[0119]** When a function as a stress alert kit (a biosensor + a sound/light/vibration unit) is provided for the inhaler device 100, the controller 116 in the inhaler device 100 starts, if biological data collected by a biosensor indicates a certain value or larger, a process for outputting an alert sound from an audio unit on the basis of a fact that both the biosensor and the audio unit have been attached. More specifically, the controller 116 starts a process for determining whether a value of the biological data has become the certain value or larger and, if the value of the biological data has become the certain value or larger, performs a process for generating sound data and outputting the sound data to the audio unit.

(Operations of Inhalation System)

**[0120]** FIG. 9 is a diagram illustrating a first example of operations performed by the inhalation system according to the present embodiment. Here, a case where an accessory unit 200-1 is attached to the inhaler device 100 will be described as an example.

(Step S1-1)

**[0121]** The accessory unit 200-1 is attached to the inhaler device 100.

(Step S2-1)

**[0122]** In the inhaler device 100, the sensor 112 detects the attachment of the accessory unit 200-1 to the inhaler device 100.

(Step S3-1)

**[0123]** In the inhaler device 100, the power supply 111 supplies power to the accessory unit 200-1 attached to the inhaler device 100 under control of the controller 116.

**[0124]** The power supply 111 of the inhaler device 100 supplies power to the electrode mechanism 201-1 in the accessory unit 200-1.

(Step S3-1)

**[0125]** In the inhaler device 100, the controller 116 obtains information for identifying a function of the accessory unit 200 and sets a processing mode on the basis of the obtained information for identifying the function of the accessory unit 200.

(Step S5-1)

**[0126]** In the accessory unit 200-1, the controller 210-1 operates on the power supplied from the electrode mechanism 201-1 and controls the communicator 202-1 and the sensor 203-1.

**[0127]** FIG. 10 is a diagram illustrating a second example of the operations performed by the inhalation system according to the present embodiment. Here, operations performed when an accessory unit 200-1 attached to the inhaler device 100 is removed from the inhaler device 100 will be described as an example.

(Step S1-2)

**[0128]** The accessory unit 200-1 is removed from the inhaler device 100.

(Step S2-2)

**[0129]** In the inhaler device 100, the sensor 112 detects the removal of the accessory unit 200-1 from the inhaler device 100. The sensor 112 detects that the accessory unit 200-1 is no longer electrically connected.

(Step S3-2)

**[0130]** In the inhaler device 100, the controller 116 stops, on the basis of a result of the detection of the removal of the accessory unit 200-1 from the inhaler device

100, the process for enabling the function of the accessory unit 200-1.

**[0131]** FIG. 11 is a diagram illustrating a third example of the operations performed by the inhalation system according to the present embodiment. Here, operations performed when an accessory unit 200-1 and an accessory unit 200-2 are attached to the inhaler device 100 will be described as an example. When a plurality of accessory units 200 are attached to the inhaler device 100, the controller 116 of the inhaler device 100 starts a process in accordance with a function of each of the accessory units 200 on the basis of the function.

(Step S1-3)

**[0132]** The accessory unit 200-1 and the accessory unit 200-2 are attached to the inhaler device 100.

(Step S2-3)

**[0133]** In the inhaler device 100, the sensor 112 detects the attachment of the accessory unit 200-1 to the inhaler device 100.

(Step S3-3)

**[0134]** In the inhaler device 100, the power supply 111 supplies power to the accessory unit 200-1 attached to the inhaler device 100 under control of the controller 116.

**[0135]** In the accessory unit 200-1, the power supply 111 of the inhaler device 100 supplies power to the electrode mechanism 201-1.

(Step S4-3)

**[0136]** In the inhaler device 100, the controller 116 obtains information for identifying a function of the accessory unit 200 and sets a processing mode on the basis of the obtained information for identifying the function of the accessory unit 200.

(Step S5-3)

**[0137]** In the accessory unit 200-1, the controller 210-1 operates on the power supplied from the electrode mechanism 201-1 and controls the communicator 202-1 and the sensor 203-1.

(Step S6-3)

**[0138]** In the inhaler device 100, the sensor 112 detects the attachment of the accessory unit 200-2 to the inhaler device 100.

(Step S7-3)

**[0139]** In the inhaler device 100, the power supply 111 supplies power to the communicator 202-2 attached to the inhaler device 100 under control of the controller 116.

**[0140]** The power supply 111 of the inhaler device 100 supplies power to the electrode mechanism 201-2 in the accessory unit 200-2.

(Step S8-3)

**[0141]** In the inhaler device 100, the controller 116 obtains information for identifying a function of the accessory unit 200 and sets a processing mode on the basis of the obtained information for identifying the function of the accessory unit 200.

(Step S9-3)

**[0142]** In the accessory unit 200-2, the controller 210-2 operates on the power supplied from the electrode mechanism 201-2 and controls the communicator 202-2 and the notifier 204-2.

**[0143]** FIG. 12 is a diagram illustrating a fourth example of the operations performed by the inhalation system according to the present embodiment. Here, operations performed when an accessory unit 200-1 and an accessory unit 200-2 attached to the inhaler device 100 are removed from the inhaler device 100 will be described as an example.

(Step S1-4)

**[0144]** The accessory unit 200-1 and the accessory unit 200-2 are removed from the inhaler device 100. The sensor 112 detects that the accessory unit 200-1 and the accessory unit 200-2 are no longer electrically connected.

(Step S2-4)

**[0145]** In the inhaler device 100, the sensor 112 detects the removal of the accessory unit 200-1 and the accessory unit 200-2 from the inhaler device 100.

(Step S3-4)

**[0146]** In the inhaler device 100, the controller 116 stops, on the basis of a result of the detection of the removal of the accessory unit 200-1 and the accessory unit 200-2 from the inhaler device 100, a process for enabling a function of the accessory unit 200-1 and a process for enabling a function of the accessory unit 200-2.

**[0147]** Although a process where two accessory units 200 are removed from the inhaler device 100 has been described with reference to FIG. 12, the number of accessory units 200 removed is not limited to this example. For example, the description also applies to a process where three or more accessory units 200 are removed from the inhaler device 100.

**[0148]** With the inhalation system 1 according to the present embodiment, the inhalation system 1 includes

the inhaler device 100 including a power supply as the power supply 111 and a heater as the heater 221-1, the heater 221-2, or the heater 221-3 and a plurality of accessory units 200 that are removably attached to the inhaler device 100 and that provide functions for the inhaler device 100. In a case where the plurality of accessory units 200 are attached, the inhaler device 100 can perform the function provided by each of the plurality of accessory units 200. With this configuration, since, in a case where the plurality of accessory units 200 are attached, the inhaler device 100 can perform the function provided by each of the plurality of accessory units 200, the inhaler device 100 can increase the functions of the inhaler device 100. The functions provided by the plurality of accessory units 200 for the inhaler device 100 may be different from each other or at least partly the same.

**[0149]** In addition, one of the plurality of accessory units includes an information collection function provision accessory unit that provides a function of collecting information. With this configuration, in a case where the accessory unit 200 is attached to the inhaler device 100, the accessory unit 200 can provide the function of collecting information for the inhaler device 100.

**[0150]** In addition, the information collection function provision accessory unit includes a data collection sensor that collects various types of data. With this configuration, in a case where the accessory unit 200 is attached to the inhaler device 100, the accessory unit 200 can provide a function of collecting various types of data for the inhaler device 100 using the data collection sensor.

**[0151]** In addition, the data collection sensor includes at least one of a smoking data collection sensor capable of collecting smoking data, a biosensor capable of obtaining biological data, or a positional information collection sensor capable of collecting positional information. With this configuration, in a case where the accessory unit 200 is attached to the inhaler device 100, the accessory unit 200 can provide a function of collecting at least one of smoking data, biological data, or positional information for the inhaler device 100 using the data collection sensor.

**[0152]** In addition, the information collection function provision accessory unit includes a communication module that provides a communication function. With this configuration, in a case where the accessory unit 200 is attached to the inhaler device 100, the accessory unit 200 can provide the communication function for the inhaler device 100.

**[0153]** In addition, one of the plurality of accessory units also includes an operation provision accessory unit that provides a certain operation. With this configuration, in a case where the accessory unit 200 is attached to the inhaler device 100, the accessory unit 200 can provide the certain operation for the inhaler device 100.

**[0154]** In addition, the operation provision accessory unit includes at least one of a function of generating a sound, a function of generating light, a function of generating a scent, a vibration function, or a display function. With this configuration, in a case where the accessory unit 200 is attached to the inhaler device 100, the accessory unit 200 can provide at least one of the function of generating a sound, the function of generating light, the function of generating a scent, the vibration function, or the display function for the inhaler device 100.

**[0155]** In addition, the inhaler device 100 obtains information for identifying functions of the attached accessory units 200 and changes a processing mode of the inhaler device 100 on a basis of the obtained information for identifying the functions provided by the accessory units 200. With this configuration, the inhaler device 100 can obtain the information for identifying the functions provided by the accessory units 200 and change the mode of the inhaler device on the basis of the obtained information for identifying the functions provided by the accessory units 200. The inhaler device 100 therefore, can receive the provision of the functions from the accessory unit 200.

**[0156]** With the inhalation system 1 according to the present embodiment, the accessory unit 200 is one of the plurality of accessory units 200 that provide functions for the inhaler device 100. In a case where the accessory unit 200 is attached to the inhaler device 100, the accessory unit 200 provides the corresponding function for the inhaler device 100. With this configuration, in a case where the inhaler device 100 is attached to one of the plurality of accessory units 200, the accessory unit 200 can provide the corresponding function for the inhaler device 100. The accessory unit 200, therefore, can increase the functions of the inhaler device 100.

**[0157]** With the inhalation system 1 according to the present embodiment, the inhaler device 100 includes a power supply as the power supply 111 and the controller 116 that can perform a function provided by each of the plurality of accessory units 200. In a case where the plurality of accessory units 200 are attached, the controller 116 can perform the function provided by each of the plurality of accessory units 200. With this configuration, in a case where the plurality of accessory units 200 are attached, the inhaler device 100 can perform the function provided by each of the plurality of accessory units 200. The functions of the inhaler device 100, therefore, can be increased.

(Modification of Embodiment)

**[0158]** FIG. 1 can be used for an example of an inhalation system 1a according to a modification of the embodiment. The inhalation system 1a according to the modification of the embodiment is different from the inhalation system 1a according to the embodiment in that an inhaler device 100-2 included in the inhalation system 1a according to the embodiment includes a communicator.

«1. Configuration Examples of Inhaler Device»

**[0159]** FIG. 13 is a diagram illustrating a first configuration example of an inhaler device according to the modification of the embodiment. As illustrated in FIG. 13, an inhaler device 100A-2 in this configuration example includes a power supply unit 110. The power supply unit 110 includes a power supply 111, a sensor 112, a notifier 113, a memory 114, a communicator 115, and a controller 116-2.

**[0160]** The communicator 115 is a communication interface for communicating information between the inhaler device 100A-2 and other apparatuses such as the accessory unit 200 and the terminal apparatus 130. The communicator 115 is a communication interface capable of performing communication in accordance with any wired or wireless communication standard. The communication standard may be, for example, a wireless LAN, a wired LAN, Wi-Fi (registered trademark), Bluetooth (registered trademark), or the like. In an example, the communicator 115 receives, from a server (not illustrated), information regarding a new OS in order to update the information regarding an OS stored in the memory 114. In another example, the communicator 115 transmits an accessory information request to the accessory unit 200. The communicator 115 then receives an accessory information response transmitted from the accessory unit 200 in response to the transmitted accessory information request.

**[0161]** The controller 116-2 functions as an arithmetic processing device and a control device and controls the whole operation of the inhaler device 100A-2 and the whole operation of the accessory unit 200 connected to the inhaler device 100A-2 in accordance with various programs. The controller 116-2 is achieved, for example, by an electronic circuit such a CPU (central processing unit) or a microprocessor. The controller 116-2 may also include a ROM (read-only memory) storing the programs to be used, operation parameters, and the like and a RAM (random-access memory) that temporarily stores parameters and the like that change as necessary. The inhaler device 100A-2 and the accessory unit 200 connected to the inhaler device 100A-2 perform various types of processing under control of the controller 116-2.

**[0162]** The supply of power from the power supply 111 to the other components, the charging of the power supply 111, the detection of information by the sensor 112, the notification of information by the notifier 113, the storing and reading of information by the memory 114, and the communication of information by the communicator 115 are examples of processing controlled by the controller 116-2.

**[0163]** The controller 116-2 also controls other types of processing performed by the inhaler device 100A-2, such as inputting of information to the components and processing based on information output from the components. The controller 116-2 also controls the detection of the accessory unit 200 by the sensor 112, the creation of an accessory information request for requesting information regarding the accessory unit 200 based on the detection of the accessory unit 200, the reception of an accessory information request by the communicator 115, the reception of an accessory information response by the communicator 115, obtainment of information for identifying a function of the accessory unit 200 included in an accessory information response, a change to (setting of) a processing mode based on obtained information for identifying a function of the accessory unit 200, and processing based on a result of the change to the processing mode.

**[0164]** The inhaler device 100A-2 includes a cartridge 220-1. The cartridge 220-1 includes a heater 221-1, a liquid guide 222-1, and a liquid storage 223-1.

**[0165]** FIG. 14 is a diagram illustrating a second configuration example of the inhaler device according to the modification of the embodiment. As illustrated in FIG. 14, an inhaler device 100B-2 in this configuration example includes a power supply unit 110. The power supply unit 110 includes a power supply 111, a sensor 112, a notifier 113, a memory 114, a communicator 115, and a controller 116-2.

**[0166]** The inhaler device 100B-2 includes a cartridge 220-2. The cartridge 220-2 includes a heater 221-2, a liquid guide 222-2, and a liquid storage 223-2. The inhaler device 100B-2 includes a flavor imparting cartridge 230-2.

**[0167]** FIG. 15 is a diagram illustrating a third configuration example of the inhaler device according to the modification of the embodiment. As illustrated in FIG. 15, an inhaler device 100C-2 in this configuration example includes a power supply 111, a sensor 112, a notifier 113, a memory 114, a communicator 115, a controller 116-2, a heater 221-3, a holder 240-3, and a heat insulator 244-3.

**[0168]** A configuration example of the inhaler device 100-2 has been described. It is needless to say that the configuration of the inhaler device 100-2 is not limited to that described above, and one of various configurations described hereinafter may be employed, instead.

**[0169]** In an example, the power supply unit 110 need not include the communicator 115. In this case, the communicator 115 is provided separately from the power supply unit 110.

(Example of Attachment of Accessory Unit)

**[0170]** FIG. 16 is a diagram schematically illustrating configuration examples of attachment of an accessory unit to the inhaler device according to the modification of the embodiment.

**[0171]** In an example illustrated in FIG. 16(1), an accessory unit 200-3 is attached to the inhaler device 100-2.

**[0172]** In a first example of this configuration example, near-field communication (NFC) is employed as an example of the communication standard of the communicator 202-3 of the accessory unit 200-3, and Bluetooth

(registered trademark) is employed as an example of the communication standard of the communicator 115 of the inhaler device 100-2. With this configuration, since the accessory unit 200-3 need not perform pairing, the accessory unit 200-3 can be used for communication with another inhaler device, and the inhaler device 100-2 can be used for communication other than the communication with another inhaler device. For example, the accessory unit 200-3 can communicate with another inhaler device in a P2P (point-to-point) mode.

**[0173]** In a second example of this configuration example, LPWA is employed as an example of the communication standard of the communicator 202-3 of the accessory unit 200-3, and Bluetooth (registered trademark) is employed as an example of the communication standard of the communicator 115 of the inhaler device 100. With this configuration, the accessory unit 200-3 can be used to transmit smoking data, biological data, or the like, and the inhaler device 100-2 can be used to receive a heating profile or software.

**[0174]** As illustrated in FIG. 16(2), two accessory units 200-3 are attached to the inhaler device 100-2.

**[0175]** In a first example of this configuration example, near-field communication (NFC) is employed as an example of the communication standard of the communicator 202-3 of one of the accessory units 200-3, and Bluetooth (registered trademark) is employed as an example of the communication standard of the other accessory unit 200-3.

**[0176]** In a second example of this configuration example, LPWA is employed as the communication standard of the communicator 202-3 of one of the accessory units 200-3, and Bluetooth (registered trademark) is employed as an example of the communication standard of the other accessory unit 200-3.

**[0177]** When a plurality of accessory units 200 are attached to the inhaler device 100, the controller 116-2 provides a certain function, if any, that can be achieved by a combination of the plurality of accessory units 200 for the inhaler device 100.

**[0178]** When distributed communication (e.g., when both a BLE module and an NFC module are attached) is provided for the inhaler device 100-2, the controller 116-2 in the inhaler device 100-2 starts distribution of transmission, by BLE or NFC, of information for transmission of data stored in the memory 114 on the basis of a fact that both the BLE module and the NFC module have been attached.

**[0179]** When an accessory unit 200-3 including a communication module and an accessory unit 200-1 including a puff sensor are attached to the inhaler device 100-2, the controller 116-2 in the inhaler device 100-2 starts a process for a communication connection with the terminal apparatus 130 such as a smartphone using the communication module. The controller 116-2 then performs a process for transmitting information stored in the memory 114 to the terminal apparatus 130 through the communication connection. The controller 116-2 also waits in a state where, when information indicating detection of a puff is received from the accessory unit 200-1 for the puff sensor, a process for storing the information indicating detection of a puff in the memory 114 of the inhaler device 100-2 can be performed. When information indicating detection of a puff is received from the accessory unit 200-1 thereafter, the controller 116-2 starts to store the information in the memory 114.

(Operations of Inhalation System)

**[0180]** FIG. 17 is a diagram illustrating a first example of operations performed by the inhalation system according to the modification of the embodiment. Here, a case where an accessory unit 200-1 is attached to the inhaler device 100-2 will be described as an example.

(Step S1-5)

**[0181]** The accessory unit 200-1 is attached to the inhaler device 100-2.

(Step S2-5)

**[0182]** In the inhaler device 100-2, the sensor 112 detects the attachment of the accessory unit 200-1 to the inhaler device 100-2.

(Step S3-5)

**[0183]** In the inhaler device 100, the controller 116-2 creates an accessory information request for requesting information regarding the accessory unit 200-1 on the basis of a result of the detection of the attachment of the accessory unit 200-1 to the inhaler device 100-2.

(Step S4-5)

**[0184]** In the inhaler device 100-2, the controller 116-2 outputs the created accessory information request to the communicator 115. The communicator 115 obtains the accessory information request output from the controller 116-2 and transmits the obtained accessory information request to the accessory unit 200-1.

(Step S5-5)

**[0185]** In the accessory unit 200-1, the communicator 202-1 receives the accessory information request transmitted from the inhaler device 100-2. The controller 210-1 obtains the accessory information request received by the communicator 202-1. The controller 210-1 creates, on the basis of the obtained accessory information request, an accessory information response that includes information for identifying a function of the accessory unit 200-1 and whose destination is the inhaler device 100-2.

(Step S6-5)

**[0186]** In the accessory unit 200-1, the controller 210-1 outputs the created accessory information response to the communicator 202-1. The communicator 202-1 obtains the accessory information response output from the controller 210-1 and transmits the obtained accessory information response to the inhaler device 100-2.

(Step S7-5)

**[0187]** In the inhaler device 100-2, the communicator 115 receives the accessory information response transmitted from the accessory unit 200-1. The controller 116-2 obtains the accessory information response received by the communicator 115. The controller 116-2 performs, on the basis of the information for identifying the function of the accessory unit 200-1 included in the obtained accessory information response, a process for enabling the function of the accessory unit 200-1.

**[0188]** FIG. 18 is a diagram illustrating a second example of the operations performed by the inhalation system according to the modification of the embodiment. Here, operations performed when an accessory unit 200-1 attached to the inhaler device 100-2 is removed from the inhaler device 100-2 will be described as an example.

(Step S 1-6)

**[0189]** The accessory unit 200-1 is removed from the inhaler device 100-2.

(Step S2-6)

**[0190]** In the inhaler device 100-2, the sensor 112 detects the removal of the accessory unit 200-1 from the inhaler device 100-2. The sensor 112 detects that the accessory unit 200-1 is no longer electrically connected.

(Step S3-6)

**[0191]** In the inhaler device 100-2, the controller 116-2 stops, on the basis of a result of the detection of the removal of the accessory unit 200-1 from the inhaler device 100-2, the process for enabling the function of the accessory unit 200-1. More specifically, when the accessory unit 200 includes a puff sensor, the controller 116-2 stops (cancels) waiting in a state where a process for storing information indicating detection of a puff in the memory 114 of the inhaler device 100-2 can be performed. When the accessory unit 200-1 includes an audio unit, the controller 116-2 stops (cancels) waiting in a state where a process for outputting audio information under a certain condition can be performed.

**[0192]** A process achieved by a certain function that can be achieved by a combination of accessory units is stopped. If there is an accessory unit 200 that has not been removed in this case, a process for performing a function achieved by the accessory unit 200 starts.

**[0193]** FIG. 19 is a diagram illustrating a third example of the operations performed by the inhalation system according to the modification of the embodiment. Here, operations performed when an accessory unit 200-1 and an accessory unit 200-2 are attached to the inhaler device 100-2 will be described as an example. When a plurality of accessory units 200 are attached to the inhaler device 100-2, the controller 116-2 of the inhaler device 100-2 starts a process in accordance with a function of each of the accessory units 200 on the basis of the function.

(Step S1-7)

**[0194]** The accessory unit 200-1 and the accessory unit 200-2 are attached to the inhaler device 100-2.

(Step S2-7)

**[0195]** In the inhaler device 100-2, the sensor 112 detects the attachment of the accessory unit 200-1 to the inhaler device 100-2.

(Step S3-7)

**[0196]** In the inhaler device 100-2, the controller 116-2 creates an accessory information request for requesting information regarding the accessory unit 200-1 on the basis of a result of the detection of the attachment of the accessory unit 200-1 to the inhaler device 100-2.

(Step S4-7)

**[0197]** In the inhaler device 100-2, the controller 116-2 outputs the created accessory information request to the communicator 115. The communicator 115 obtains the accessory information request output from the controller 116-2 and transmits the obtained accessory information request to the accessory unit 200-1.

(Step S5-7)

**[0198]** In the accessory unit 200-1, the communicator 202-1 receives the accessory information request transmitted from the inhaler device 100-2. The controller 210-1 obtains the accessory information request received by the communicator 202-1. The controller 210-1 creates, on the basis of the obtained accessory information request, an accessory information response that includes information for identifying a function of the accessory unit 200-1 and whose destination is the inhaler device 100-2.

(Step S6-7)

**[0199]** In the accessory unit 200-1, the controller 210-1 outputs the created accessory information response to the communicator 202-1. The communicator 202-1 ob-

tains the accessory information response output from the controller 210-1 and transmits the obtained accessory information response to the inhaler device 100-2.

(Step S7-7)

**[0200]** In the inhaler device 100-2, the communicator 115 receives the accessory information response transmitted from the accessory unit 200-1. The controller 116-2 obtains the accessory information response received by the communicator 115. The controller 116-2 performs, on the basis of the information for identifying the function of the accessory unit 200-1 included in the obtained accessory information response, a process for enabling the function of the accessory unit 200-1.

(Step S8-7)

**[0201]** In the inhaler device 100-2, the sensor 112 detects the attachment of the accessory unit 200-2 to the inhaler device 100-2.

(Step S9-7)

**[0202]** In the inhaler device 100-2, the controller 116-2 creates an accessory information request for requesting information regarding the accessory unit 200-2 on the basis of a result of the detection of the attachment of the accessory unit 200-2 to the inhaler device 100-2.

(Step S10-7)

**[0203]** In the inhaler device 100-2, the controller 116-2 outputs the created accessory information request to the communicator 115. The communicator 115 obtains the accessory information request output from the controller 116-2 and transmits the obtained accessory information request to the accessory unit 200-2.

(Step S11-7)

**[0204]** In the accessory unit 200-2, the communicator 202-2 receives the accessory information request transmitted from the inhaler device 100-2. The controller 210-2 obtains the accessory information request received by the communicator 202-2. The controller 210-2 creates, on the basis of the obtained accessory information request, an accessory information response that includes information for identifying a function of the accessory unit 200-2 and whose destination is the inhaler device 100-2.

(Step S12-7)

**[0205]** In the accessory unit 200-2, the controller 210-2 outputs the created accessory information response to the communicator 202-2. The communicator 202-2 obtains the accessory information response output from the controller 210-2 and transmits the obtained accessory information response to the inhaler device 100-2.

(Step S13-7)

**[0206]** In the inhaler device 100-2, the communicator 115 receives the accessory information response transmitted from the accessory unit 200-2. The controller 116-2 obtains the accessory information response received by the communicator 115. The controller 116-2 performs, on the basis of the information for identifying the function of the accessory unit 200-2 included in the obtained accessory information response, a process for enabling the function of the accessory unit 200-2.

**[0207]** Although a process where two accessory units 200 are attached to the inhaler device 100-2 has been described with reference to FIG. 19, the number of accessory units 200 attached is not limited to this example. For example, the description also applies can also be applied to a process where three or more accessory units 200 are attached to the inhaler device 100-2.

**[0208]** FIG. 20 is a diagram illustrating a fourth example of the operations performed by the inhalation system according to the modification of the embodiment. Here, operations performed when an accessory unit 200-1 and an accessory unit 200-2 attached to the inhaler device 100-2 are removed will be described as an example.

(Step S1-8)

**[0209]** The accessory unit 200-1 and the accessory unit 200-2 are removed from the inhaler device 100-2. The sensor 112 detects that the accessory unit 200-1 and the accessory unit 200-2 are no longer electrically connected.

(Step S2-8)

**[0210]** In the inhaler device 100-2, the sensor 112 detects the removal of the accessory unit 200-1 and the accessory unit 200-2 from the inhaler device 100-2.

(Step S3-8)

**[0211]** In the inhaler device 100-2, the controller 116-2 stops, on the basis of a result of the detection of the removal of the accessory unit 200-1 and the accessory unit 200-2 from the inhaler device 100-2, a process for enabling a function of the accessory unit 200-1 and a process for enabling a function of the accessory unit 200-2.

**[0212]** Although a process where two accessory units 200 are removed from the inhaler device 100-2 has been described with reference to FIG. 20, the number of accessory units 200 removed is not limited to this example. For example, the description also applies to a process where three or more accessory units 200 are removed from the inhaler device 100-2.

**[0213]** With the inhalation system 1 according to the modification of the embodiment, in addition to the inha-

lation system according to the embodiment, each of the plurality of communication modules can perform communication using a different communication method. With this configuration, when attached to the inhaler device 100-2, a plurality of accessory units 200 can provide communication functions based on different communication methods.

**[0214]** Although embodiments have been described, these embodiments are presented as examples and not intended to limit the scope of the invention. These embodiments can be implemented in various other modes and subjected to various types of omission, replacement, modification, and combination without deviating from the spirit of the invention. These embodiments are included in the scope and the spirit of the invention, and also included in the invention described in the claims and its equivalent scope.

**[0215]** The inhaler device 100 and the accessory units 200 described above may be achieved by a computer, instead. In this case, a program for achieving a function of each function block is stored in a computer-readable storage medium. The inhaler device 100 and the accessory units 200 may be achieved by loading the program stored in the storage medium into a computer system and executing the program using a CPU. The "computer system" here includes an OS (operating system) and hardware such as peripheral devices.

**[0216]** The "computer-readable storage medium" refers to a portable medium such as a flexible disk, a magneto-optical disk, a ROM, or a CD-ROM. The "computer-readable storage medium" also includes a storage device incorporated into a computer system, such as a hard disk.

**[0217]** Furthermore, the "computer-readable storage medium" may also include a storage medium that dynamically holds a program for a short period of time. The storage medium that dynamically holds a program for a short period of time is, for example, a communication line at a time when a program is transmitted over a network such as the Internet or a communication link such as a telephone line.

**[0218]** The "computer-readable storage medium" may also include a storage medium that holds a program for a certain period of time, such as a volatile memory inside a computer system that serves as a server or a client. The program may be used to achieve a part of the above-described functions. The program may be one that can achieve the above-described functions in combination with a program that is already stored in a computer system. The program may be achieved using a programmable logic device, instead. The programmable logic device is, for example, an FPGA (field-programmable gate array).

Reference Signs List

**[0219]** 1, 1a...inhalation system, 100, 100A, 100B, 100C, 100-2, 100A-2, 100B-2, 100C-2...inhaler device, 130...terminal apparatus, 200-1 to 200-n, 200...accessory unit, 110...power supply unit, 111...power supply, 112...sensor, 113...notifier, 114...memory, 115...communicator, 116...controller, 180A, 180B...airflow path, 181A, 181B...air inlet hole, 182A, 182B...air outlet hole, 190A, 190B...arrow, 201-1, 201-2, 201-3...electrode mechanism, 202-1, 202-2, 202-3...communicator, 203-1...sensor, 204-2...notifier, 210-1, 210-2, 210-3...controller, 220-1, 220-2...cartridge, 221-1, 221-2, 221-3...heater, 222-1, 222-2...liquid guide, 223-1, 223-2...liquid storage, 224A, 224B...mouthpiece, 230-2...flavor imparting cartridge, 231-2...flavor source, 240-3...holder, 241-3...internal space, 242-3...opening, 243-3...bottom, 244-3...heat insulator, 250-3...stick substrate, 251-3...substrate, 252-3...inhalation port

## Claims

1. An inhalation system comprising:

   an inhaler device including a power supply and a heater; and
   a plurality of accessory units that are removably attached to the inhaler device and that provide functions for the inhaler device,
   wherein, the inhaler device configured to perform the functions provided by each of the plurality of accessory units in response to attachment of the plurality of accessory units.

2. The inhalation system according to claim 1, wherein one of the plurality of accessory units includes an information collection function provision accessory unit that provides a function of collecting information.

3. The inhalation system according to claim 2, wherein the information collection function provision accessory unit includes a data collection sensor that collects various types of data.

4. The inhalation system according to claim 3, wherein the data collection sensor includes at least one of a smoking data collection sensor capable of collecting smoking data, a biosensor capable of obtaining biological data, or a positional information collection sensor capable of collecting positional information.

5. The inhalation system according to any of claims 2 to 4, wherein the information collection function provision accessory unit includes a communication module that provides a communication function.

6. The inhalation system according to claim 5, wherein each of a plurality of the communication modules is capable of performing communication

using a different communication method.

**7.** The inhalation system according to claim 1, wherein one of the plurality of accessory units further includes an operation provision accessory unit that provides a certain operation.

**8.** The inhalation system according to claim 7, wherein the operation provision accessory unit includes at least one of a function of generating a sound, a function of generating light, a function of generating a scent, a vibration function, or a display function.

**9.** The inhalation system according to any of claims 1 to 7, wherein the inhaler device obtains information for identifying functions of the attached accessory units and changes a processing mode of the inhaler device on a basis of the obtained information for identifying the functions provided by the accessory units.

**10.** An accessory unit that is one of a plurality of accessory units providing functions for an inhaler device, wherein, in a case where the accessory unit is attached to the inhaler device, the accessory unit provides the corresponding function for the inhaler device.

**11.** An inhaler device comprising:

a power supply;
a heater; and
a controller configured to perform functions provided by each of a plurality of accessory units, wherein, the controller configured to perform the function provided by each of the plurality of accessory units in response to attachment of the plurality of accessory units.

**12.** A control method performed by an inhalation system, the control method comprising:

a step of, using an inhaler device including a power supply and a heater, detecting attachment of a plurality of accessory units;
a step of, using the plurality of accessory units, providing functions for the inhaler device; and
a step of, using the inhaler device, enabling the functions provided by the plurality of accessory units.

**13.** A program for causing a computer of an inhaler device to perform a process comprising:

a step of detecting attachment of a plurality of accessory units; and
a step of enabling functions provided by the plurality of accessory units.

FIG. 1

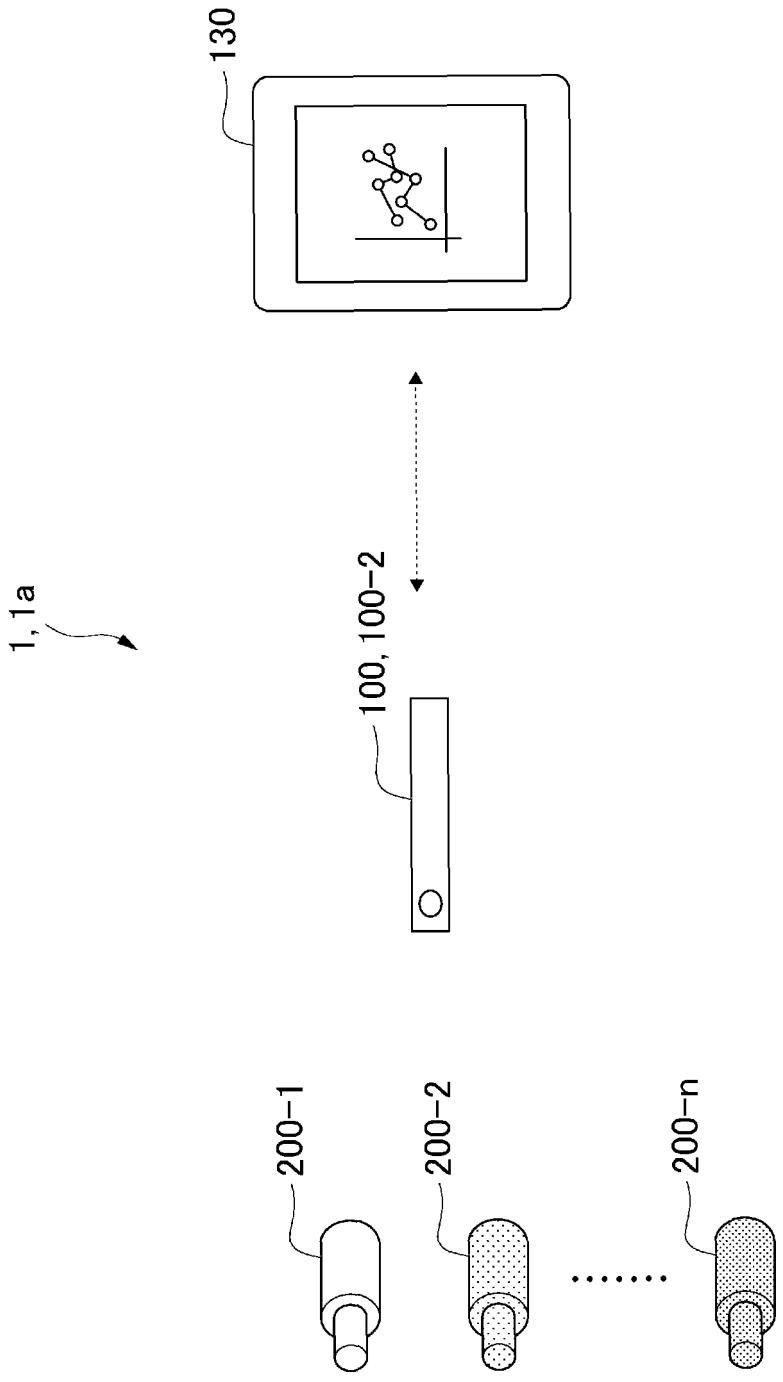


FIG. 2

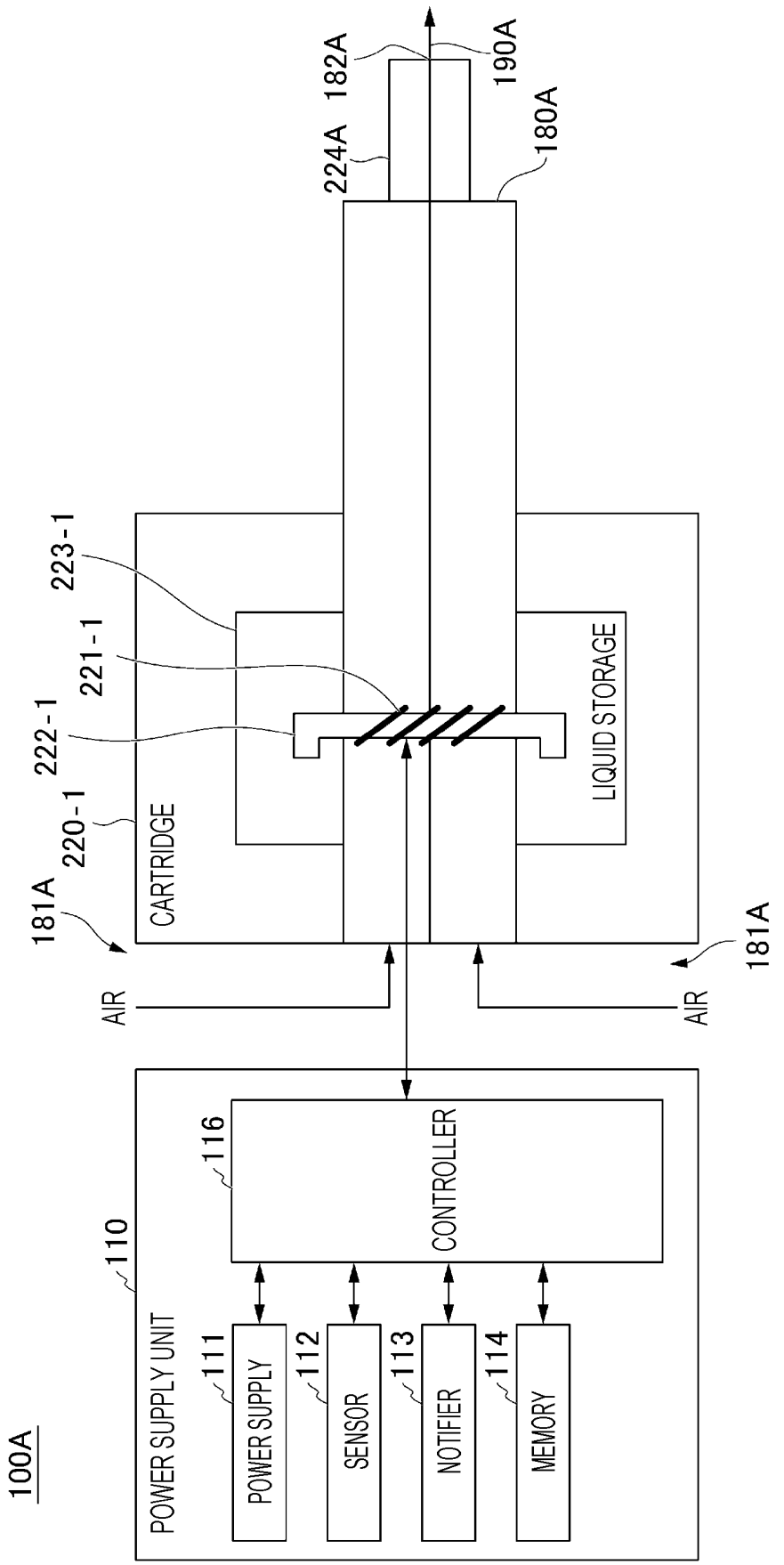

100A
POWER SUPPLY UNIT
110
CONTROLLER
116
POWER SUPPLY
111
SENSOR
112
NOTIFIER
113
MEMORY
114
AIR
AIR
181A
181A
CARTRIDGE
220-1
222-1
221-1
223-1
LIQUID STORAGE
224A
182A
190A
180A

FIG. 3

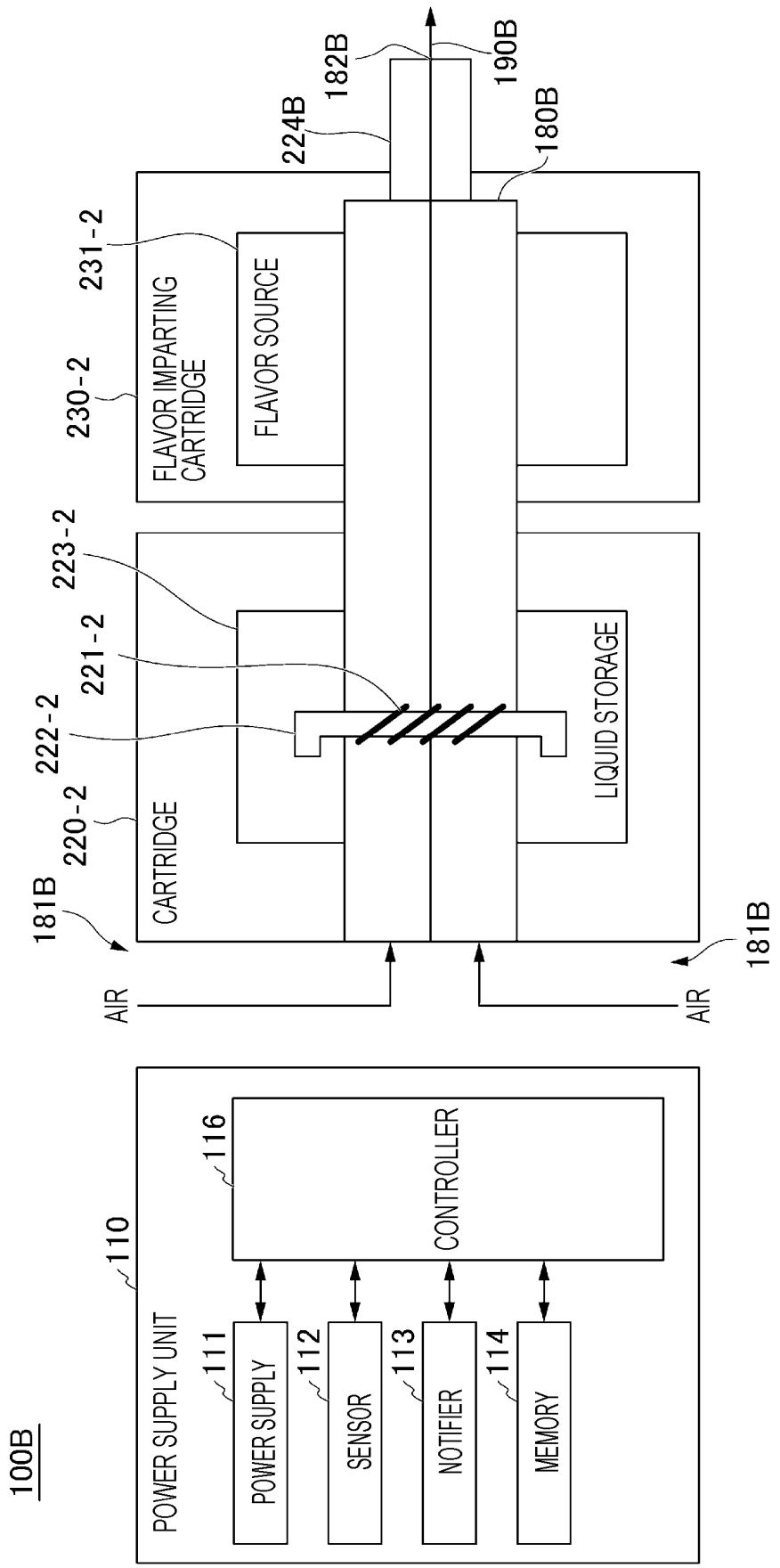
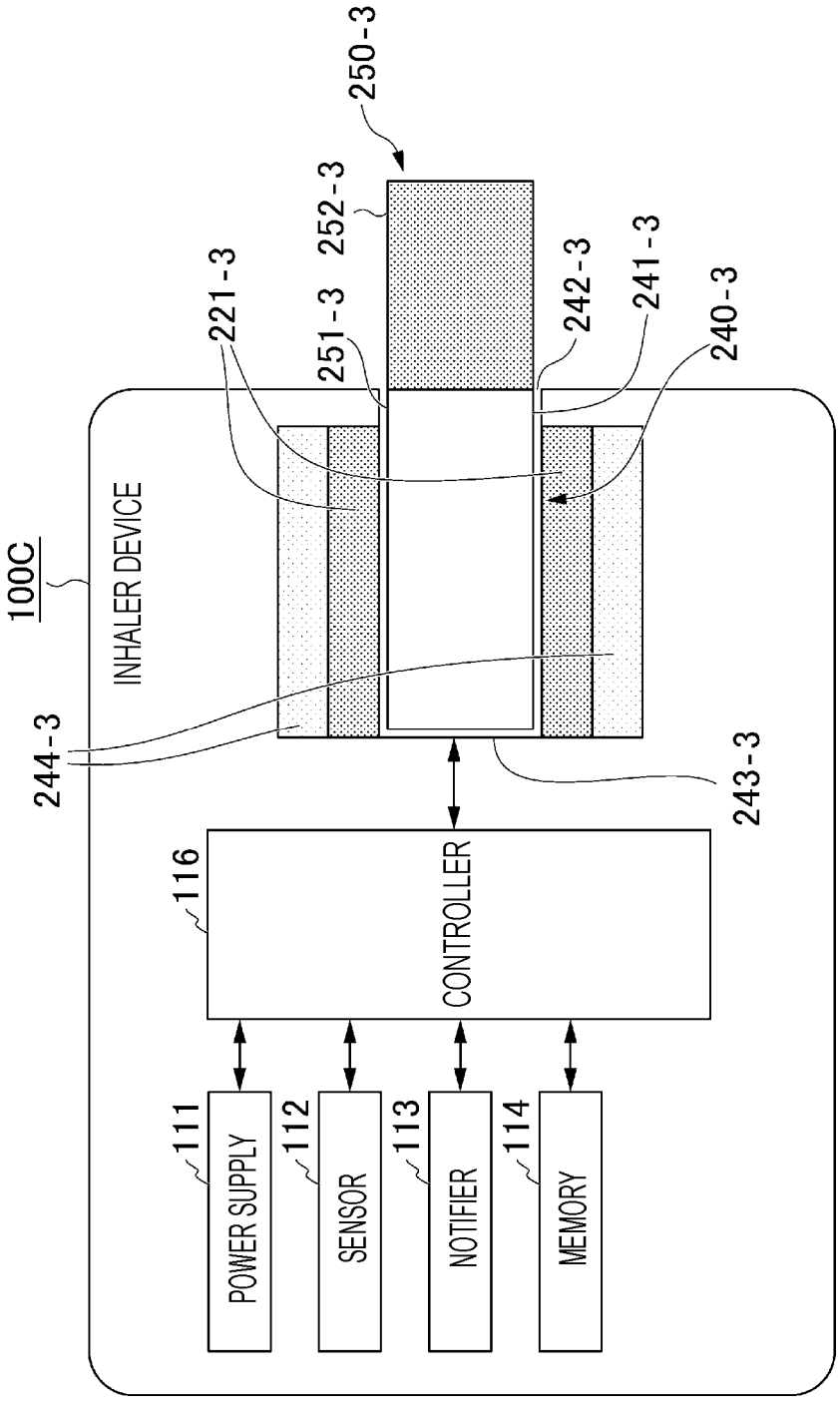

100B
POWER SUPPLY UNIT
110
116
CONTROLLER
111
POWER SUPPLY
112
SENSOR
113
NOTIFIER
114
MEMORY
181B
AIR
220-2
CARTRIDGE
222-2
221-2
223-2
LIQUID STORAGE
230-2
FLAVOR IMPARTING CARTRIDGE
231-2
FLAVOR SOURCE
224B
182B
190B
180B

FIG. 4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INHALER DEVICE
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251-3
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241-3
240-3
244-3
243-3
116
CONTROLLER
111
POWER SUPPLY
112
SENSOR
113
NOTIFIER
114
MEMORY

FIG. 5

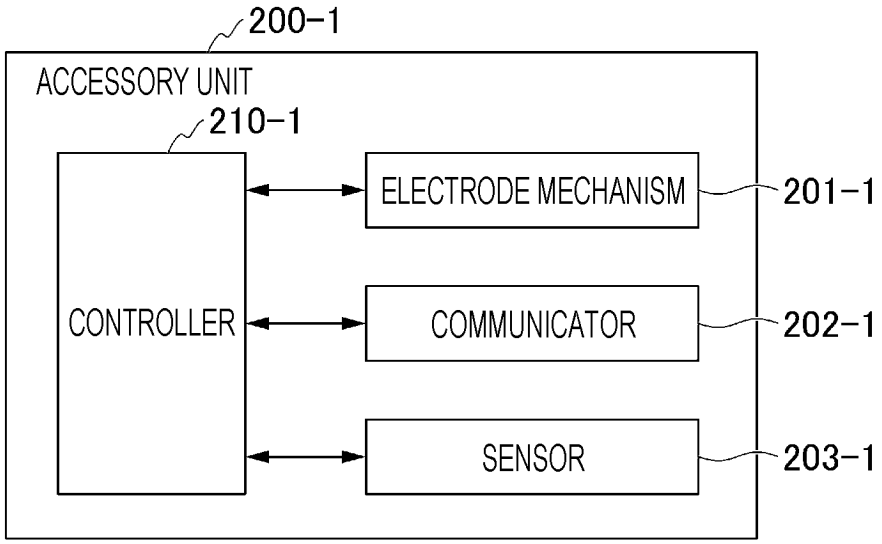



FIG. 6

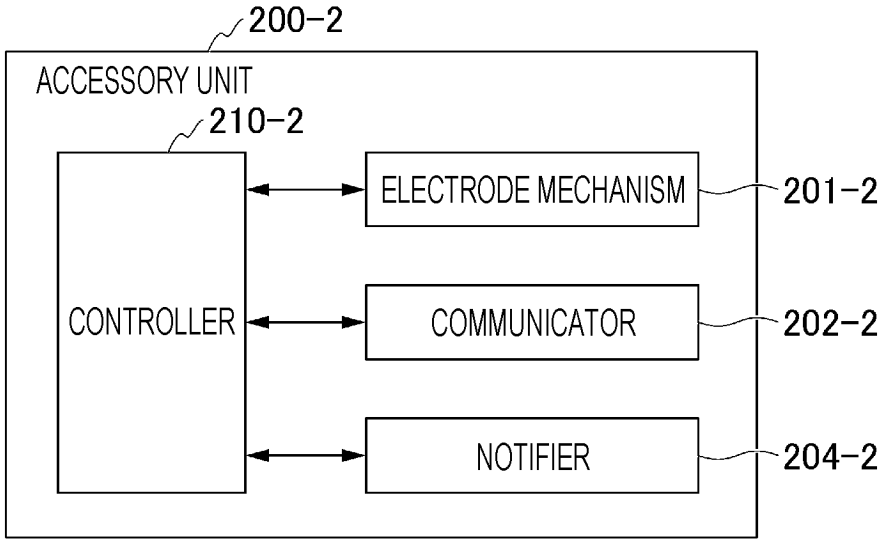



FIG. 7

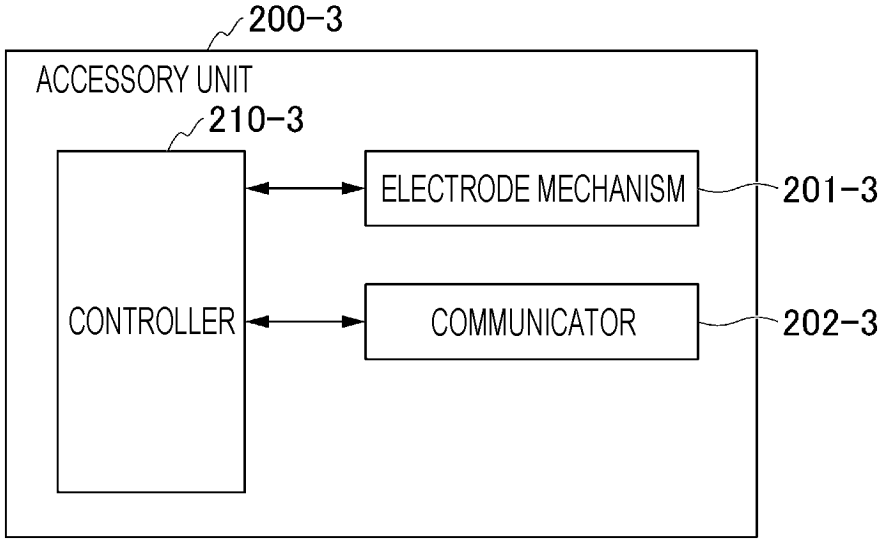


FIG. 8

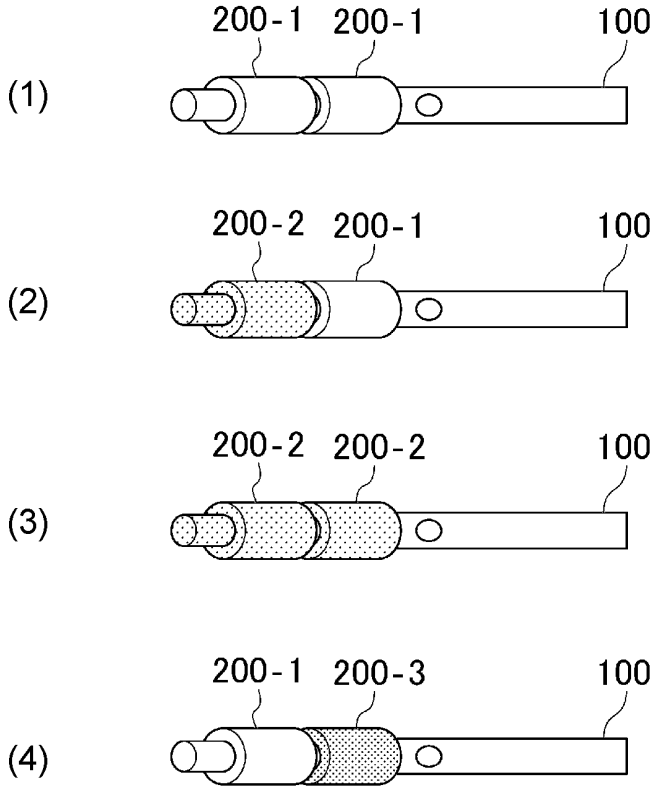

(1)
200-1
200-1
100
(2)
200-2
200-1
100
(3)
200-2
200-2
100
(4)
200-1
200-3
100

FIG. 9

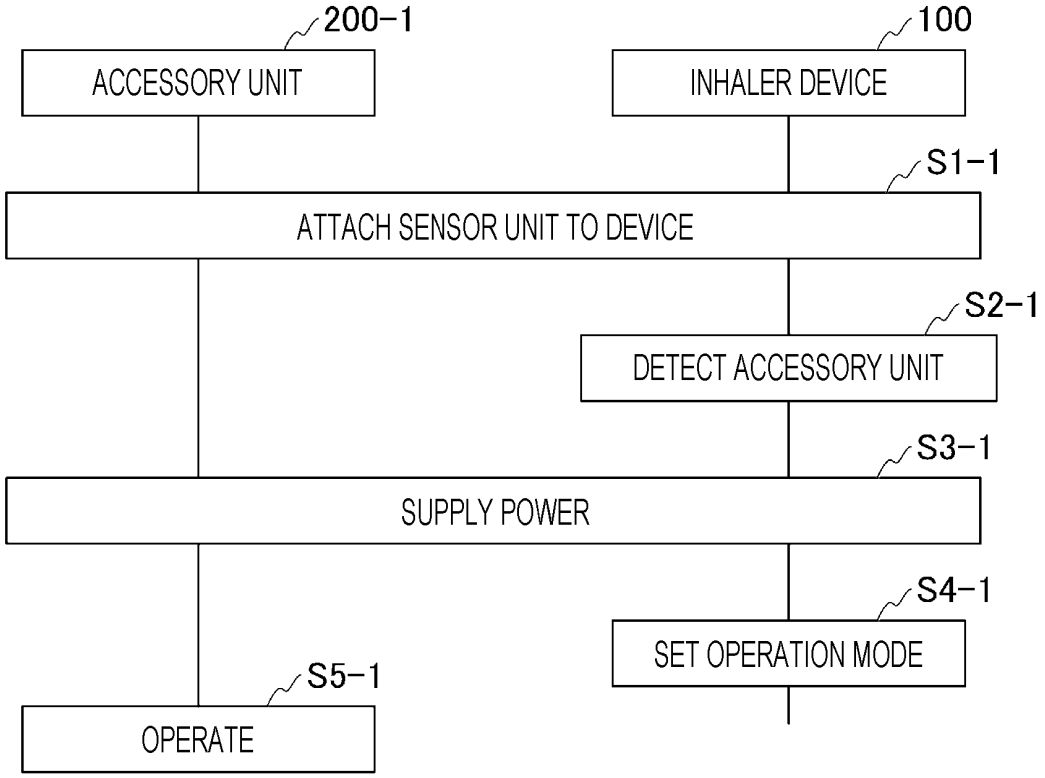

200-1
ACCESSORY UNIT
100
INHALER DEVICE
S1-1
ATTACH SENSOR UNIT TO DEVICE
S2-1
DETECT ACCESSORY UNIT
S3-1
SUPPLY POWER
S4-1
SET OPERATION MODE
S5-1
OPERATE

FIG. 10

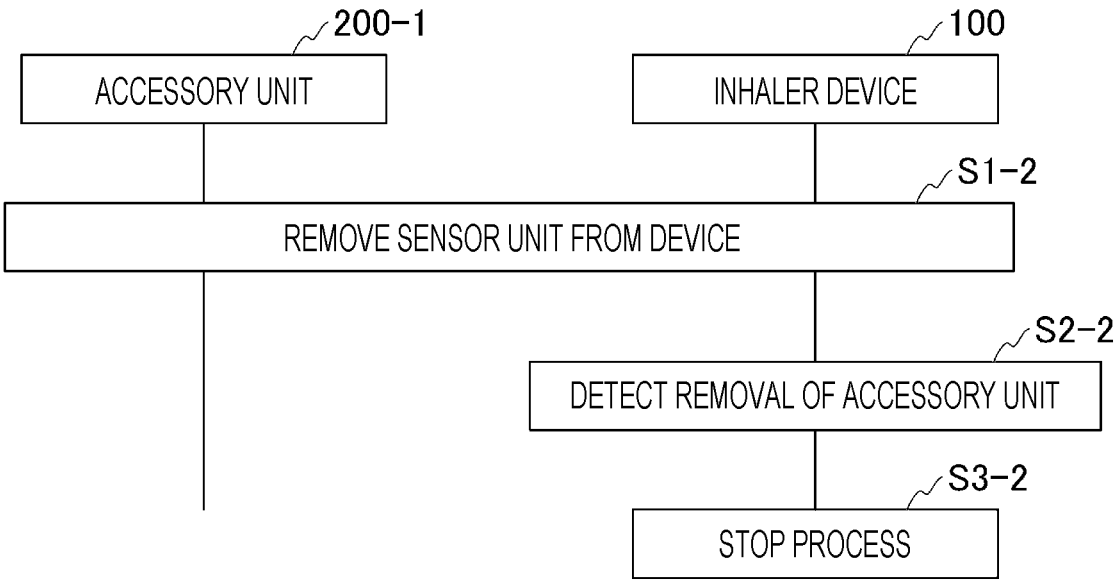

200-1
ACCESSORY UNIT
100
INHALER DEVICE
S1-2
REMOVE SENSOR UNIT FROM DEVICE
S2-2
DETECT REMOVAL OF ACCESSORY UNIT
S3-2
STOP PROCESS

FIG. 11

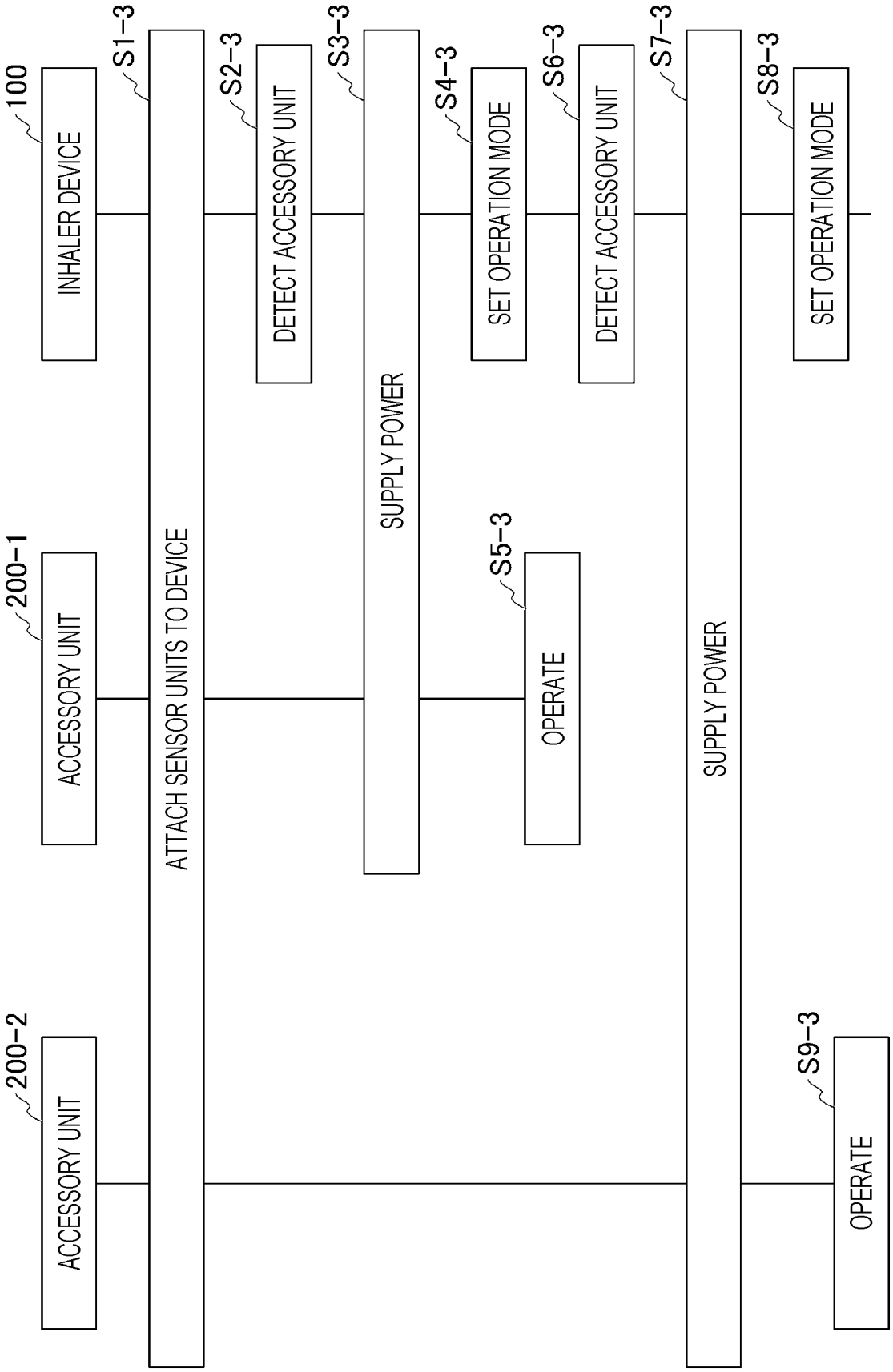
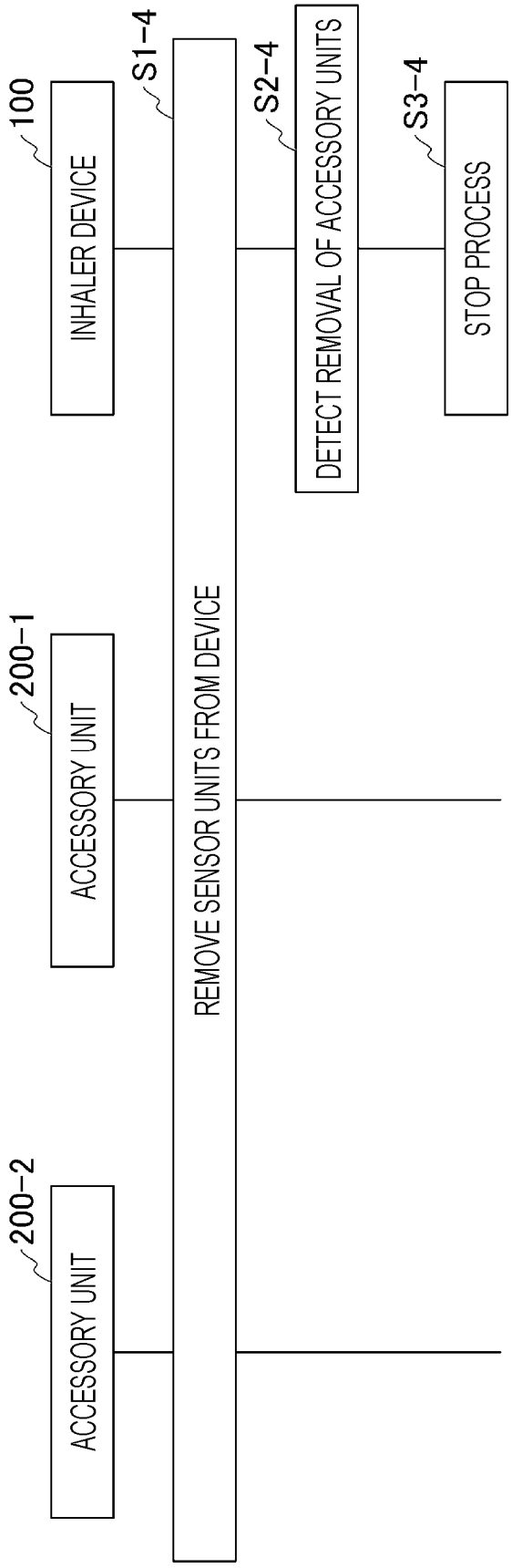

100
INHALER DEVICE
S1-3
ATTACH SENSOR UNITS TO DEVICE
S2-3
DETECT ACCESSORY UNIT
S3-3
SUPPLY POWER
S4-3
SET OPERATION MODE
S6-3
DETECT ACCESSORY UNIT
S7-3
SUPPLY POWER
S8-3
SET OPERATION MODE
200-1
ACCESSORY UNIT
S5-3
OPERATE
200-2
ACCESSORY UNIT
S9-3
OPERATE

FIG. 12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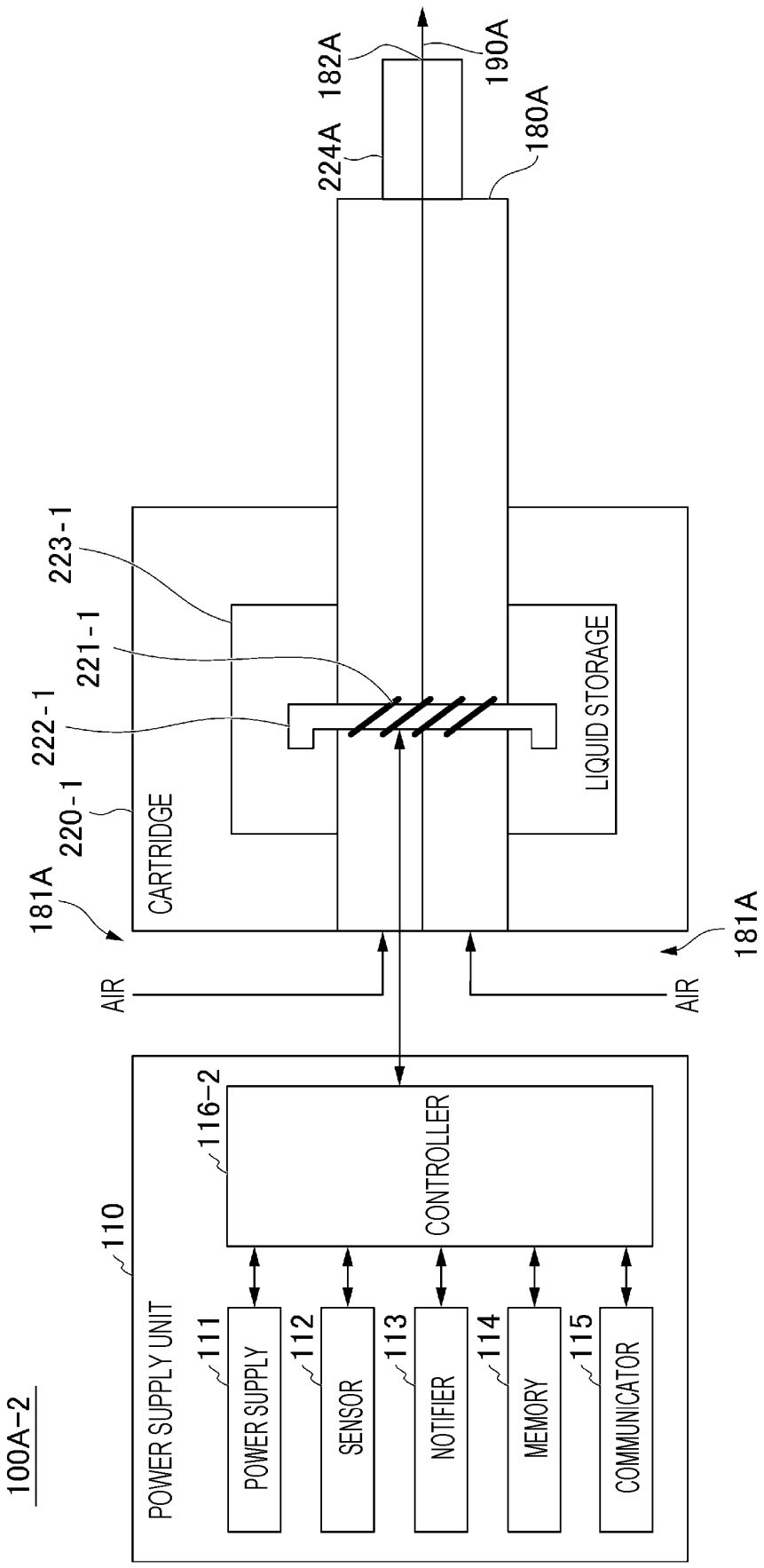
200-1
ACCESSORY UNIT
200-2
ACCESSORY UNIT
S1-4
REMOVE SENSOR UNITS FROM DEVICE
S2-4
DETECT REMOVAL OF ACCESSORY UNITS
S3-4
STOP PROCESS

FIG. 13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NOTIFIER
114
MEMORY
115
COMMUNICATOR
116-2
CONTROLLER
AIR
AIR
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181A
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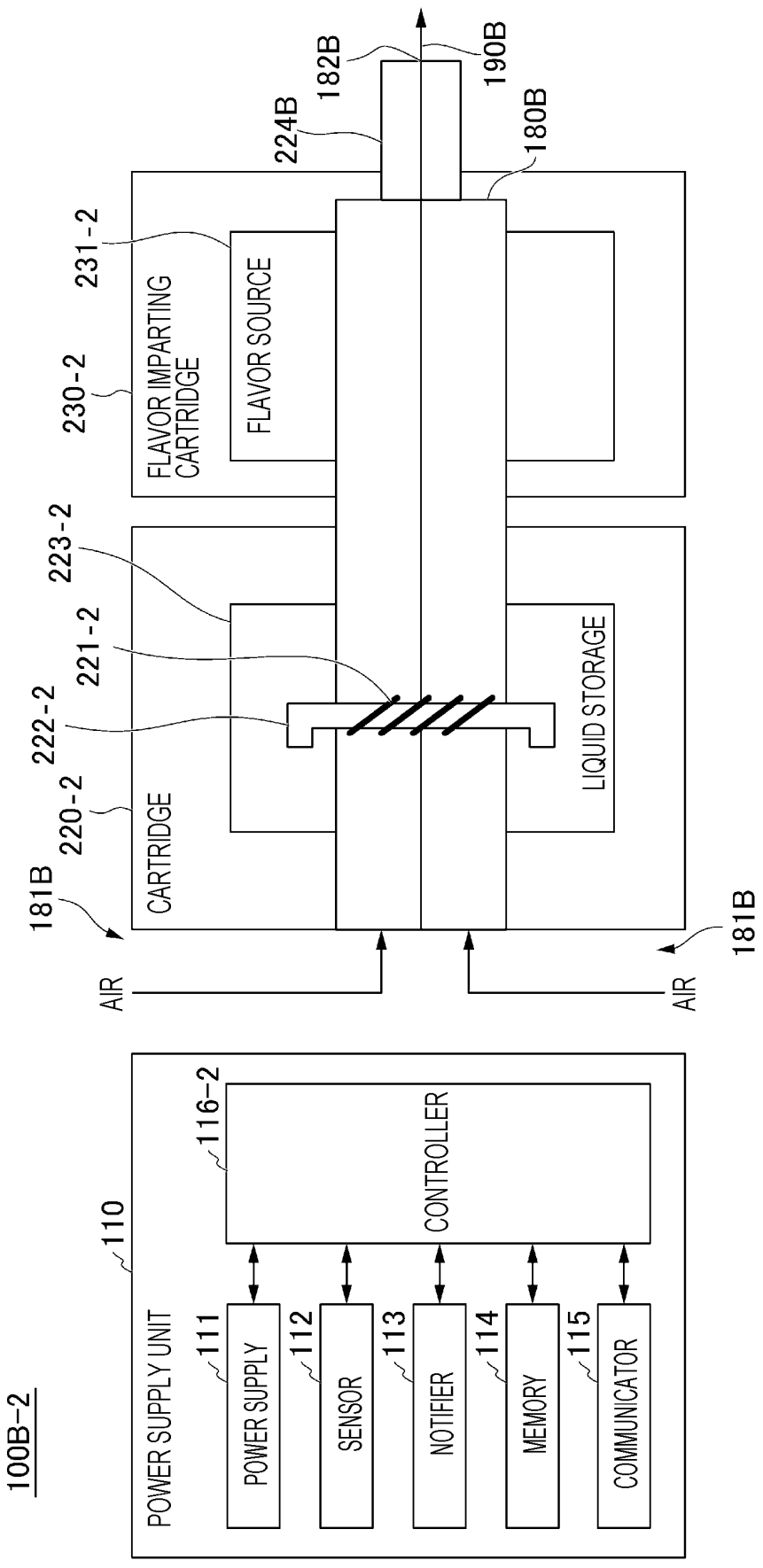
CARTRIDGE
222-1
221-1
223-1
LIQUID STORAGE
224A
182A
190A
180A

FIG. 14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SENSOR
112
NOTIFIER
113
MEMORY
114
COMMUNICATOR
115
AIR
181B
CARTRIDGE
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221-2
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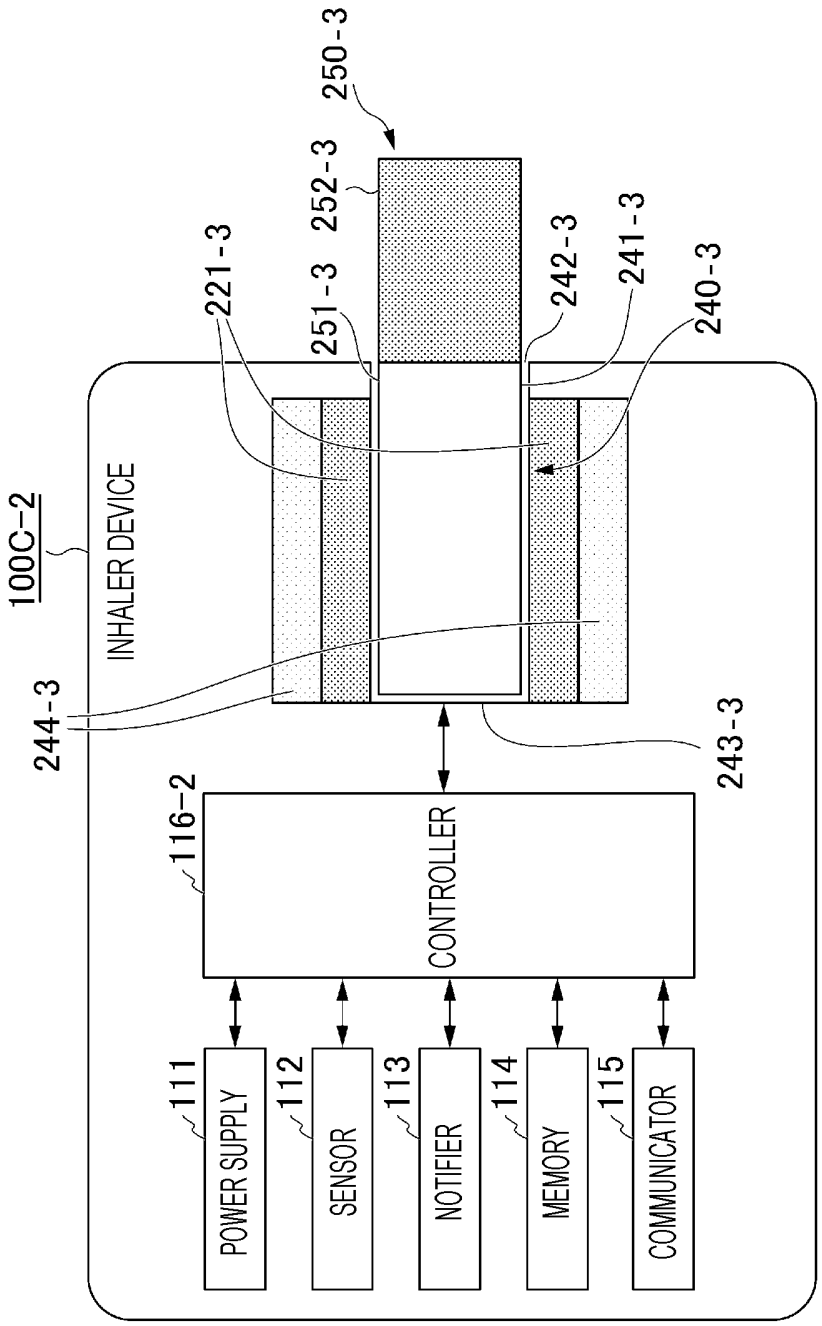
LIQUID STORAGE
FLAVOR IMPARTING CARTRIDGE
230-2
FLAVOR SOURCE
231-2
224B
182B
190B
180B

FIG. 15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251-3
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241-3
240-3
100C-2
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244-3
243-3
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POWER SUPPLY
112
SENSOR
113
NOTIFIER
114
MEMORY
115
COMMUNICATOR

FIG. 16

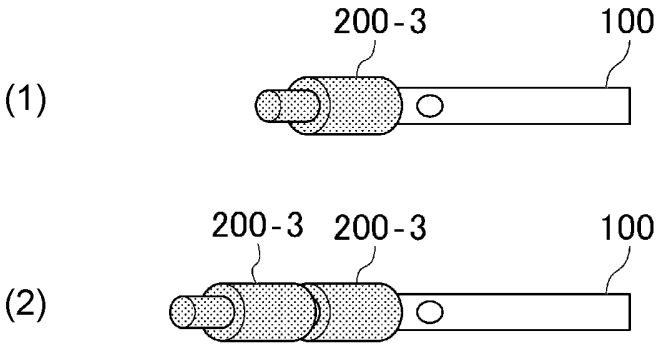

(1)
200-3
100
(2)
200-3
200-3
100

FIG. 17

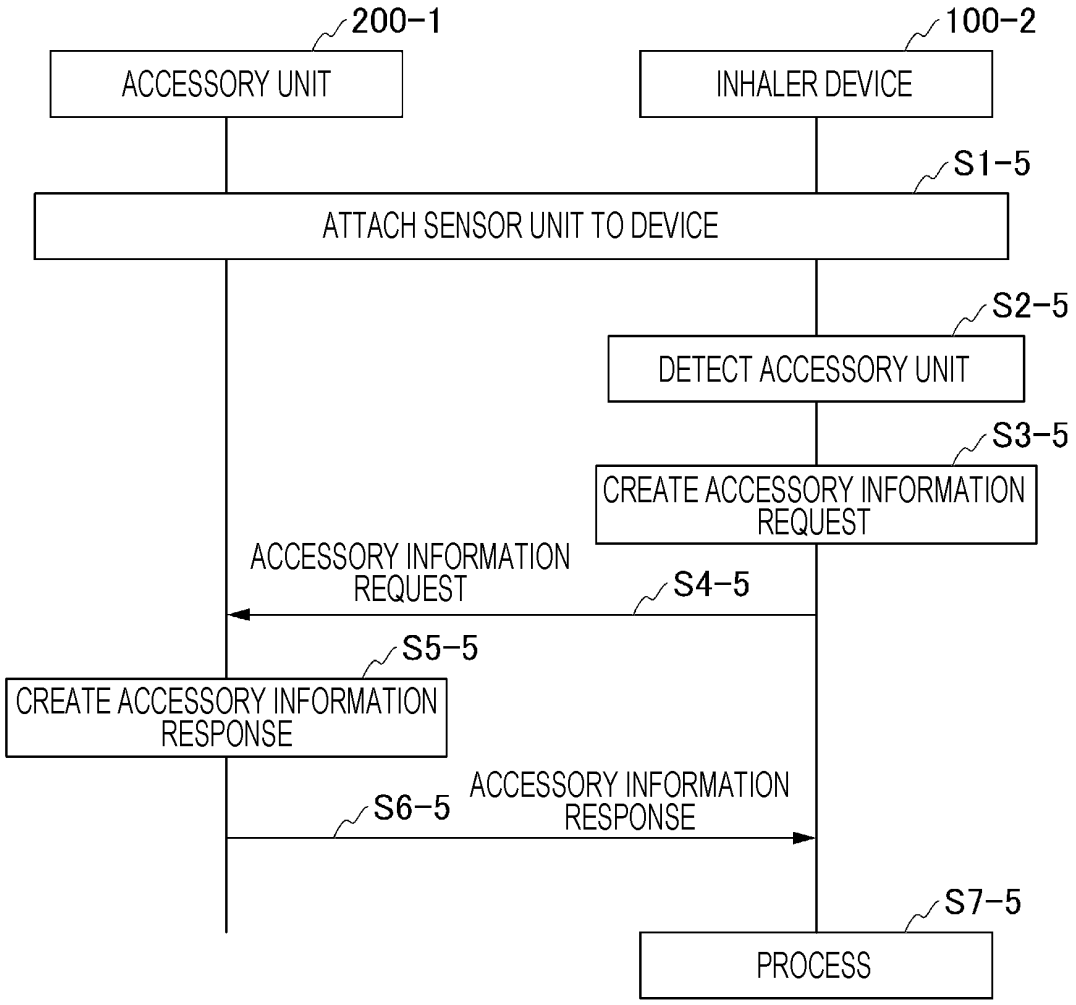

200-1
ACCESSORY UNIT
100-2
INHALER DEVICE
S1-5
ATTACH SENSOR UNIT TO DEVICE
S2-5
DETECT ACCESSORY UNIT
S3-5
CREATE ACCESSORY INFORMATION REQUEST
ACCESSORY INFORMATION REQUEST
S4-5
S5-5
CREATE ACCESSORY INFORMATION RESPONSE
S6-5
ACCESSORY INFORMATION RESPONSE
S7-5
PROCESS

FIG. 18

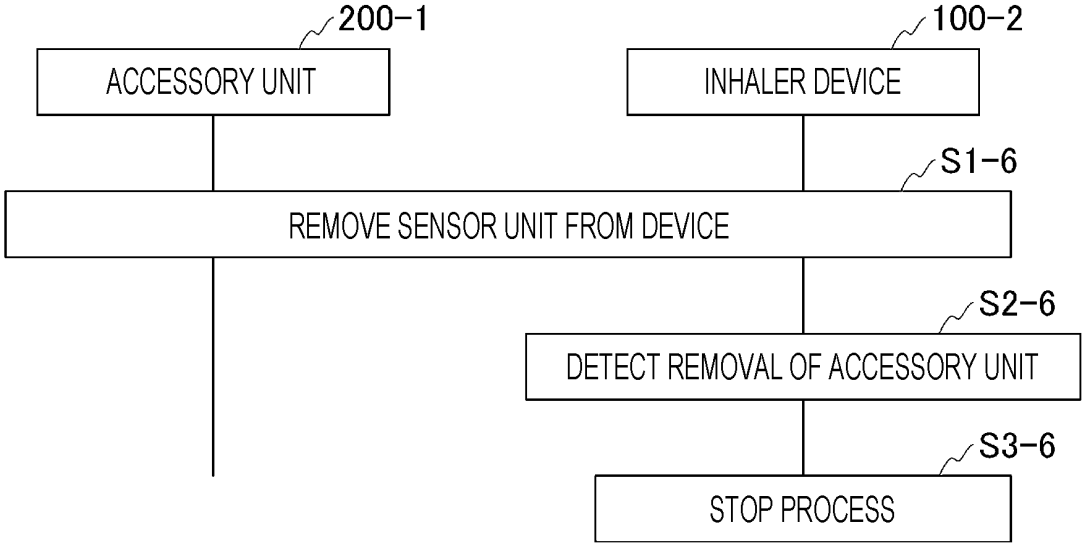

200-1
ACCESSORY UNIT
100-2
INHALER DEVICE
S1-6
REMOVE SENSOR UNIT FROM DEVICE
S2-6
DETECT REMOVAL OF ACCESSORY UNIT
S3-6
STOP PROCESS

FIG. 19

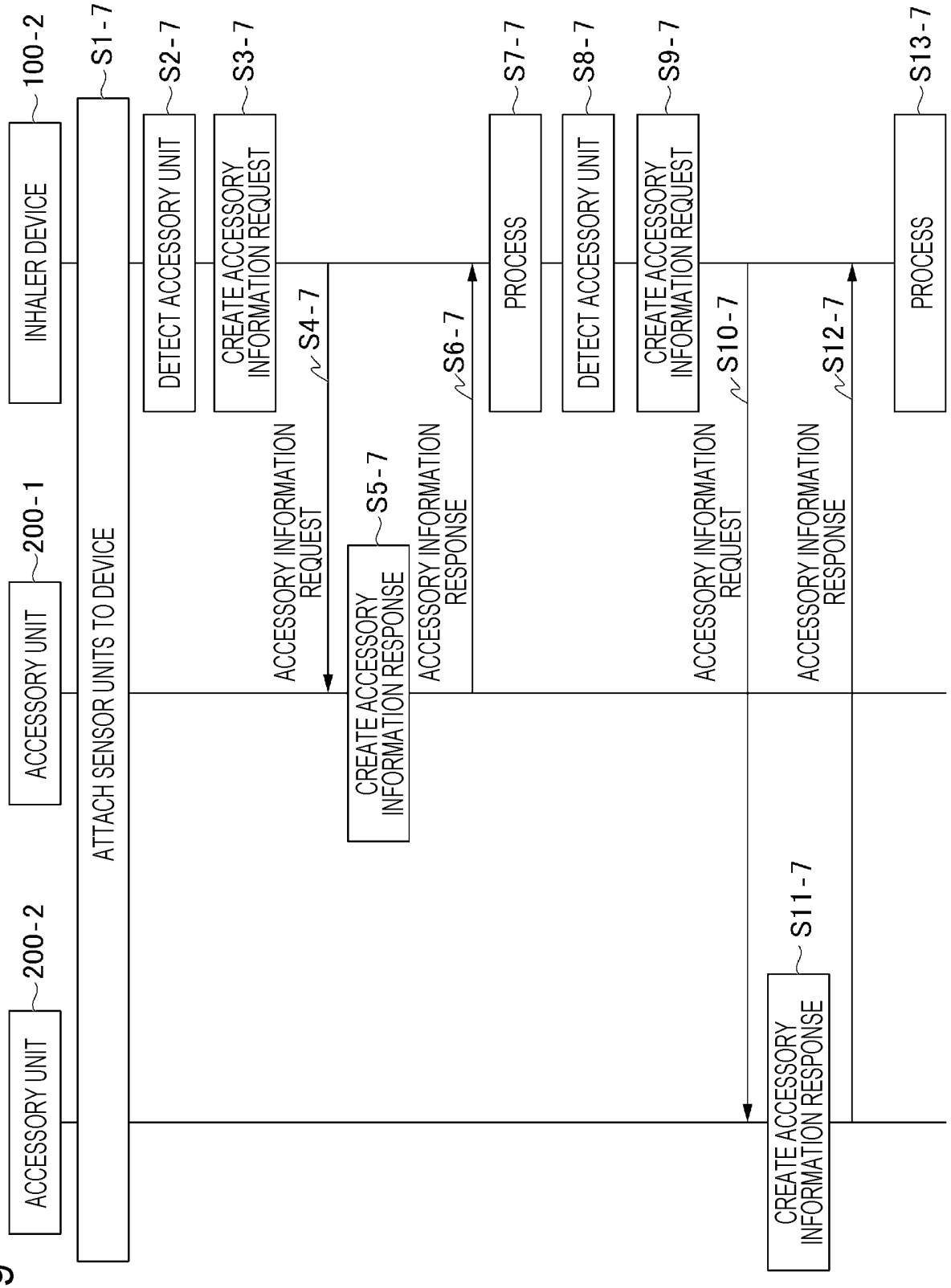
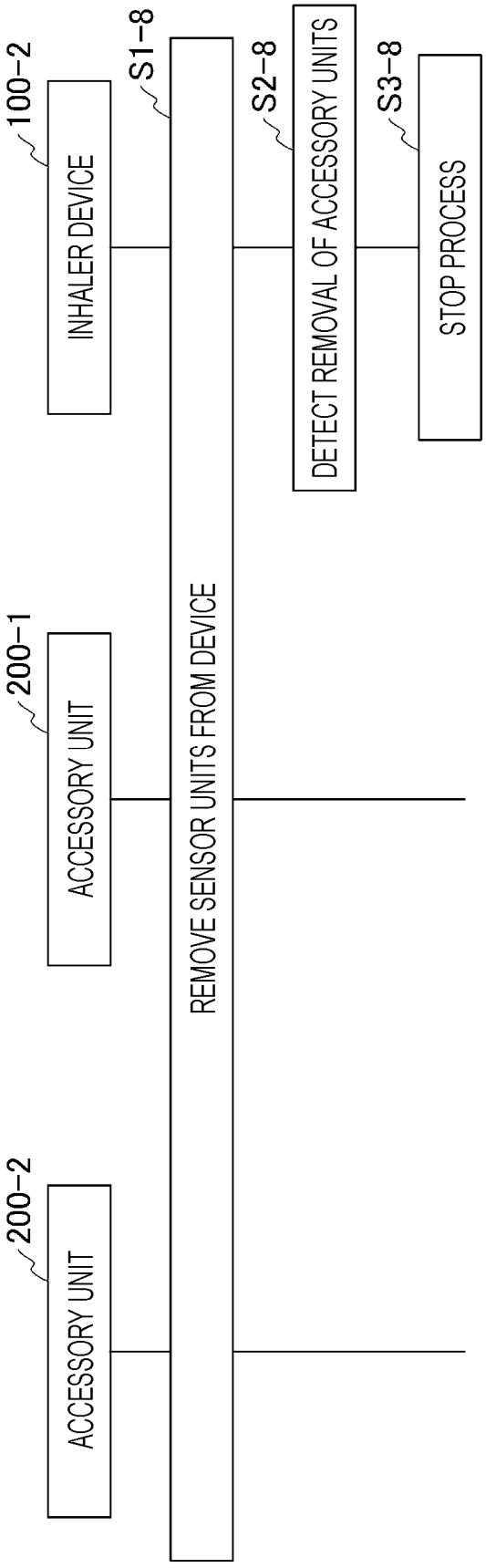

ACCESSORY UNIT
200-2
ACCESSORY UNIT
200-1
INHALER DEVICE
100-2
ATTACH SENSOR UNITS TO DEVICE
S1-7
DETECT ACCESSORY UNIT
S2-7
CREATE ACCESSORY INFORMATION REQUEST
S3-7
ACCESSORY INFORMATION REQUEST
S4-7
CREATE ACCESSORY INFORMATION RESPONSE
S5-7
ACCESSORY INFORMATION RESPONSE
S6-7
PROCESS
S7-7
DETECT ACCESSORY UNIT
S8-7
CREATE ACCESSORY INFORMATION REQUEST
S9-7
ACCESSORY INFORMATION REQUEST
S10-7
CREATE ACCESSORY INFORMATION RESPONSE
S11-7
ACCESSORY INFORMATION RESPONSE
S12-7
PROCESS
S13-7

FIG. 20


100-2
INHALER DEVICE
200-1
ACCESSORY UNIT
200-2
ACCESSORY UNIT
S1-8
REMOVE SENSOR UNITS FROM DEVICE
S2-8
DETECT REMOVAL OF ACCESSORY UNITS
S3-8
STOP PROCESS

**INTERNATIONAL SEARCH REPORT**

International application No.
PCT/JP2020/041854

A. CLASSIFICATION OF SUBJECT MATTER
A24F 40/50(2020.01)i
FI: A24F40/50
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)
A24F40/50

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

| | |
|---|---|
| Published examined utility model applications of Japan | 1922–1996 |
| Published unexamined utility model applications of Japan | 1971–2021 |
| Registered utility model specifications of Japan | 1996–2021 |
| Published registered utility model applications of Japan | 1994–2021 |

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| Y | JP 2020-513851 A (CANOPY GROWTH CORPORATION) 21 May 2020 (2020-05-21) paragraphs [0053]-[0057], fig. 1-2 | 1-13 |
| Y | JP 2015-501575 A (THE BOEING CO.) 15 January 2015 (2015-01-15) paragraphs [0023]-[0024], [0030]-[0042], fig. 3, 5 | 1-13 |
| A | JP 2017-512459 A (RAI STRATEGIC HOLDINGS, INC.) 25 May 2017 (2017-05-25) paragraphs [0070]-[0115], fig. 2-3, 5 | 1-13 |

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☒ See patent family annex.

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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 January 2021 (08.01.2021) | 19 January 2021 (19.01.2021) |

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

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**INTERNATIONAL SEARCH REPORT**
Information on patent family members

International application no.
PCT/JP2020/041854

| Patent Documents referred in the Report | Publication Date | Patent Family | Publication Date |
|---|---|---|---|
| JP 2020-513851 A | 21 May 2020 | US 2018/0263283 A1 paragraphs [0058]-[0062], fig. 1-2<br>WO 2018/165758 A1<br>EP 3595468 A1<br>KR 10-2019-0131053 A | |
| JP 2015-501575 A | 15 Jan. 2015 | US 2013/0095888 A1 paragraphs [0028]-[0029], [0035]-[0047], fig. 3, 5<br>WO 2013/055479 A1<br>EP 2767077 A1<br>CN 103875231 A<br>KR 10-2014-0082960 A | |
| JP 2017-512459 A | 25 May 2017 | US 2015/0224268 A1 paragraphs [0048]-[0093], fig. 2-3, 5<br>WO 2015/120124 A1<br>EP 3103085 A1<br>CN 106164958 A | |

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## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


- WO 2019129548 A **[0004]**
- WO 2018215629 A **[0004]**