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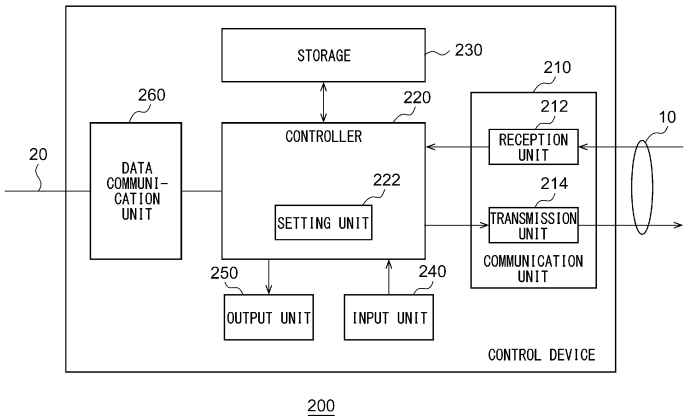
(54) ALARM SYSTEM, CONTROL DEVICE, AND DETECTOR

(57) An alarm system includes: a plurality of detectors; and a control device 200 capable of communicating with each of the plurality of detectors. The control device 200 includes a reception unit 212 and an output unit 250. The reception unit 212 receives, from each of the plurality of detectors, information on year/month of manufacture indicating a year and a month when the detector is manufactured and information on year/month of installation indicating a year and a month when the detector is installed. The output unit outputs a notification related to at least one of a time of maintenance or a time of replacement when at least one of the year/month of manufacturer or the year/month of installation received by the reception unit 212 reaches a notification deadline.

FIG. 3



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Description

[TECHNICAL FIELD]

[0001] The present disclosure relates to notification technology and, in particular, to alarm systems, control devices, and detectors for alerting of information related to the detector.

[BACKGROUND ART]

[0002] In a fire alarm system, a large number of fire detectors installed in a building are connected to a fire receiver by a detector circuit, and the fire receiver acquires fire detection information from each fire detector through the detector circuit. In the event a fire breaks out, the fire receiver alerts an emergency contact such as a fire station of an outbreak of fire (fire alarm) via a public telephone network, etc. Some fire detectors have a self-diagnosis function for diagnosing whether or not their fire detection function is normal. For example, each fire detector periodically performs a self-diagnosis and transmits a result to the fire receiver via the detector circuit as self-diagnosis result information. The maintenance contractor performs maintenance based on the self-diagnosis result information. In order to facilitate the work schedule planning of the maintenance contractor, the self-diagnosis result information is also transmitted to the management device via the Internet (see, for example, Patent Literature 1) .

[0003] [Patent Literature 1] JP 2003-248888

[SUMMARY OF INVENTION]

[TECHNICAL PROBLEM]

[0004] The detector should be maintained or replaced even if a trouble such as malfunction does not occur. The timing whereby such maintenance or replacement should be performed is determined to start when the detector is manufactured or when the detector is installed. The manager must manage the time when the detector is manufactured or the time when the detector is installed to know the time of maintenance or the time of replacement.

[0005] The present disclosure addresses the issue described above, and a purpose thereof is to provide a technology that makes it easy to know the time of maintenance or the time of replacement.

[SOLUTION TO PROBLEM]

[0006] An alarm system according to an aspect of the present disclosure includes: a plurality of detectors; and a control device capable of communicating with each of the plurality of detectors. The control device includes: a reception unit that receives, from each of the plurality of detectors, information on year/month of manufacture indicating a year and a month when the detector is manufactured and information on year/month of installation indicating a year and a month when the detector is installed; and an output unit that outputs a notification related to at least one of a time of maintenance or a time of replacement when at least one of the year/month of manufacturer or the year/month of installation received by the reception unit reaches a notification deadline.

[0007] Another aspect of the present disclosure relates to a control device. The control device is capable of communicating with each of a plurality of detectors and includes: a reception unit that receives, from each of the plurality of detectors, information on year/month of manufacture indicating a year and a month when the detector is manufactured and information on year/month of installation indicating a year and a month when the detector is installed; and an output unit that outputs a notification related to at least one of a time of maintenance or a time of replacement when at least one of the year/month of manufacturer or the year/month of installation received by the reception unit reaches a notification deadline.

[0008] Still another aspect of the present disclosure relates to a detector. The detector is communicable with a control device and includes: a storage that stores information on year/month of manufacture indicating a year and a month when the detector is manufactured and information on year/month of installation indicating a year and a month when the detector is installed; a reception unit that receives a request signal from the control device; and a transmission unit that transmits the information on year/month of manufacture and the information on year/month of installation stored in the storage to the control device when the reception unit receives the request signal.

[0009] Optional combinations of the aforementioned constituting elements, and implementations of the present disclosure in the form of methods, apparatuses, systems, computer programs, and recording mediums recording computer programs may also be practiced as additional modes of the present disclosure.

[ADVANTAGEOUS EFFECTS OF INVENTION]

[0010] According to the present disclosure, it is easy to know the time of maintenance or the time of replacement.

[BRIEF DESCRIPTION OF DRAWINGS]

[0011]

Fig. 1 shows a configuration of an alarm system according to the exemplary embodiment;

Fig. 2 is a diagram illustrating a configuration of the detector of Fig. 1;

Fig. 3 shows a configuration of the control device of Fig. 1;

Figs. 4A-4C show the data structure of a table stored

in the storage of Fig. 2;
Figs. 5A-5B show the data structure of the information in the control device of Fig. 3;
Figs. 6A-6B show screens displayed on the output unit of Fig. 3;
Fig. 7 is a sequence chart illustrating a notification procedure performed by the alarm system of Fig. 1; and
Fig. 8 is a flowchart showing a notification procedure performed by the control device of Fig. 3.

[DESCRIPTION OF EMBODIMENTS]

[0012] A summary of an exemplary embodiment will be given before describing the exemplary embodiment in specific details. The exemplary embodiment relates to an alarm system that includes a plurality of detectors (fire detectors) installed in a facility such as a building and a control device (fire receiver) capable of communicating with each of the plurality of detectors. When a detector detects an outbreak of fire in the alarm system, the control device outputs a fire alarm. Until now, managers have used a personal computer with a medium different from that of the alarm system or paper to record the time when the operation of the alarm system is started, the time of maintenance, and, in particular, the year/month of manufacture of the detector, the year/month of installation, etc. Therefore, it is easy to overlook when the time of maintenance or the time of replacement approaches several months-several years after the start of operation. In addition, the detector should be replaced 10-15 years after it started to be used. However, the period from the time the detector is manufactured to the installation and start of operation may be prolonged, and it is difficult to know the time of replacement merely by referring to the year/month of manufacture. Furthermore, when it becomes necessary to find a detector that meets a particular year/month of manufacture due to a discovery of a problem in the quality aspect of the detector, the manager must check the installed detectors one by one, which requires a great deal of effort.

[0013] The warning system of the exemplary embodiment notifies the manager of the time of maintenance or the time of replacement that arrives in a yearly cycle by storing the year/month of manufacture and the year/month of installation of the detector in the detector and in the control device. To describe it more specifically, the year/month of manufacture of the detector is not only printed on the main body but also is stored in the storage in the detector. Furthermore, the control device acquires the year/month of manufacture from the detector by communication. This makes it possible for the control device and the terminal device connected to the control device to know the year/month of manufacture. In addition, information related to maintenance and replacement such as the year/month of installation and the position of installation can be written in the detector from the control device. The year/month of installation and the position of installation thus written are transmitted from the detector to the control device. This not only makes it possible for the control device to know the year/month of installation of the detector but also makes it possible for the detector main body to store the year/month of installation in case only the control device is replaced.

[0014] Since information such as the year/month of manufacture and the year/month of installation is aggregated in the control device and the server, the information can be displayed in the control device or communicated by the terminal device. Furthermore, when the year/month of manufacture or the year/month of installation reaches a notification deadline, the control device outputs a notification related to at least one of the time of maintenance or the time of replacement. As a result, when the time of maintenance or the time of replacement approaches, the manager can know the information without omission.

[0015] Fig. 1 shows a configuration of an alarm system 1000. The alarm system 1000 includes a detector circuit 10, a network 20, a first detector 100a, a second detector 100b, ..., an Nth detector 100n, which are generically referred to as a detector 100, a control device 200, a fire station device 300, a server 400, and a terminal device 500. A setting device 30 may or may not be included in the alarm system 1000. In this case, the detector circuit 10, the detector 100, and the control device 200 are installed in the facility, and the network 20, the fire station device 300, the server 400, and the terminal device 500 are installed outside the facility. The facility is a building subject to monitoring by the alarm system 1000 and is, for example, an office building. The facility is not limited to an office building, but may be a dwelling unit of a housing complex, an independent housing, a commercial facility, etc.

[0016] In each of the plurality of rooms in the facility, the detector 100 is installed as a sensor for detecting an outbreak of fire. The plurality of detectors 100 are connected by the detector circuit 10 in a bus configuration to be connected to the control device 200. With this connection, each detector 100 can communicate with the control device 200.

[0017] Fig. 2 is a diagram illustrating a configuration of the detector 100. The detector 100 includes a communication unit 110, a controller 120, a storage 130, a detection unit 140, and a speaker 150, and the communication unit 110 includes a reception unit 112 and a transmission unit 114. The detection unit 140 detects an outbreak of fire by detecting the smoke or detecting the heat. In the case of smoke-based detection for detecting the smoke, an outbreak of fire is detected as the smoke enters the detector 100, and the light of the light emitting diode is reflected by particles of the smoke and reaches the light receiving unit. In the case of heat-based detection for detecting the heat, an outbreak of fire is detected as the heat sensitive element reaches a certain temperature. When the detection unit 140 detects an outbreak of fire, the controller 120 outputs a sound for communicating a

fire outbreak from the speaker 150 and generates alarm information for communicating a fire outbreak. The alarm information includes detector address information for identifying the detector 100.

[0018] The transmission unit 114 transmits the alarm information to the detector circuit 10. The alarm information transmitted from the first detector 100a of Fig. 1 is relayed by the second detector 100b through the Nth detector 100n in the stated order and transmitted to the control device 200. To describe it more specifically, when the reception unit 112 of the second detector 100b receives the alarm information from the first detector 100a via the detector circuit 10, the reception unit 112 outputs the alarm information to the controller 120. The transmission unit 114 transmits the alarm information from the controller 120 to the third detector 100c (not shown) via the detector circuit 10. The other detectors 100 operate in the same way. Reference is made back to Fig. 1.

[0019] The control device 200 can communicate with the plurality of detectors 100 via the detector circuit 10. Fig. 3 shows a configuration of the control device 200. The control device 200 includes a communication unit 210, a controller 220, a storage 230, an input unit 240, an output unit 250, and a data communication unit 260, and the communication unit 210 includes a reception unit 212 and a transmission unit 214, and the controller 220 includes a setting unit 222. The reception unit 212 receives the alarm information from the detector 100 via the detector circuit 10. The reception unit 212 outputs the alarm information to the controller 220. The controller 220 controls the operation of the control device 200. When the controller 220 receives the alarm information from the reception unit 212, the controller 220 outputs the alarm information from the output unit 250 or outputs the alarm information to the data communication unit 260. The output unit 250 is an interface such as a monitor and a speaker. Reference is made back to Fig. 1.

[0020] The data communication unit 260 of the control device 200 is connected to the network 20 and is connected to the fire station device 300 via the network 20. The network 20 is, for example, the Internet. The data communication unit 260 transmits the alarm information to the fire station device 300 via the network 20. The alarm information includes a unique ID for identifying the control device 200. The fire station device 300 is a device used in a fire station, and, when the fire station device 300 receives the alarm information from the control device 200, the fire station device 300 recognizes an outbreak of fire in the facility in which the control device 200 is installed, based on the unique ID included in the alarm information. When an outbreak of fire is recognized, firefighters are urged into action, or the police station is contacted. In this process, the alarm information may not be directly transmitted to the fire station device 300 but may be transmitted to a device of the management company. In that case, the management company notifies the fire station of an outbreak of fire.

[0021] Hereinafter, the process for communicating the time of maintenance and the time of replacement of the detector 100 in the alarm system 1000 will be described in the order: (1) the manufacturing stage, (2) the stage from construction/wiring to the start of operation, and (3) after the start of operation. In addition, the process (3) after the start of operation will be described in the order: (3-1) collection of information, (3-2) viewing of information, and (3-3) notification.

(1) The manufacturing stage

[0022] In the manufacturing process of the detector 100, the manufacturer prints the year/month of manufacture in each detector 100 and writes the year/month of manufacture in the storage 130 (Fig. 2) of the detector 100. The year/month of manufacture indicates the year and the month when the detector 100 was manufactured. The year/month of manufacture may be the year when the detector 100 was manufactured. Further, the manufacturer also writes the product number information and the type information on the detector 100 into the storage 130. Figs. 4A-4C show the data structure of a table stored in the storage 130. Fig. 4A shows the data structure of the table at the time of manufacturing. The table includes the product number information, type information, and year/month of manufacture information. Figs. 4B-4C will be described later.

(2) The stage from construction and wiring to the start of operation

[0023] The detector 100 is connected to each room in the facility, and the detectors 100 are connected by the detector circuit 10. The detector circuit 10 is also connected to the control device 200. The control device 200 is connected to the network 20. As a result, the configuration shown in Fig. 1 is realized. In order to enable each detector 100 to communicate with the control device 200 via the detector circuit 10, information for identifying the detector 100 (hereinafter referred to as "detector address information") is set in each detector 100. For setting of the detector address information, a DIP switch (not shown) provided in the detector 100 is used, for example. The storage 130 of the detector 100 stores the detector address information. Fig. 4B shows the data structure of the table during construction and wiring. In the table, the detector address information is added to the information shown in Fig. 4A. Fig. 4C will be described later.

[0024] The input unit 240 of the control device 200 shown in Fig. 3 is an interface to allow an administrator or a user to input information. For example, the input unit may be a button or a touch panel. After the detector 100 is installed, the manager inputs the year/month of installation information in the input unit 240. The manager may encompass a construction contractor. The year/month of installation indicates the year and the month when the detector 100 was installed. The year/month of installation may be the year and the month when the alarm system

is started to be operated as well as the year and the month when it is installed. Further, the year/month of installation may be the year when the detector 100 was installed. When the controller 220 receives the year/month of installation information from the input unit 240, the controller 220 outputs the year/month of installation information to the transmission unit 214. The transmission unit 214 transmits the year/month of installation information to each detector 100 via the detector circuit 10.

[0025] The reception unit 112 of the detector 100 shown in Fig. 2 receives the year/month of installation information via the detector circuit 10. The reception unit 112 outputs the year/month of installation information to the controller 120. The controller 120 writes the year/month of installation information in the storage 130. Fig. 4C shows the data structure of the table at the time of construction and wiring after Fig. 4B. In the table, the year/month of installation information is added to the information shown in Fig. 4B. That is, the storage 130 stores at least the year/month of manufacture information and the year/month of installation information.

[0026] As shown in Fig. 1, the setting device 30 may be used to write the year/month of installation information in the detector 100. The setting device 30 is a device for inputting the setting to the detector 100 and has a cable for connection to the detector 100 and an interface to allow the administrator to input information. When the setting device 30 receives the year/month of installation information from the administrator via the interface while the cable is inserted into the detector 100, the setting device 30 transmits the year/month of installation information to the detector 100. As in the case of the foregoing, the controller 120 of the detector 100 writes the year/month of installation information in the storage 130.

[0027] After the year/month of installation information is stored in the storage 130 of each detector 100, the administrator inputs the notification deadline to the input unit 240 of the control device 200 of Fig. 3. The notification deadline is information about a period from the year/month of manufacture or the year/month of installation to the notification of the time of maintenance or the time of replacement. The notification deadline represents a threshold for the period from the year/month of manufacture or the year/month of installation. For example, the notification deadline for the time of maintenance is input to indicate every 6 months from the year/month of manufacture, and the notification deadline for the time of replacement is input to indicate 3 years from the year/month of installation. The notification deadline represented in year and month is not limited thereto. Hereinafter, the notification deadline for time of maintenance and the notification deadline for the time of replacement will be collectively described as "notification deadline". The setting unit 222 sets the notification deadline received from the input unit 240. In this process, a common notification deadline may be set for the plurality of detectors 100, or a notification deadline may be set for each detector 100.

(3) After the start of operation

(3-1) Collection of information

[0028] The controller 220 of the control device 200 of Fig. 3 generates a signal (hereinafter referred to as a "request signal") for requesting information about the detector 100. The transmission unit 214 transmits a request signal to each detector 100 via the detector circuit 10. Transmission of the request signal may be made periodically.

[0029] The reception unit 112 of the detector 100 of Fig. 2 receives a request signal via the detector circuit 10. The reception unit 112 outputs the request signal to the controller 120. When the reception unit 112 receives the request signal, the controller 120 outputs the information in the table stored in the storage 130 to the transmission unit 114 as an information signal. The information signal includes, for example, the detector address information, product number information, type information, year/month of manufacture information, and year/month of installation information. The transmission unit 114 transmits the information signal via the detector circuit 10. When the reception unit 112 receives the request signal or the information signal, the controller 120 causes the received request signal or information signal to be transmitted from the transmission unit 114. That is, the request signal and the information signal are transferred sequentially in the plurality of detectors 100.

[0030] The reception unit 212 of the control device 200 of Fig. 3 receives the information signal from each detector 100 via the detector circuit 10. That is, the reception unit 212 receives the year/month of manufacture information and the year/month of installation information from each of the plurality of detectors 100 and also receives the related information related to the detector 100. The related information corresponds to product number information, etc. The communication unit 210 outputs the received information signal to the controller 220. The controller 220 stores the detail of the information signal in the storage 230.

[0031] Identification information is assigned to the room where the detector 100 is installed, and the manager inputs the identification information on the room where the detector 100 is installed into the input unit 240 as installation location information. The controller 220 also stores the installation location information in the storage 230. Figs. 5A-5B show the data structure of the information in the control device 200. Fig. 5A shows the data structure of a table stored in the storage 230. As shown, the detector address information, product number information, type information, year/month of manufacture information, year/month of installation information, and installation location information on each detector 100 are stored in association with each other. Fig. 5B will be described later, and reference is made back

to Fig. 3.

[0032] It should be noted that the controller 220 may compare the year/month of manufacture information and the year/month of installation information on one detector 100. Since the detector 100 is installed after it is manufactured, the year/month of manufacture should be earlier than the year/month of installation. If an error occurs when the year/month of manufacture or the year/month of installation is stored in the storage 130, however, the year/month of installation will be earlier than the year/month of manufacture. The controller 220 detects an error in at least one of the year/month of manufacture or the year/month of installation when the year/month of installation is earlier than the year/month of manufacture. In that case, the controller 220 outputs an error alert from the output unit 250.

(3-2) Viewing of information

[0033] The controller 220 outputs the table stored in the storage 230 to the data communication unit 260 as detector information. The detector information may include a unique ID of the control device 200. The data communication unit 260 transmits the detector information to the server 400 (Fig. 1) via the network 20. This corresponds to transmitting the year/month of manufacture information, the year/month of installation information, and the related information to the server 400.

[0034] The server 400 of Fig. 1 can communicate with the control device 200 via the network 20 and receives the detector information from the control device 200. The server 400 stores the received detector information. In the detector information, the detector address information, product number information, type information, year/month of manufacture and month information, year/month of installation information, and installation location information are presented in association with the unique ID.

[0035] The terminal device 500 of Fig. 1 is, for example, a smartphone, a tablet terminal device, a mobile phone device and is used by the administrator. The terminal device 500 has a communication function and can communicate with the control device 200 via the network 20. The storage of the terminal device 500 stores a program that can be executed in the terminal device 500. For example, an application program is stored. One of the application programs is an application program that can execute the process in the alarm system 1000 (hereinafter referred to as "alarm system application"). The administrator inputs a request for viewing the detector information by manipulating the terminal device 500. When the terminal device 500 accepts the request, the terminal device 500 transmits a request signal for requesting to view the detector information to the server 400 via the network 20.

[0036] When the server 400 receives the request signal from the terminal device 500 via the network 20, the server 400 transmits the stored detector information to the terminal device 500 via the network 20. This corresponds to notifying the terminal device 500 of the year/month of manufacture information and the year/month of installation information in response to the request from the terminal device 500. When the terminal device 500 receives the detector information from the server 400 via the network 20, the terminal device 500 displays the detector information on the screen. The administrator recognizes the detector address information, product number information, type information, year/month of manufacture information, year/month of installation information, and installation location information for each detector 100 by looking at the screen.

(3-3) Notification

[0037] The controller 220 of Fig. 3 compares at least one of the year/month of manufacture or the year/month of installation with the notification deadline. The controller 220 identifies the arrival of at least one of the time of maintenance or the time of replacement when at least one of the year/month of manufacture or the year/month of installation reaches the notification deadline. The controller 220 outputs a notification indicating the arrival of at least one of the time of maintenance or the time of replacement from the output unit 250. When the output unit 250 is a monitor, a message for communicating that at least one of the time of maintenance or the time of replacement has arrived and a message prompting maintenance or replacement are displayed as a notification. Figs. 6A-6B show screens displayed on the output unit 250. Fig. 1A shows a message displayed when the time of maintenance of the first detector 100a arrives, and Fig. 1B shows a message displayed when the time of replacement of the first detector 100a arrives.

[0038] Further, when the output unit 250 is a speaker, a sound for communicating that at least one of the time of maintenance or the time of replacement has arrived and a sound to prompt maintenance or replacement are output as a notification. Such notification may be provided for a plurality of detectors 100 collectively or for each detector 100.

[0039] When the controller 220 identifies the arrival of at least one of the time of maintenance or the time of replacement, the controller 220 outputs, to the data communication unit 260, a signal including a notification for communicating the arrival of at least one of the time of maintenance or the time of replacement (hereinafter referred to as a "notification signal"). The data communication unit 260 transmits the notification signal to the server 400 (Fig. 1) via the network 20. The server 400 receives the notification signal from the control device 200 via the network 20. Subsequently, the server 400 transmits the notification signal to the terminal device 500 via the network 20. When the terminal device 500 receives the notification signal from the server 400 via the network 20, the terminal device 500 displays a message or outputs a sound in the same manner as the output unit

250 of the control device 200. That is, the server 400 causes the notification to be output from the terminal device 500.

[0040] The device, the system, or the entity that executes the method according to the disclosure is provided with a computer. By causing the computer to run a program, the function of the device, the system, or the entity that executes the method according to the disclosure is realized. The computer is comprised of a processor that operates in accordance with the program as a main hardware feature. The disclosure is non-limiting as to the type of the processor so long as the function is realized by running the program. The processor is comprised of one or a plurality of electronic circuits including a semiconductor integrated circuit (IC) or a large-scale integration (LSI). The plurality of electronic circuits may be integrated in one chip or provided in a plurality of chips. The plurality of chips may be aggregated in one device or provided in a plurality of devices. The program is recorded in a non-transitory recording medium such as a computer-readable ROM, optical disk, and hard disk drive. The program may be stored in a recording medium in advance or supplied to a recording medium via wide area communication network including the Internet.

[0041] The operation of the alarm system 1000 having the above configuration will be described. Fig. 7 is a sequence chart illustrating a notification procedure performed by the alarm system 1000. The figure shows the process in (3-2) viewing of information. When the control device 200 transmits a request signal to the detector 100 (S10), the detector 100 transmits an information signal to the control device 200 (S12). The control device 200 transmits the detector information to the server 400 (S14). When the terminal device 500 transmits a request signal to the server 400 (S16), the server 400 transmits the detector information to the terminal device 500 (S18). The terminal device 500 displays the detector information (S20).

[0042] Fig. 8 is a flowchart showing a notification procedure performed by the control device 200. The figure shows the process in (3-3) notification. When the year/month of manufacture or the year/month of installation reaches the notification deadline in the controller 220 (Y in S100), the output unit 250 outputs a notification (S102). If the year/month of manufacture or the year/month of installation does not reach the notification deadline in the controller 220 (N in S100), the process is terminated.

[0043] According to the exemplary embodiment, a notification related to at least one of the time of maintenance or the time of replacement is output when at least one of the year/month of manufacture information and the year/month of installation information received from the detector 100 reaches the notification deadline. Therefore, the time of maintenance or the time of replacement can be easily known. Further, the notification deadline is set so that the notification can be given in a timing schedule in accordance with the administrator's intention. Further, since the year/month of manufacture information and the year/month of installation information are also stored in the server 400, the year/month of manufacture information and the year/month of installation information can be displayed on the terminal device 500. In addition, since the year/month of manufacture information and the year/month of installation information are displayed on the terminal device 500, the manager can know the arrival of time of maintenance or the time of replacement without omission. Further, the related information is also transmitted to the server 400 so that a variety of information can be stored in the server 400.

[0044] Further, since a notification is also given from the terminal device 500, the administrator can know the arrival of the time of maintenance or the time of replacement without omission. Further, when the year/month of installation is earlier than the year/month of manufacture, an error in at least one of the year/month of manufacture or the year/month of installation is communicated so that the accuracy of timing of output of the notification related to at least one of the time of maintenance or the time of replacement can be improved. Further, since the year/month of installation can be written in the detector 100 from the control device 200, not only is it possible for the control device 200 to know the year/month of installation of the detector 100 but it is also possible to store the year/month of installation in the detector 100 main body in case only the control device 200 is replaced.

[0045] One embodiment of the present disclosure is summarized below. An alarm system (1000) according to an aspect of the present disclosure includes: a plurality of detectors (100); and a control device (200) capable of communicating with each of the plurality of detectors (100). The control device (200) includes: a reception unit (212) that receives, from each of the plurality of detectors (100), information on year/month of manufacture indicating a year and a month when the detector (100) is manufactured and information on year/month of installation indicating a year and a month when the detector (100) is installed; and an output unit (250) that outputs a notification related to at least one of a time of maintenance or a time of replacement when at least one of the year/month of manufacturer or the year/month of installation received by the reception unit (212) reaches a notification deadline.

[0046] The control device (200) may further include a setting unit (222) that sets the notification deadline.

[0047] A server (400) capable of communicating with the control device (200) may further be provided. The control device (200) may further include a communication unit (260) that transmits, to the server (400), the information on year/month of manufacture and the information on year/month of installation received by the reception unit (212). In response to a request from a terminal device (500) capable of communicating with the server (400), the server (400) notifies the terminal device (500) of the information on year/month of manufacture and the information on year/month of installation.

[0048] The reception unit (212) may also receive, from each of the plurality of detectors (100), related information related to the detector (100), and the communication unit (260) may also transmit the related information received by the reception unit (212) to the server (400).

[0049] The communication unit (260) may transmit the notification that should be output from the output unit (250) to the server (400), and the server (400) may cause the notification to be output from the terminal device (500).

[0050] When the year/month of installation is earlier than the year/month of manufacture, the output unit (250) alerts of an error in at least one of the year/month of manufacture or the year/month of installation.

[0051] Another aspect of the present disclosure relates to a control device (200). The control device (200) is capable of communicating with each of a plurality of detectors (100) and includes: a reception unit (212) that receives, from each of the plurality of detectors (100), information on year/month of manufacture indicating a year and a month when the detector (100) is manufactured and information on year/month of installation indicating a year and a month when the detector (100) is installed; and an output unit (250) that outputs a notification related to at least one of a time of maintenance or a time of replacement when at least one of the year/month of manufacturer or the year/month of installation received by the reception unit (212) reaches a notification deadline.

[0052] Still another aspect of the present invention relates to a detector (100). The detector (100) is communicable with a control device (200) and includes: a storage (130) that stores information on year/month of manufacture indicating a year and a month when the detector (100) is manufactured and information on year/month of installation indicating a year and a month when the detector (100) is installed; a reception unit (112) that receives a request signal from the control device (200); and a transmission unit (114) that transmits the information on year/month of manufacture and the information on year/month of installation stored in the storage (130) to the control device (200) when the reception unit (112) receives the request signal.

[0053] The present disclosure has been described above based on an exemplary embodiment. The exemplary embodiment intended to be illustrative only and it will be understood by those skilled in the art that various modifications to combinations of constituting elements and processes are possible and that such modifications are also within the scope of the present disclosure.

[INDUSTRIAL APPLICABILITY]

[0054] According to the present disclosure, it is easy to know the time of maintenance or the time of replacement.

[REFERENCE SIGNS LIST]

[0055] 10 detector circuit, 20 network, 30 setting device, 100 detector, 110 communication unit, 112 reception unit, 114 transmission unit, 120 controller, 130 storage, 140 detection unit, 150 speaker, 200 control device, 210 communication unit, 212 reception unit, 214 transmission unit, 220 controller, 222 setting unit, 230 storage, 240 input unit, 250 output unit, 260 data communication unit (communication unit), 300 fire station device, 400 server, 500 terminal device, 10000 alarm system

Claims

1. An alarm system comprising:

a plurality of detectors; and
a control device capable of communicating with each of the plurality of detectors, wherein
the control device includes:

a reception unit that receives, from each of the plurality of detectors, information on year/month of manufacture indicating a year and a month when the detector is manufactured and information on year/month of installation indicating a year and a month when the detector is installed; and
an output unit that outputs a notification related to at least one of a time of maintenance or a time of replacement when at least one of the year/month of manufacturer or the year/month of installation received by the reception unit reaches a notification deadline.

2. The alarm system according to claim 1, wherein
the control device further includes a setting unit that sets the notification deadline.

3. The alarm system according to claim 1 or 2, further comprising:

a server capable of communicating with the control device, wherein
the control device further includes a communication unit that transmits, to the server, the information on year/month of manufacture and the information on year/month of installation received by the reception unit, and
in response to a request from a terminal device capable of communicating with the server, the server notifies the terminal device of the information on year/month of manufacture and the information on year/month of installation.

4. The alarm system according to claim 3, wherein

the reception unit also receives, from each of the plurality of detectors, related information related to the detector, and
the communication unit also transmits the related information received by the reception unit to the server.

5. The alarm system according to claim 3 or 4, wherein

the communication unit transmits the notification that should be output from the output unit to the server, and
the server causes the notification to be output from the terminal device.

6. The alarm system according to any one of claims 1 through 5, wherein
when the year/month of installation is earlier than the year/month of manufacture, the output unit alerts of an error in at least one of the year/month of manufacture or the year/month of installation.

7. A control device capable of communicating with each of a plurality of detectors, comprising:

a reception unit that receives, from each of the plurality of detectors, information on year/month of manufacture indicating a year and a month when the detector is manufactured and information on year/month of installation indicating a year and a month when the detector is installed; and
an output unit that outputs a notification related to at least one of a time of maintenance or a time of replacement when at least one of the year/month of manufacturer or the year/month of installation received by the reception unit reaches a notification deadline.

8. A detector communicable with a control device, comprising:

a storage that stores information on year/month of manufacture indicating a year and a month when the detector is manufactured and information on year/month of installation indicating a year and a month when the detector is installed;
a reception unit that receives a request signal from the control device; and
a transmission unit that transmits the information on year/month of manufacture and the information on year/month of installation stored in the storage to the control device when the reception unit receives the request signal.

FIG. 1

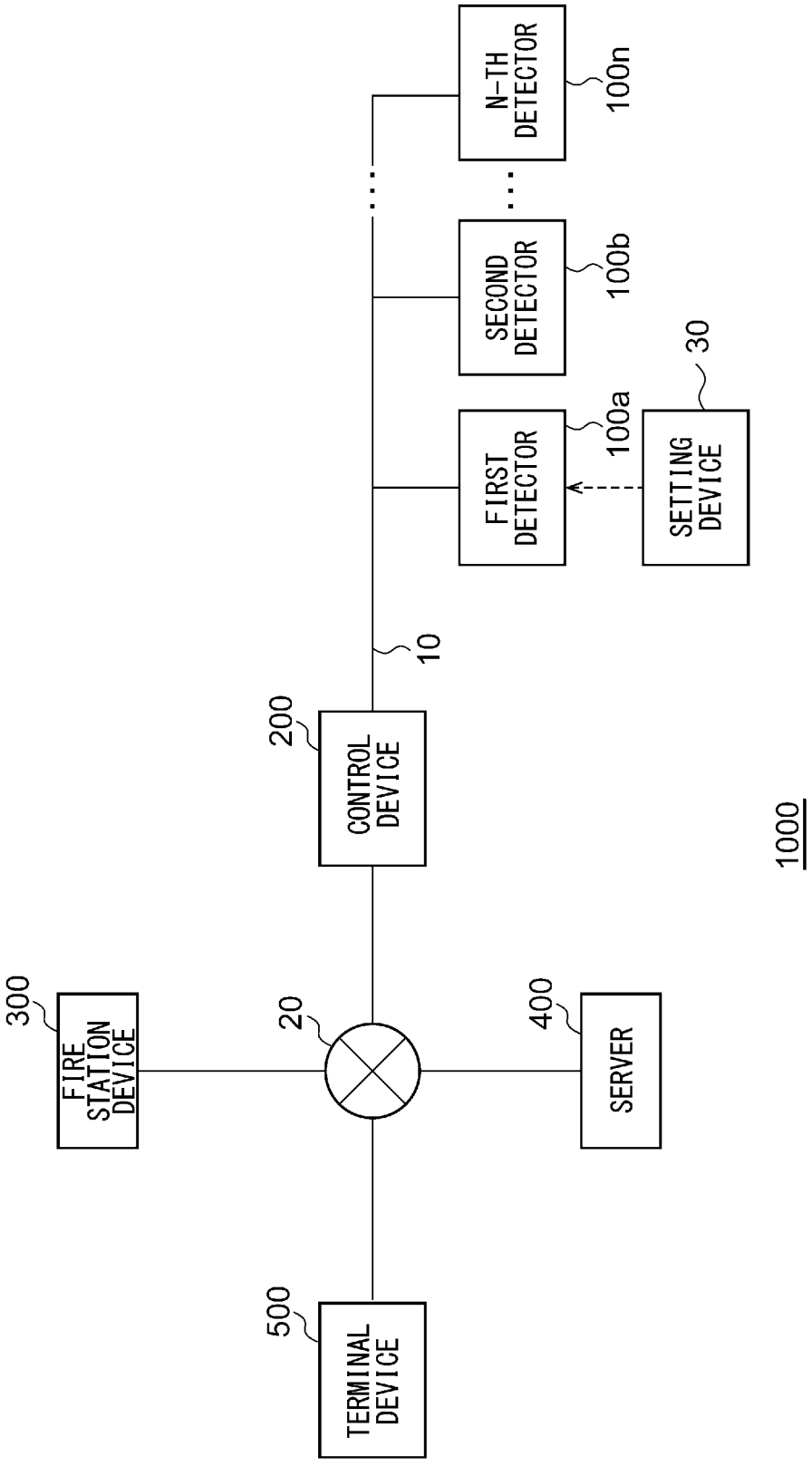
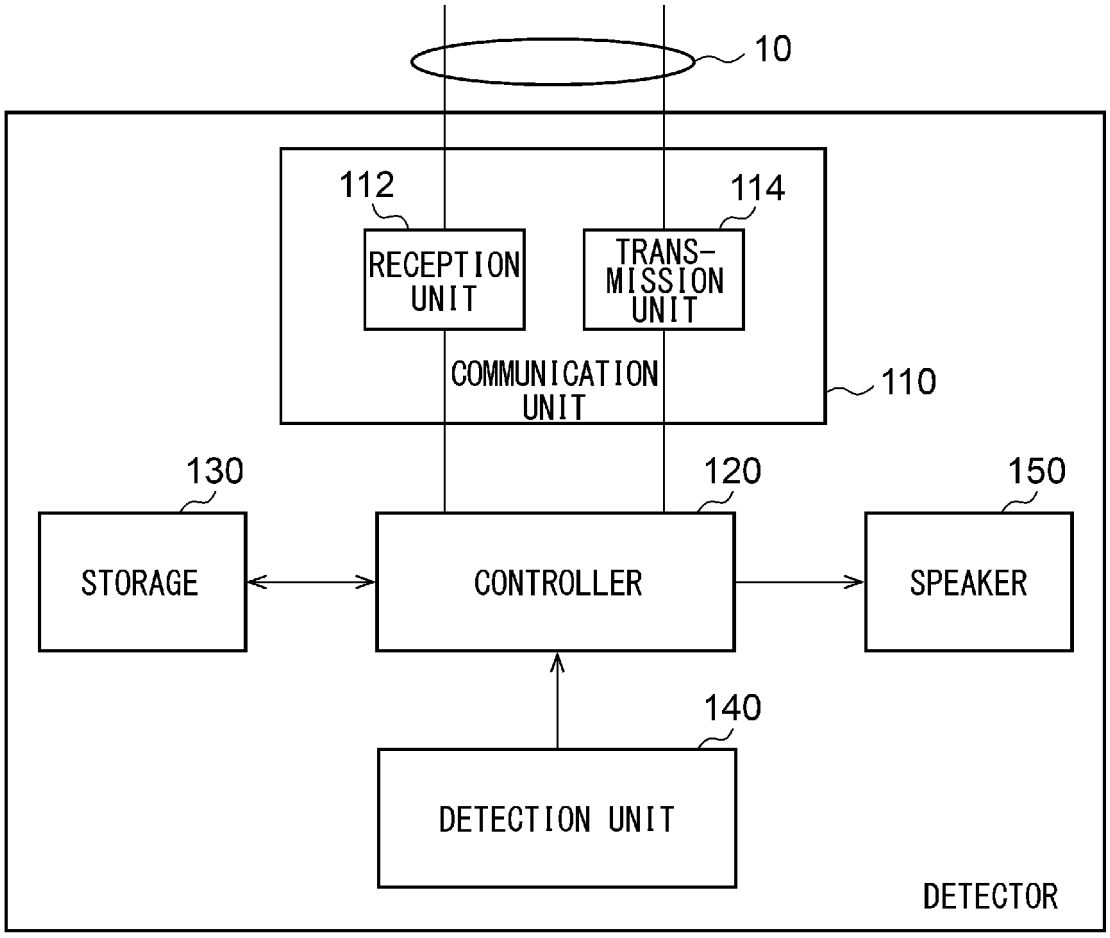

N-TH DETECTOR
100n
SECOND DETECTOR
100b
FIRST DETECTOR
100a
SETTING DEVICE
30
10
200
CONTROL DEVICE
300
FIRE STATION DEVICE
20
400
SERVER
500
TERMINAL DEVICE
1000

FIG. 2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114
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TRANS-MISSION UNIT
COMMUNICATION UNIT
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130
120
150
STORAGE
CONTROLLER
SPEAKER
140
DETECTION UNIT
DETECTOR
100

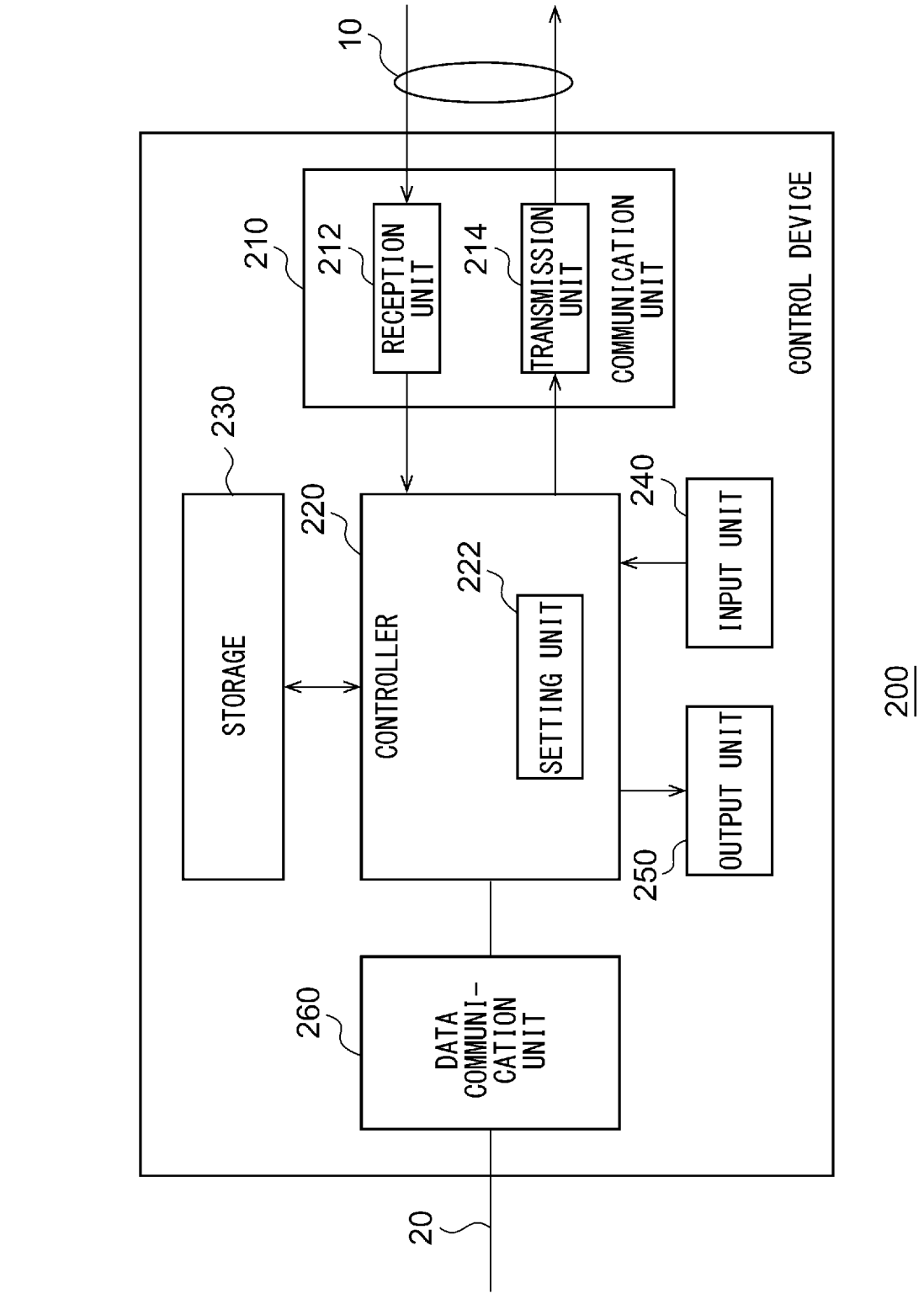

10
CONTROL DEVICE
210
212
RECEPTION UNIT
214
TRANSMISSION UNIT
COMMUNICATION UNIT
230
STORAGE
220
CONTROLLER
222
SETTING UNIT
240
INPUT UNIT
250
OUTPUT UNIT
260
DATA COMMUNI-CATION UNIT
20
200

FIG. 3

FIG. 4A

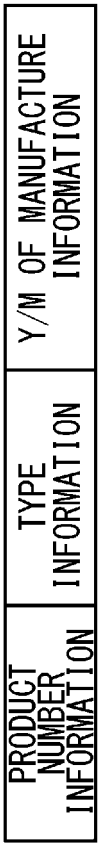
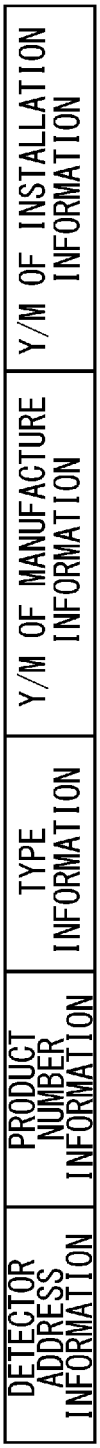


FIG. 4B

FIG. 4C



130

FIG. 5A

DETECTOR ADDRESS INFORMATION	PRODUCT NUMBER INFORMATION	TYPE INFORMATION	Y/M OF MANUFACTURE INFORMATION	Y/M OF INSTALLATION INFORMATION	INSTALLATION LOCATION INFORMATION
A1	B1	C1	D1	E1	F1
A2	B2	C2	D2	E2	F2
AZ	BZ	CZ	DZ	EZ	FZ

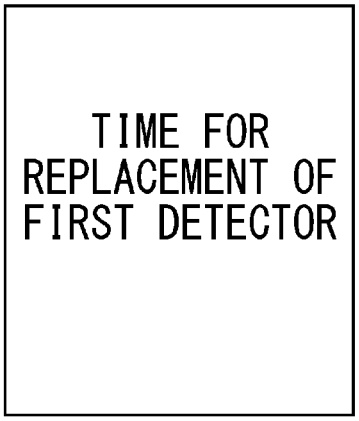
FIG. 5B

UNIQUE ID	DETECTOR ADDRESS INFORMATION	PRODUCT NUMBER INFORMATION	TYPE INFORMATION	Y/M OF MANUFACTURE INFORMATION	Y/M OF INSTALLATION INFORMATION	INSTALLATION LOCATION INFORMATION

200

FIG. 6A

FIG. 6B



250

FIG. 7

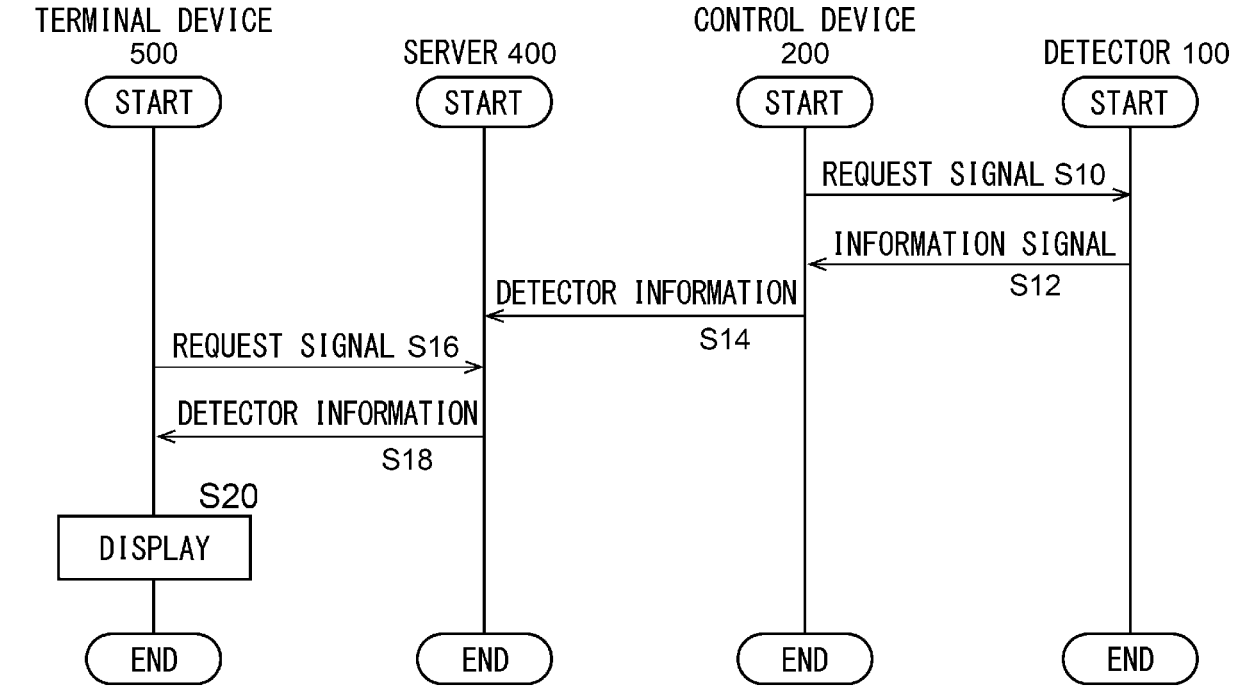
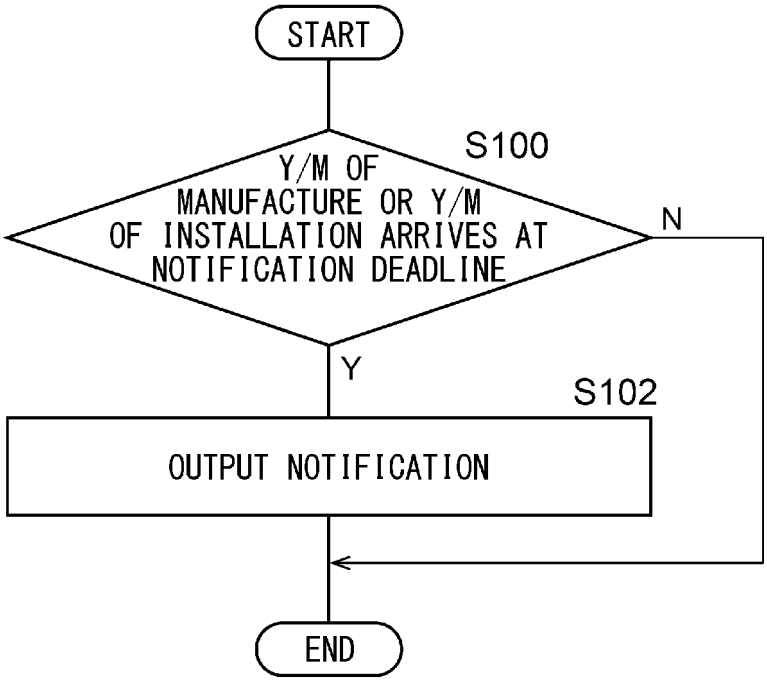


FIG. 8


START
S100
Y/M OF MANUFACTURE OR Y/M OF INSTALLATION ARRIVES AT NOTIFICATION DEADLINE
N
Y
S102
OUTPUT NOTIFICATION
END

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2022/002628

A. CLASSIFICATION OF SUBJECT MATTER

G08B 29/04(2006.01)i; ***G08B 17/00***(2006.01)i
FI: G08B17/00 L; G08B29/04

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)

G08B17/00-31/00

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

Published examined utility model applications of Japan 1922-1996
Published unexamined utility model applications of Japan 1971-2022
Registered utility model specifications of Japan 1996-2022
Published registered utility model applications of Japan 1994-2022

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2019-146119 A (OMRON CORPORATION) 29 August 2019 (2019-08-29) paragraphs [0014], [0041]-[0056], fig. 1, 4-5, 8-9	1-2, 7-8
Y		3-5
A		6
Y	JP 2015-197855 A (NOHMI BOSAI LTD) 09 November 2015 (2015-11-09) paragraphs [0010], [0021]-[0024], fig. 1, 3-4, 6	3-5
Y	JP 2017-69828 A (NOHMI BOSAI LTD) 06 April 2017 (2017-04-06) paragraphs [0038]-[0044]	5
A	JP 2019-117642 A (NOHMI BOSAI LTD) 18 July 2019 (2019-07-18) paragraphs [0015], [0020]	1-8

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

* Special categories of cited documents:
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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
23 March 2022	**05 April 2022**
Name and mailing address of the ISA/JP **Japan Patent Office (ISA/JP)** **3-4-3 Kasumigaseki, Chiyoda-ku, Tokyo 100-8915** **Japan**	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2022/002628

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
JP 2019-146119 A	29 August 2019	US 2019/0268527 A1 paragraphs [0037]-[0052], fig. 1, 4-5, 8-9 EP 3531679 A1 CN 110191257 A	
JP 2015-197855 A	09 November 2015	(Family: none)	
JP 2017-69828 A	06 April 2017	(Family: none)	
JP 2019-117642 A	18 July 2019	(Family: none)	

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2003248888 A **[0003]**