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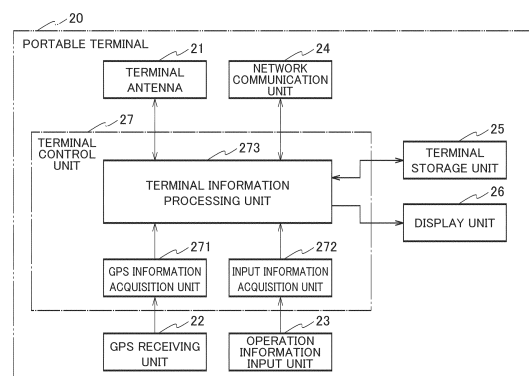
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(54) **AIR CONDITIONER MANAGEMENT SYSTEM, PORTABLE TERMINAL USED IN SAME, AND AIR CONDITIONER**

(57) An air conditioner management system includes an air conditioner (10) and a portable terminal (20) carried by a worker performing maintenance and inspection and connected to the air conditioner through short-distance wireless communication. The portable terminal (20) includes: a GPS information acquisition unit (271) that receives a GPS signal and acquires location information of the portable terminal; an input information acquisition unit (272) that acquires location information that has been input through a manual operation; and a terminal information processing unit (273) that adds acquisition category information to acquired location information, the acquisition category information indicating whether corresponding location information is the location information acquired based on the GPS signal or the location information that has been input through the manual operation, and sends them to the air conditioner (10). The air conditioner (10) includes a storage unit (112c) that stores the location information and the acquisition category information sent from the portable terminal (20).

FIG. 3



Description

FIELD

[0001] Embodiments according to the present invention relate to an air conditioner management system, and a portable terminal and an air conditioner used in the air conditioner management system.

BACKGROUND

[0002] It is desirable to know an installation location of an air conditioner in order to perform maintenance and inspection of the air conditioner and to determine the cause of failures. For this purpose, an outdoor unit of an air conditioner is equipped with a GPS receiving function, and installation location information acquired through the GPS receiving function is made known to the air conditioner. It is possible to perform maintenance and inspection of a target air conditioner and to determine the cause of a failure using this location information.

CITATION LIST

Patent Literature

[0003] PTL 1: Japanese Patent No. 4845814

SUMMARY

[0004] However, equipping an air conditioner with a GPS receiving function as described above increases the number of parts in the air conditioner and increases the cost. Thus, it is feasible for a worker performing maintenance and inspection of an air conditioner to use a portable terminal having a GPS receiving function to acquire location information at the installation site of the air conditioner and store it in a memory of the air conditioner using a communication function between the portable terminal and the air conditioner. By performing processing in this way, the location information of the air conditioner can be stored in the air conditioner without providing a GPS receiving function in the air conditioner body.

[0005] However, when a portable terminal acquires location information of an air conditioner, the portable terminal cannot receive a GPS signal in some cases depending on the topography of the location, the installation environment of the air conditioner, the weather, or the like. In such cases, it becomes impossible to input location information into the air conditioner.

[0006] The present invention has been made in view of the above-described circumstances, and it is an object of the present invention to provide an air conditioner management system capable of acquiring location information of an air conditioner even when GPS information cannot be received at the installation location of the air conditioner, and a portable terminal and an air conditioner used in the air conditioner management system.

[0007] To achieve the above-described object, an air conditioner management system according to the present invention includes an air conditioner, and a portable terminal capable of being connected to the air conditioner through wireless communication, wherein the portable terminal includes: a GPS information acquisition unit configured to receive a GPS signal and acquire location information of the portable terminal; an input information acquisition unit configured to acquire location information input through a manual operation, and a terminal information processing unit configured to add acquisition category information to the location information of the portable terminal acquired by the GPS information acquisition unit or the location information acquired by the input information acquisition unit, the acquisition category information indicating whether corresponding location information is the location information acquired based on the GPS signal or the location information input through the manual operation, and send them to the air conditioner, and the air conditioner includes a storage unit configured to store the location information and the acquisition category information sent from the portable terminal.

[0008] A portable terminal according to the present invention includes: a GPS information acquisition unit configured to receive a GPS signal and acquires location information of the portable terminal; an input information acquisition unit configured to acquire location information input through a manual operation; and a terminal information processing unit configured to add acquisition category information to the location information of the portable terminal acquired by the GPS information acquisition unit or the location information acquired by the input information acquisition unit, the acquisition category information indicating whether corresponding location information is the location information acquired based on the GPS signal or the location information input through the manual operation, and send them to an air conditioner that is wirelessly connected to the portable terminal, for storage as location information of the air conditioner.

[0009] An air conditioner according to the present invention includes a storage unit that stores location information sent from a portable terminal as location information of the air conditioner, wherein the air conditioner is connected to the portable terminal through a short-distance wireless communication, and the portable terminal includes a GPS information acquisition unit configured to receive a GPS signal and acquire location information of the portable terminal, an input information acquisition unit configured to acquire location information input through a manual operation, and a terminal information processing unit configured to add acquisition category information to the location information of the portable terminal acquired by the GPS information acquisition unit or the location information acquired by the input information acquisition unit, the acquisition category information indicating whether corresponding location information is the location information acquired based on the GPS sig-

nal or the location information input through the manual operation, and send the location information and the acquisition category information.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010]

[FIG. 1] FIG. 1 is an overall view illustrating a configuration of an air conditioner management system according to an embodiment of the present invention.

[FIG. 2] FIG. 2 is a block diagram illustrating a configuration of an air conditioner used in the air conditioner management system according to the embodiment of the present invention.

[FIG. 3] FIG. 3 is a block diagram illustrating a configuration of a portable terminal used in the air conditioner management system according to the embodiment of the present invention.

[FIG. 4] FIG. 4 is a flow chart illustrating an operation of setting location information of the air conditioner using the portable terminal of the air conditioner management system according to the embodiment of the present invention.

[FIG. 5] FIG. 5 is a screen configuration diagram when first display information is displayed on the portable terminal of the air conditioner management system according to the embodiment of the present invention.

[FIG. 6] FIG. 6 is a screen configuration diagram when second display information is displayed on the portable terminal of the air conditioner management system according to the embodiment of the present invention.

[FIG. 7] FIG. 7 is a flow chart illustrating an operation of acquiring and updating location information stored in the air conditioner, in the portable terminal of the air conditioner management system according to the embodiment of the present invention.

[FIG. 8] FIG. 8 is a screen configuration diagram when the first display information, in which location information acquired based on a GPS signal is illustrated on map information, is displayed on the portable terminal of the air conditioner management system according to the embodiment of the present invention.

[FIG. 9] FIG. 9 is a screen configuration diagram when the second display information, in which manually input location information is illustrated on the map information, is displayed on the portable terminal of the air conditioner management system according to the embodiment of the present invention.

DETAILED DESCRIPTION

<Configuration of Air Conditioner Management System According to Embodiment>

[0011] A configuration of an air conditioner management system according to an embodiment of the present invention will be described with reference to FIG. 1. An air conditioner management system 1 according to the embodiment includes an air conditioner 10 and a portable terminal 20 capable of performing short-distance wireless communication using NFC (near-field communication) with the air conditioner 10. The portable terminal 20 is a terminal carried by a worker who performs installation work or maintenance inspection of the air conditioner 10.

[0012] FIG. 1 illustrates a schematic configuration of the air conditioner 10, and FIG. 2 illustrates a detailed configuration thereof. The air conditioner 10 includes an outdoor unit 11, an indoor unit 12 connected to the outdoor unit 11 through a communication line and a refrigerant piping, and a remote controller 13 connected to the indoor unit 12 for communication. The outdoor unit 11 includes an NFC tag 111 and an outdoor controller 112. The NFC tag 111 includes an outdoor unit antenna 111a for performing NFC communication, a nonvolatile memory 111b, and an information input/output (I/O) unit 111c. The information I/O unit 111c performs processing of inputting and outputting information through NFC communication. The outdoor unit 11, the indoor unit 12, or the remote controller 13 may be connected to a centralized control device of a higher level air conditioner or to an air conditioner management server through the Internet.

[0013] The outdoor controller 112 includes a first communication unit 112a, a second communication unit 112b, an outdoor storage unit 112c, and a control unit 112d. The first communication unit 112a communicates with the NFC tag 111. The second communication unit 112b communicates with the indoor unit 12. The outdoor storage unit 112c stores various information about the outdoor unit 11. Similar to the nonvolatile memory 111b of the NFC tag 111, the outdoor storage unit 112c uses a nonvolatile memory whose memory is not erased when the power supply is shut off. The control unit 112d controls sending and receiving of information to and from the NFC tag 111, the indoor unit 12, and the outdoor storage unit 112c.

[0014] The indoor unit 12 includes an indoor controller 121 that configures to control equipment in the indoor unit 12 based on information sent from the outdoor unit 11 and information sent from the remote controller 13. The remote controller 13 sends user operation information to the indoor unit 12. The indoor controller 121 sends information for controlling equipment in the outdoor unit 11 to the outdoor controller 112. The indoor controller 121 sends information for display on a display unit (not illustrated) of the remote controller 13.

[0015] The portable terminal 20 is constituted by, for example, a smart device, and as illustrated in FIG. 3,

includes a terminal antenna 21 for communicating with the NFC tag 111 of the outdoor unit 11 using NFC, a GPS receiving unit 22, an operation information input unit 23, a network communication unit 24, a terminal storage unit 25, a display unit 26, and a terminal control unit 27.

[0016] The GPS receiving unit 22 receives a GPS signal and acquires location information of the portable terminal 20. The operation information input unit 23 is constituted by a touch screen or the like and inputs manual operation information from a worker. The network communication unit 24 connects to a general wide area network. The terminal storage unit 25 stores information based on an instruction from the terminal control unit 27. The display unit 26 is constituted by a liquid crystal screen that serves also as a touch screen used as the operation information input unit 23, and displays information based on an instruction from the terminal control unit 27.

[0017] The terminal control unit 27 includes a GPS information acquisition unit 271, an input information acquisition unit 272, and a terminal information processing unit 273. The GPS information acquisition unit 271 acquires location information acquired by the GPS receiving unit 22. The input information acquisition unit 272 acquires operation information manually input by a worker through the operation information input unit 23.

[0018] When a location information setting instruction for the air conditioner 10 is input from the operation information input unit 23 through a manual operation by a worker, the terminal information processing unit 273 adds acquisition category information to location information of the portable terminal 20 acquired by the GPS information acquisition unit 271 or to location information acquired by the input information acquisition unit 272, the acquisition category information indicating whether the corresponding location information is location information acquired based on a GPS signal or location information input by a worker, and sends them to the outdoor unit 11 for storage as installation location information of the air conditioner 10, more specifically, of the outdoor unit 11. When a location information read instruction for the air conditioner 10 is input from the operation information input unit 23 through a manual operation by a worker, the terminal information processing unit 273 sends a location information read request to the air conditioner 10, and in response to this, acquires location information stored in the air conditioner 10 and sent from the air conditioner 10, and stores the location information in the terminal storage unit 25 and outputs the location information to the display unit 26.

<Operations of Air Conditioner Management System According to Embodiment>

[0019] Operations of the air conditioner management system 1 according to the embodiment will be described with reference to flowcharts in FIGS. 4 and 5. In the embodiment, the portable terminal 20 carried by a worker X is designated as a portable terminal 20X, and the portable

terminal 20 carried by a worker Y is designated as a portable terminal 20Y. In the outdoor storage unit 112c of the outdoor controller 112 of the outdoor unit 11, for example, a model name "MMY-MUP****", a serial number "12345678", and a unit number "U1/12HP" are written and stored as information about the outdoor unit 11 when the outdoor unit 11 is manufactured.

[0020] First, when the air conditioner 10 is installed, the worker X inputs the name of the building where the air conditioner 10 is installed, "ABC Building No. 1 East", into the portable terminal 20X, and brings the portable terminal 20X close to the outdoor unit antenna 111a of the NFC tag 111 of the outdoor unit 11 to enable NFC communication, and thus the terminal control unit 27 of the portable terminal 20 and the control unit 112d of the outdoor controller 112 detect that NFC communication is enabled.

[0021] When detecting that NFC communication is enabled, the control unit 112d acquires the model name "MMY-MUP****", the serial number "12345678", and the unit number "U1/12HP" of the outdoor unit 11 from the outdoor storage unit 112c and sends them to the portable terminal 20 through the first communication unit 112a, the information I/O unit 111c, and the outdoor unit antenna 111a. The portable terminal 20 acquires various kinds of information, which are sent from the outdoor unit 11, in the terminal information processing unit 273 of the terminal control unit 27 through the terminal antenna 21 and displays them on the display unit 26.

[0022] With NFC communication enabled between the portable terminal 20 and the outdoor unit 11 ("YES" in S1), when the worker X performs an operation to instruct the setting of location information of the air conditioner 10 through the operation information input unit 23 of the portable terminal 20X, information on the operation is acquired by the input information acquisition unit 272 of the terminal control unit 27 ("YES" in S2).

[0023] When the input information acquisition unit 272 acquires the information on the setting instruction operation for the location information, the terminal information processing unit 273 instructs the GPS information acquisition unit 271 to acquire location information based on a GPS signal (S3). In response to the instruction, the GPS information acquisition unit 271 activates the GPS receiving unit 22 to receive a GPS signal.

[0024] Here, when a GPS signal is received properly by the GPS receiving unit 22 and the location information (latitude/longitude information) of the portable terminal 20X is acquired based on the GPS signal ("YES" in S4), the location information is acquired by the GPS information acquisition unit 271 and sent to the terminal information processing unit 273.

[0025] Upon acquiring the location information, the terminal information processing unit 273 sets acquisition category information based on bibliographic information added to the location information. Here, information indicating that the location information is acquired based on a GPS signal is set as the acquisition category infor-

mation. Then, first display information 300 including the acquired location information and the acquisition category information is displayed on the display unit 26 (S5). FIG. 5 illustrates an example of the first display information 300 displayed on the display unit 26.

[0026] In the first display information 300 in FIG. 5, "ABC Building No. 1 East" is displayed as building name information 301, which is input by the worker X. "MMY-MUP****" is displayed as model name information 302, "12345678" is displayed as a serial number 303, and "U1/12HP" is displayed as a unit number 304 of the outdoor unit 11, which are acquired from the outdoor unit 11. "35.149972" is displayed as latitude information 305 and "138.554495" is displayed as longitude information 306 of the location information acquired by the GPS information acquisition unit 271. "GPS" is displayed as acquisition category information 307, indicating that the location information was acquired based on a GPS signal.

[0027] The first display information 300 in FIG. 5 displayed on the display unit 26 (display screen) includes information on a "Back" button 308, a "Save" button 309, a "Send" button 310, and a "Read" button 311. The "Back" button 308 is a button for returning the display of the display unit 26 of the portable terminal 20 from the screen of the first display information 300 to a previous display screen. The "Save" button 309 is a button for saving the location information displayed in the first display information 300, in the terminal storage unit 25. The "Send" button 310 is a button for sending the information displayed in the first display information 300 to the outdoor unit 11. The "Read" button 311 is a button for reading out the location information stored in the outdoor unit 11.

[0028] Here, when the "Save" button 309 is operated by the worker X to instruct saving of location information ("YES" in S6), the terminal information processing unit 273 adds a flag F = 1 to the acquired location information as acquisition category information indicating that the location information is location information acquired based on a GPS signal, and stores it in the terminal storage unit 25 (S7).

[0029] When the GPS receiving unit 22 does not properly receive a GPS signal in step S4 and the terminal information processing unit 273 is unable to acquire location information based on a GPS signal ("NO" in S4), the display unit 26 outputs information prompting the worker X to input location information, for example, message information such as "location information was not available, use keys to enter location information".

[0030] The worker X confirms the message information displayed on the display unit 26, acquires location information of the current location by means other than the location information acquisition means using a GPS signal, and manually inputs the information through the operation information input unit 23. Location information acquired by means other than the location information acquisition means using a GPS signal is, for example, location information constituted by latitude and longitude information of the current location read by the worker X

from map information on which the latitude and longitude information is displayed. Although the location information acquired and manually input by the worker X in this way is often less accurate than the location information acquired using a GPS signal, it is possible to identify a rough location. The location information input through an operation by the worker X is acquired by the input information acquisition unit 272 and sent to the terminal information processing unit 273.

[0031] When acquiring the location information that has been input through an operation by the worker X ("YES" in S8), the terminal information processing unit 273 sets acquisition category information based on bibliographic information of the location information. Here, information indicating that the location information has been manually input is set as the acquisition category information. Then, second display information 400 including the acquired location information and the acquisition category information is displayed on the display unit 26 (S9). FIG. 6 illustrates an example of the second display information 400 displayed on the display unit 26 (display screen) here. If no operation is performed by the worker X ("NO" in S8), the process ends there.

[0032] In the second display information 400 in FIG. 6, building name information 401 "ABC Building No. 1 East" is displayed, and model name information 402 "MMY-MUP ****", serial number 403 "12345678", and unit number 404 "U1/12HP" of the outdoor unit 11 are displayed. Also, "35.1" is displayed as latitude information 405 and "138.6" is displayed as longitude information 406 of the location information manually input by the worker X, and "Manual" is displayed as acquisition category information 407 indicating that the location information was manually input by a worker. Also, similarly as in FIG. 5, the second display information 400 includes information on a "Back" button 408, a "Save" button 409, a "Send" button 410, and a "Read" button 411.

[0033] Here, when the worker X operates the "Save" button 409 to instruct saving of location information ("YES" in S10), the terminal information processing unit 273 adds a flag F = 0 to the acquired location information as acquisition category information indicating that the location information is location information that has been input through an operation by the worker X, and stores it in the terminal storage unit 25 (S11).

[0034] Then, when the worker X operates the "Send" button 410 to instruct sending of location information ("YES" in S12), the terminal information processing unit 273 sends the corresponding location information to the outdoor unit 11 of the air conditioner 10 through the terminal antenna 21 (S13).

[0035] In the outdoor unit 11, location information sent from the portable terminal 20X is received through the outdoor unit antenna 111a and stored in the nonvolatile memory 111b by the information I/O unit 111c of the NFC tag 111. Furthermore, the stored location information is sent to the outdoor controller 112 by the information I/O unit 111c, and is stored in the outdoor storage unit 112c

as location information of the air conditioner 10 under the control of the control unit 112d.

[0036] An operation performed when another worker Y visits the air conditioner 10 after location information of the air conditioner 10 is stored in the outdoor unit 11 in the above-described way and reads the location information using the portable terminal 20Y will be described with reference to a flowchart in FIG. 7. The flowchart in FIG. 7 illustrates control flows in parallel of the portable terminal 20 and the outdoor unit 11 operating in association with each other.

[0037] When the worker Y brings the portable terminal 20Y close to the outdoor unit antenna 111a of the outdoor unit 11 to enable NFC communication ("YES" in S21, "YES" in S22) and performs an operation to instruct reading of location information of the air conditioner 10, through the operation information input unit 23 of the portable terminal 20Y ("YES" in S23), the input information acquisition unit 272 acquires information on a location information read request operation. The terminal information processing unit 273 sends the location information read request to the outdoor unit 11 of the air conditioner 10 through the terminal antenna 21 (S24). If for some reason NFC communication is not possible between the portable terminal 20Y and the outdoor unit 11, the process ends ("NO" in S21, "NO" in S22). Also, if the portable terminal 20Y is not operated to request reading of location information ("NO" in S23), the process ends.

[0038] The location information read request sent from the portable terminal 20Y is received by the outdoor unit 11 through the outdoor unit antenna 111a and is sent to an outdoor unit information processing unit 113. The outdoor unit information processing unit 113 reads location information of the air conditioner 10 from the outdoor storage unit 112c in response to the acquired location information read request and sends it to the portable terminal 20Y through the outdoor unit antenna 111a of the NFC tag 111 (S25).

[0039] In the portable terminal 20Y, the location information of the air conditioner 10 sent from the outdoor unit 11 is received through the terminal antenna 21, is stored in the terminal storage unit 25 by the terminal information processing unit 273, and when the flag F added to the location information is 1, the first display information 300 similar to that in FIG. 5 is displayed on the display unit 26, and when the flag F is 0, the second display information 400 similar to that in FIG. 6 is displayed (S26).

[0040] Here, when information displayed on the display unit 26 is the second display information 400, the worker Y determines that accuracy may be low because the location information has been manually input, and performs processing to update the location information stored in the outdoor unit 11 by acquiring location information using a GPS signal again.

[0041] When the worker Y performs an operation to instruct the setting of location information of the air conditioner 10 through the operation information input unit 23 of the portable terminal 20Y in order to update location

information stored in the outdoor unit 11, information on the operation is acquired by the input information acquisition unit 272 of the terminal control unit 27 ("YES" in S27). Since the processing performed in steps S28 to S35 is similar to the processing in steps S3 to S7, S12, and S13 described above, detailed descriptions will be omitted.

[0042] By updating manually input location information stored in the outdoor unit 11 with location information using a GPS signal in this way, it is possible to obtain highly accurate location information from the air conditioner 10 when other workers visit the air conditioner 10 in the future.

[0043] When location information using a GPS signal could not be acquired in step S29 ("NO" in S29), update processing for location information is not executed and the process returns to step S21. When the location information already stored in the air conditioner is information acquired based on a GPS signal, the worker does not perform the location information setting instruction operation ("NO" in S27) and the installation location confirmation processing ends.

[0044] In the above-described embodiment, when the terminal information processing unit 273 acquires location information in step S4 ("YES") or step S29 ("YES"), reliability information of a GPS signal, which is created by the portable terminal 20 based on the GPS signal and indicates the reliability of the acquired location information, may be used for the acquisition category information. The reliability information of a GPS signal is information added to the GPS signal using existing technology. In contrast, the manually input location information acquired in step S8 ("YES") does not include such reliability information.

[0045] Here, the terminal information processing unit 273 determines that location information has been acquired based on a GPS signal when reliability information has been added to the acquired location information, and that location information has been manually input by a worker when reliability information has not been added.

[0046] The terminal information processing unit 273 may include map information, generate display information indicating acquired location information of the air conditioner on the map information in a display format differentiated for each item of acquisition category information added to the location information, and display the display information on the display unit 26.

[0047] For example, when the acquisition category information of the location information is "GPS", the terminal information processing unit 273 displays a circle S 1, which is centered on a location P1 of the location information and becomes larger as the reliability information becomes lower, on map information M as illustrated in FIG. 8. When the acquisition category information of the location information is "manual", the terminal information processing unit 273 displays a point centered on a location P2 of the location information on the map information M as illustrated in FIG. 9. Workers can determine whether

stored location information is "GPS" or "manual" also based on the information displayed on this map information M.

[0048] In the above-described embodiment, location information of the air conditioner 10 stored in the portable terminals 20X, 20Y may be sent from the network communication unit 24 to a portable terminal of another worker via a wide area network through operations of workers X, Y. By sending information in this way, location information of the air conditioner 10 can be provided even to a worker who is yet to go to the place of the air conditioner 10.

[0049] According to the above-described embodiment, even when GPS information cannot be received at an installation location of an air conditioner, it is possible to input and store location information of the air conditioner. When stored location information of the air conditioner is less accurate, it is possible to update the information to highly accurate information. By reading the location information of the air conditioner acquired in this way with a portable terminal carried by a worker, it is possible for the worker to easily go to the place of the air conditioner using the acquired location information when performing subsequent maintenance and inspection.

[0050] Although the outdoor unit 11 stores location information obtained from the portable terminal 20 in the outdoor storage unit 112c in the above-described embodiment, the location information may be stored only in the nonvolatile memory 111b of the NFC tag 111, and the location information stored in the nonvolatile memory 111b may be read by the control unit 112d through the first communication unit 112a and the information I/O unit 111c and be sent to the portable terminal 20 in response to a location information read request from the portable terminal 20.

[0051] While certain embodiments have been described, these embodiments have been presented by way of example only, and are not intended to limit the scope of the inventions. Indeed, the novel methods and systems described herein may be embodied in a variety of other forms; furthermore, various omissions, substitutions and changes in the form of the methods and systems described herein may be made without departing from the spirit of the inventions. The accompanying claims and their equivalents are intended to cover such forms or modifications as would fall within the scope and spirit of the inventions.

Claims

1. An air conditioner management system, comprising:

an air conditioner; and
a portable terminal capable of being connected to the air conditioner through wireless communication, wherein
the portable terminal comprises:

a GPS information acquisition unit configured to receive a GPS signal and acquire location information of the portable terminal; an input information acquisition unit configured to acquire location information that has been input through a manual operation; and a terminal information processing unit configured to add acquisition category information to the location information of the portable terminal acquired by the GPS information acquisition unit or the location information acquired by the input information acquisition unit, the acquisition category information indicating whether corresponding location information is the location information acquired based on the GPS signal or the location information that has been input through the manual operation, and send the location information and the acquisition category information to the air conditioner, and

the air conditioner comprises:

a storage unit configured to store the location information and the acquisition category information sent from the portable terminal.

2. A portable terminal wirelessly connected to an air conditioner, comprising:

a GPS information acquisition unit configured to receive a GPS signal and acquire location information of the portable terminal; an input information acquisition unit configured to acquire location information that has been input through a manual operation; and a terminal information processing unit configured to add acquisition category information to the location information of the portable terminal acquired by the GPS information acquisition unit or the location information acquired by the input information acquisition unit, the acquisition category information indicating whether corresponding location information is the location information acquired based on the GPS signal or the location information that has been input through the manual operation, and send the location information and the acquisition category information to the air conditioner to be stored as location information of the air conditioner.

3. The portable terminal according to claim 2, wherein when the terminal information processing unit acquires a location information setting request for the air conditioner, the terminal information processing unit gives an instruction to the GPS information acquisition unit to acquire location information; in a case where the terminal information processing unit acquires the location information based on the GPS

signal in response to the instruction, the terminal information processing unit adds, to the location information acquired, information indicating that the location information is the location information acquired based on the GPS signal, and sends them to the air conditioner; and in a case where the terminal information processing unit could not acquire location information based on the GPS signal, the terminal information processing unit outputs message information prompting input of location information, and upon acquisition of location information that has been input through a manual operation, the terminal information processing unit adds, to the location information acquired, information indicating that the location information is the location information that has been input through a manual operation, and sends them to the air conditioner.

4. The portable terminal according to claim 2 or 3, wherein
when the terminal information processing unit acquires a location information acquisition request for the air conditioner, the terminal information processing unit sends the location information acquisition request to the air conditioner, and acquires and outputs location information of the air conditioner sent from the air conditioner in response to the location information acquisition request.

5. The portable terminal according to any one of claims 2 to 4, wherein

reliability information indicating reliability of the GPS signal is added to the location information acquired by the GPS information acquisition unit, and
when the reliability information is added to location information, the terminal information processing unit determines that the location information has been acquired based on the GPS signal, and when the reliability information is not added, the terminal information processing unit determines that location information has been manually input, and sets the acquisition category information.

6. The portable terminal according to any one of claims 2 to 5, further comprising:

a display unit, wherein
the terminal information processing unit includes map information, generates display information indicating acquired location information of the air conditioner on the map information in a display format differentiated for each item of acquisition category information added to the location information, and displays the display information on the display unit.

7. An air conditioner, comprising:

a storage unit that stores location information sent from a portable terminal as location information of the air conditioner, wherein
the air conditioner is connected to the portable terminal through short-distance wireless communication, and
the portable terminal comprises:

a GPS information acquisition unit configured to receive a GPS signal and acquire location information of the portable terminal; an input information acquisition unit configured to acquire location information that has been input through a manual operation; and a terminal information processing unit configured to add acquisition category information to the location information of the portable terminal acquired by the GPS information acquisition unit or the location information acquired by the input information acquisition unit, the acquisition category information indicating whether corresponding location information is the location information acquired based on the GPS signal or the location information that has been input through the manual operation, and send the location information and the acquisition category information.

8. The air conditioner according to claim 7, further comprising:

a control unit that, when new location information is sent from a portable terminal connected to the air conditioner after the location information of the air conditioner is stored in the storage unit, updates information stored in the storage unit with the new location information.

FIG. 1

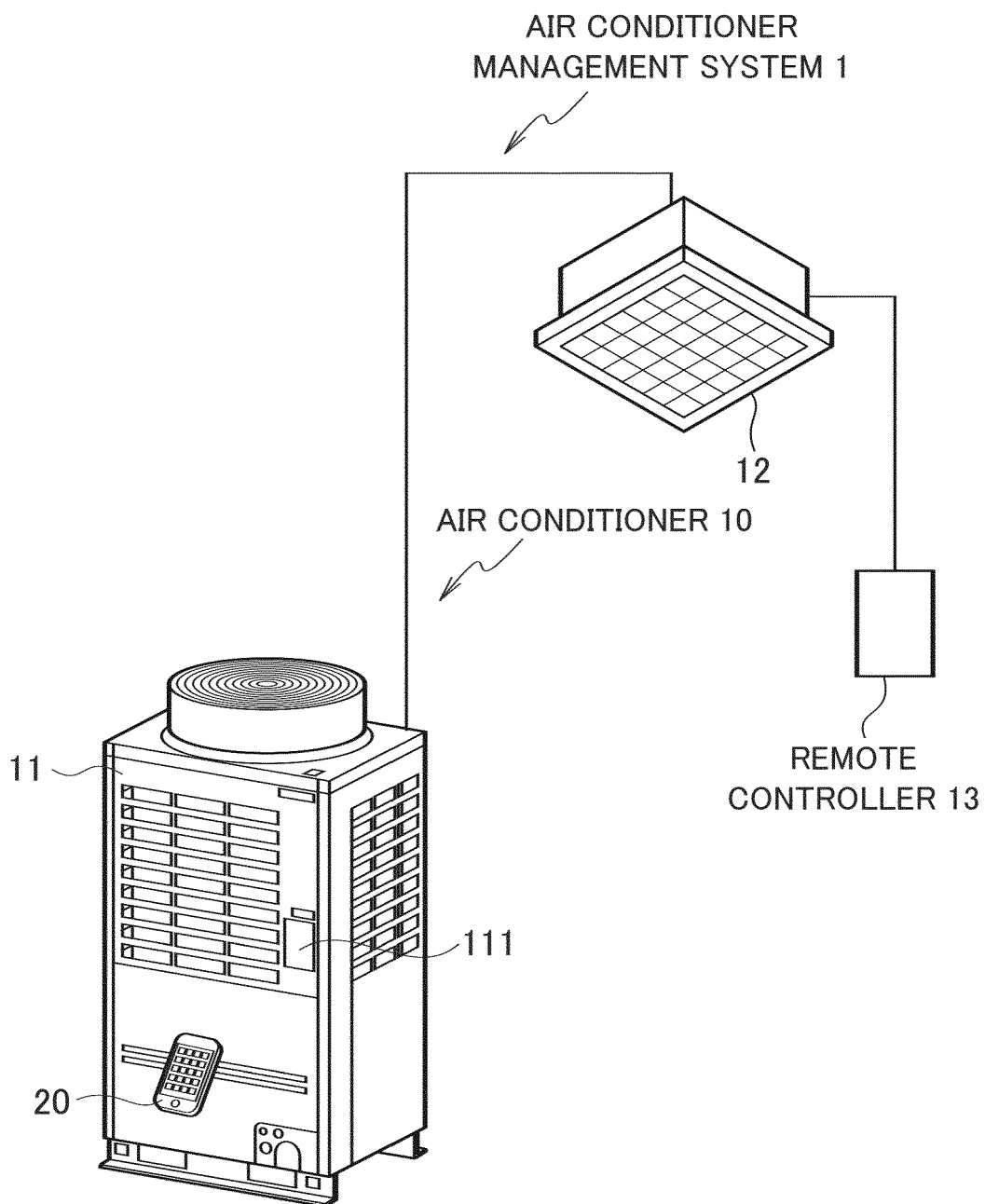


FIG. 2

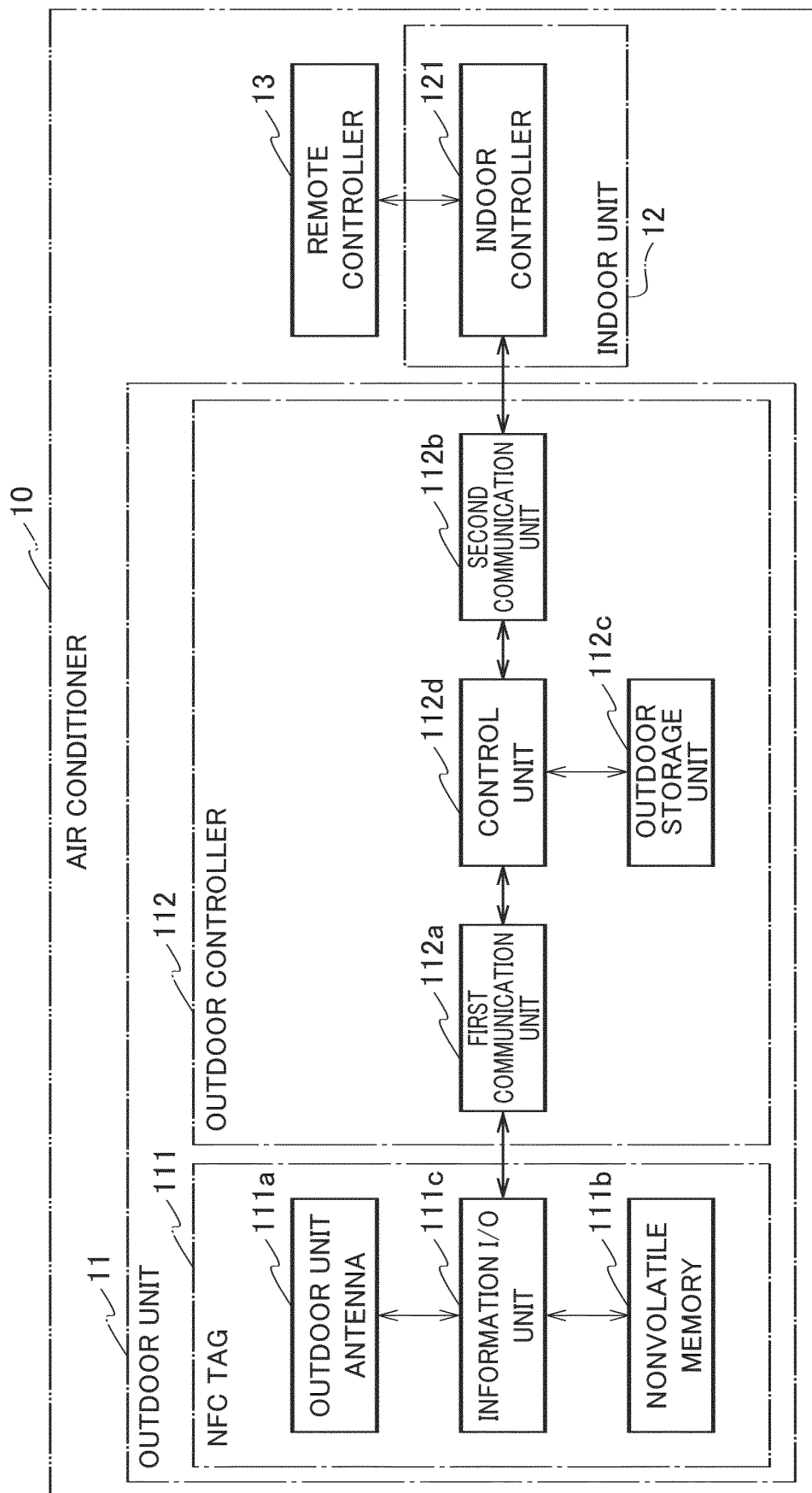


FIG. 3

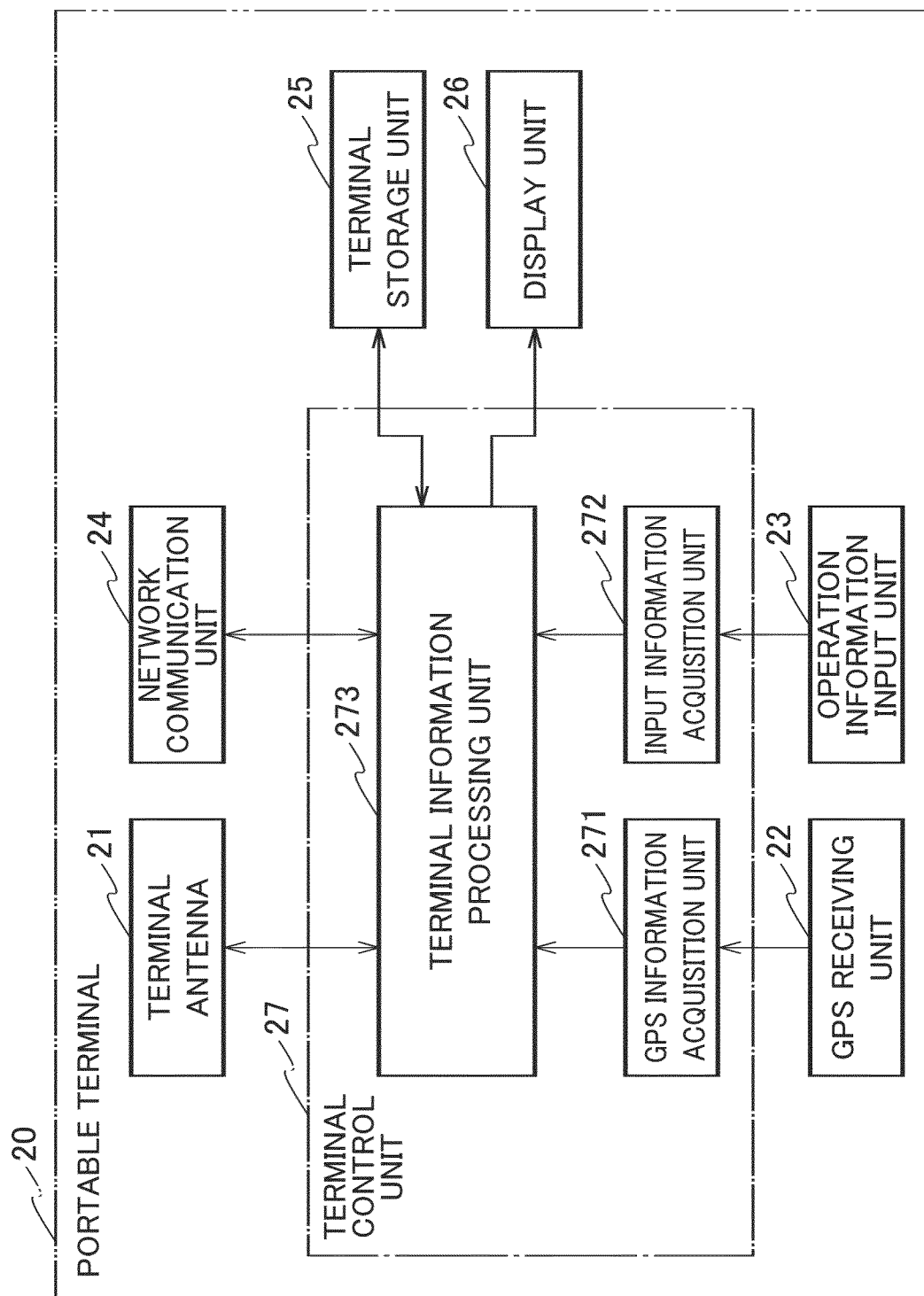


FIG. 4

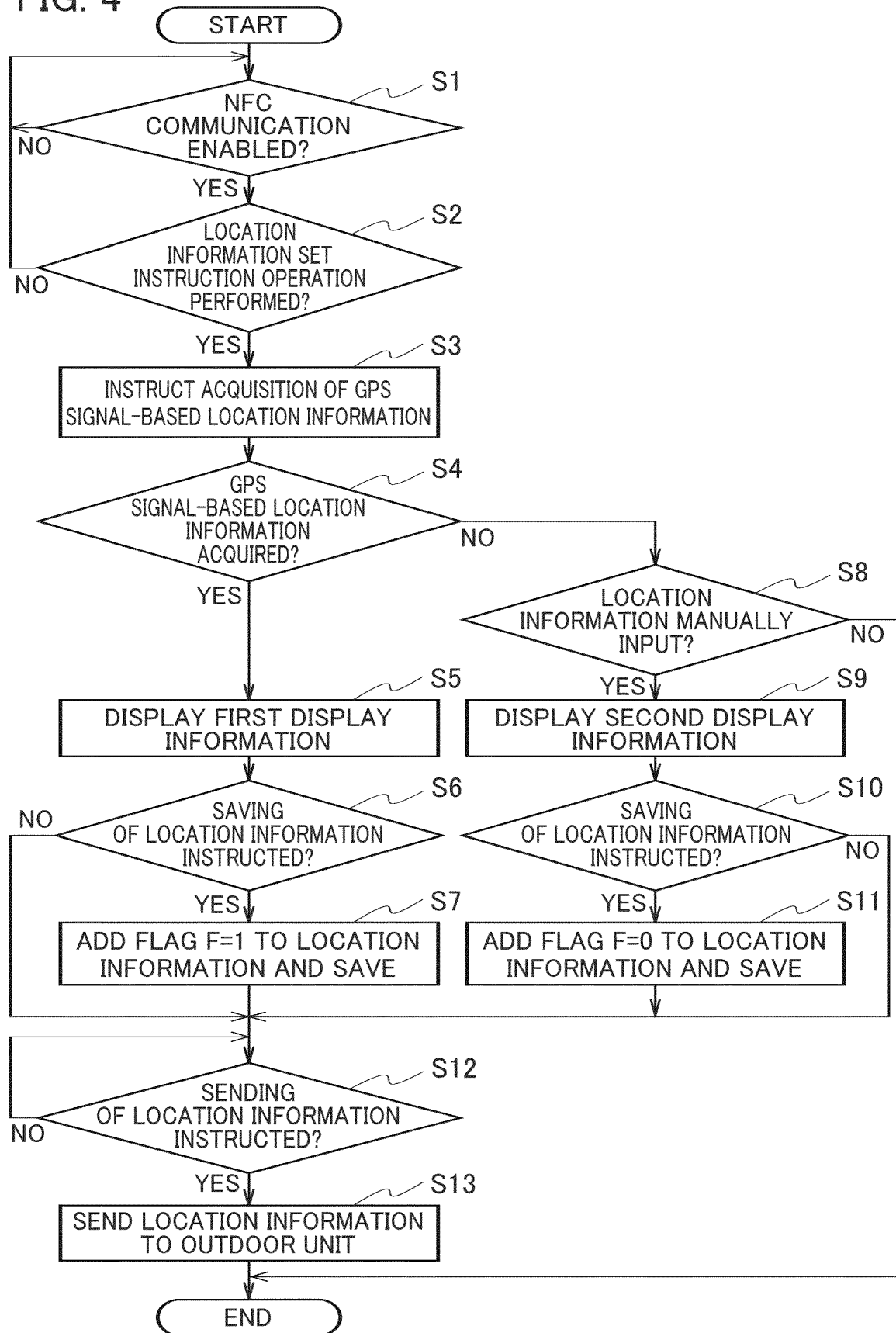


FIG. 5

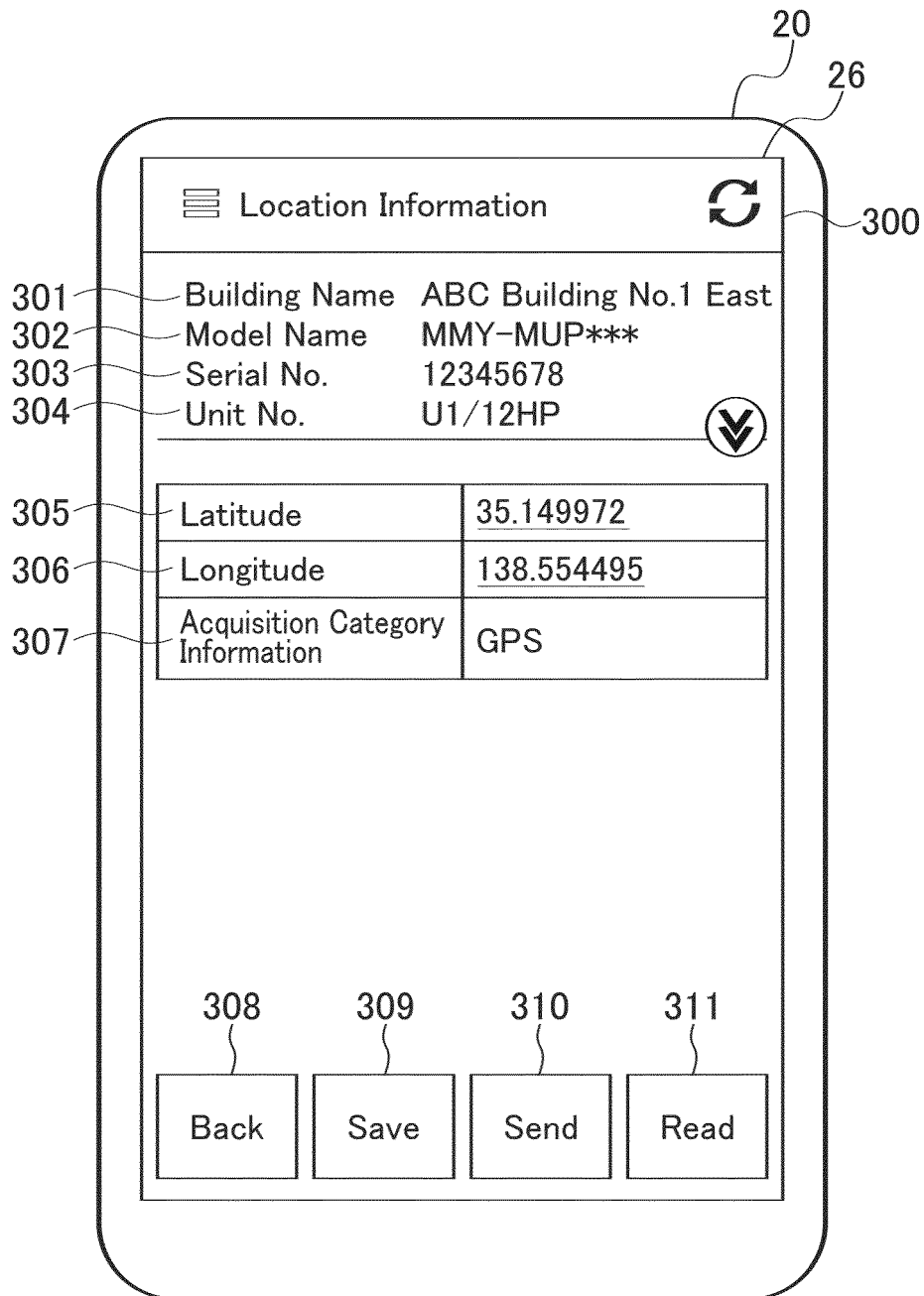


FIG. 6

20 26 400

☰ Location Information ↺

401 Building Name ABC Building No.1 East

402 Model Name MMY-MUP***

403 Serial No. 12345678

404 Unit No. U1/12HP ↻

405 Latitude	35.1
406 Longitude	138.6
407 Acquisition Category Information	Manual

408 409 410 411

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FIG. 7

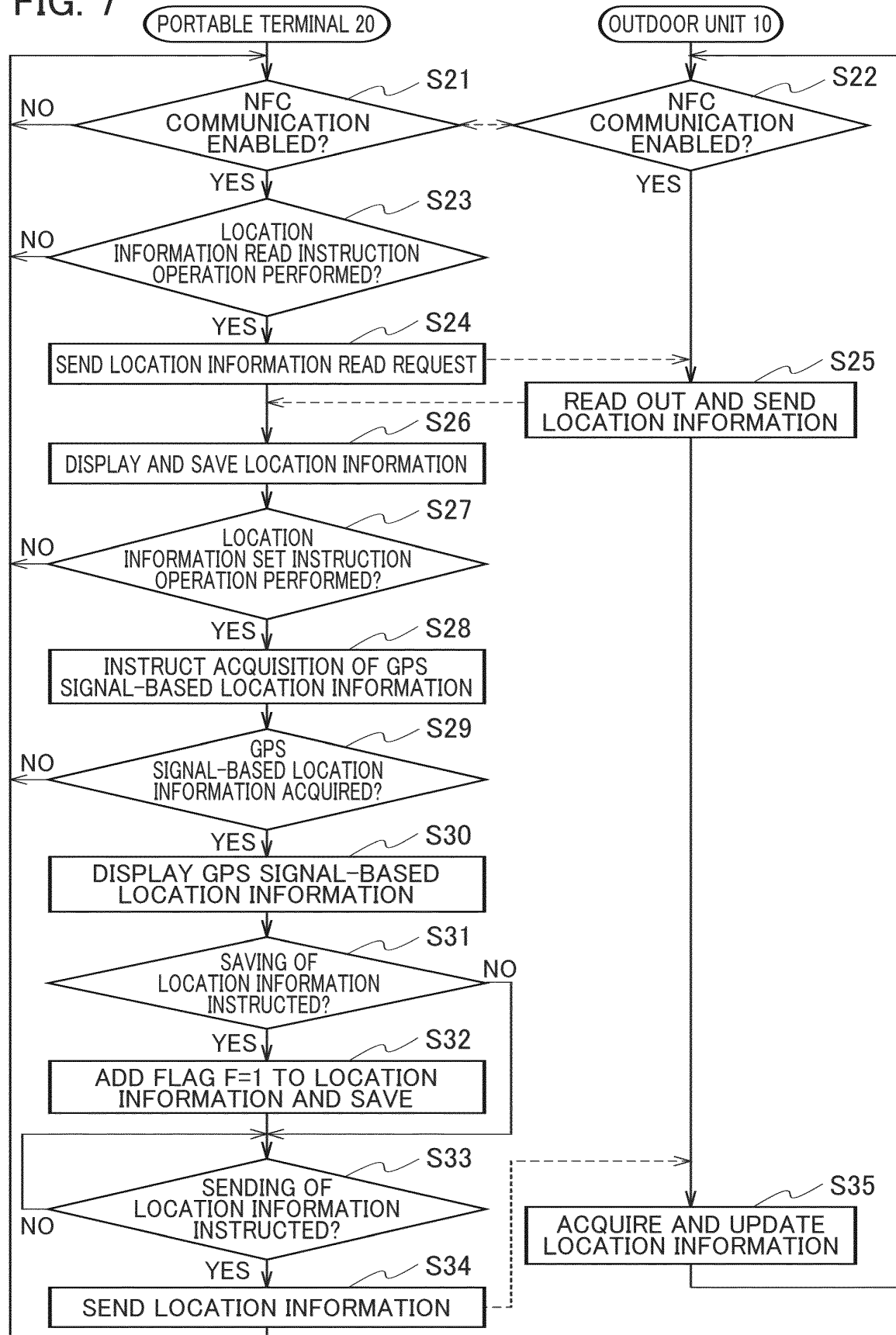


FIG. 8

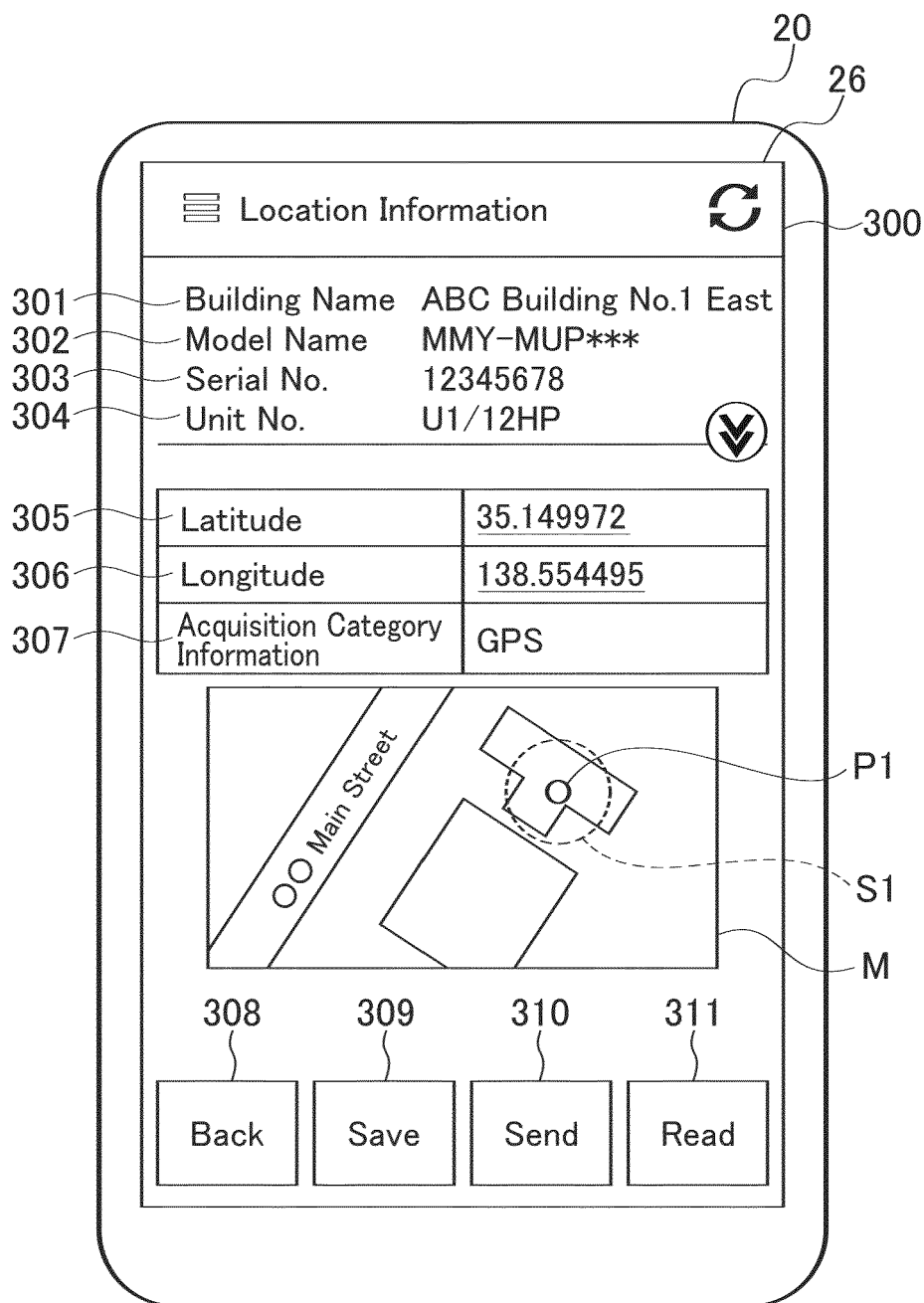
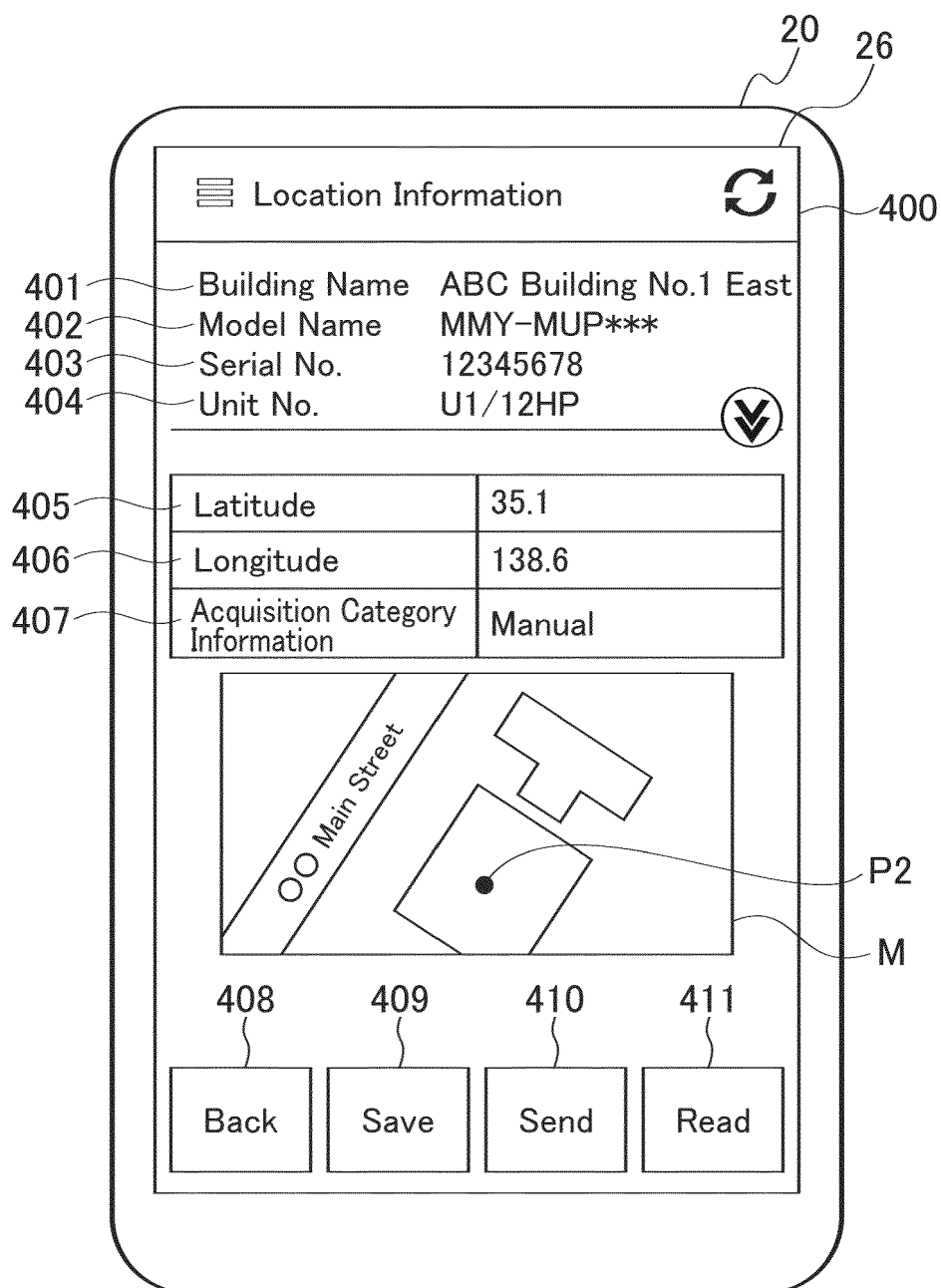


FIG. 9



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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2020/036089

A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. F24F11/50 (2018.01) i, F24F11/52 (2018.01) i
 FI: F24F11/50, F24F11/52

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Int. Cl. F24F11/50, F24F11/52

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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 1971-2020
 Registered utility model specifications of Japan 1996-2020
 Published registered utility model applications of Japan 1994-2020

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 2013/118885 A1 (DAIKIN INDUSTRIES, LTD.) 15 August 2013 (2013-08-15), paragraphs [0016]-[0023], fig. 1-4	1-8
Y	JP 2014-77680 A (JVC KENWOOD CORP.) 01 May 2014 (2014-05-01), paragraphs [0016]-[0022], fig. 1, 2	1-8
Y	JP 2007-40584 A (HITACHI, LTD.) 15 February 2007 (2007-02-15), paragraphs [0034]-[0038], [0049]-[0056], fig. 1, 12, 14, 15	1-8
Y	JP 2016-133294 A (JOHNSON CONTROLS-HITACHI AIR CONDITIONING TECHNOLOGY (HONG KONG) LTD.) 25 July 2016 (2016-07-25), paragraph [0023]	4-8

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

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* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"E" earlier application or patent but published on or after the international filing date	"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
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

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Date of the actual completion of the international search
 26.11.2020

Date of mailing of the international search report
 08.12.2020

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INTERNATIONAL SEARCH REPORT

International application No. PCT/JP2020/036089
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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(2016-03-22), paragraphs [0013]-[0026], fig. 1

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JP 2003-16519 A (KUBOTA CORP.) 17 January 2003
(2003-01-17), paragraph [0037], fig. 10

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INTERNATIONAL SEARCH REPORT
 Information on patent family members

 International application No.
 PCT/JP2020/036089

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Patent Documents referred to in the Report	Publication Date	Patent Family	Publication Date
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JP 2014-77680 A	01.05.2014	US 2014/0324340 A1 paragraphs [0023]- [0031], fig. 1, 2	
JP 2007-40584 A	15.02.2007	WO 2014/057845 A1 (Family: none)	
JP 2016-133294 A	25.07.2016	US 2017/0307246 A1 paragraphs [0066], [0067]	
		WO 2016/117371 A1 CN 107110552 A	
JP 2016-38327 A	22.03.2016	(Family: none)	
JP 2003-16519 A	17.01.2003	(Family: none)	

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REFERENCES CITED IN THE DESCRIPTION

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