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Hibara et al.

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(54) **CONTROL SYSTEM, TERMINAL, INFORMATION SETTING METHOD, AND PROGRAM**

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(73) Assignee: **Mitsubishi Electric Corporation**, Tokyo (JP)

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(51) **Int. Cl.**
G06F 17/00 (2006.01)
G06K 7/14 (2006.01)
(Continued)

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CPC ***G06K 7/1417*** (2013.01); ***G05B 19/128*** (2013.01); ***G06K 7/10722*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC G06F 17/00; G06K 19/00; G06K 9/18; G06K 7/10; G06K 9/36; G06K 9/80
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(56) **References Cited**

U.S. PATENT DOCUMENTS

2007/0043811 A1* 2/2007 Kim G06Q 10/06 709/203
2009/0138313 A1* 5/2009 Morgan G06Q 10/06 705/7.23

(Continued)

FOREIGN PATENT DOCUMENTS

EP	2 535 655	A1	12/2012
JP	H05-030110	A	2/1993
JP	2002-063294	A	2/2002
JP	2006-340060	A	12/2006
JP	2010-237790	A	10/2010
JP	2012-156836	A	8/2012
JP	2013-125330	A	6/2013

(Continued)

OTHER PUBLICATIONS

International Search Report of the International Searching Authority mailed Sep. 2, 2014 for the corresponding International application No. PCT/JP2014/067823 (and English translation).

(Continued)

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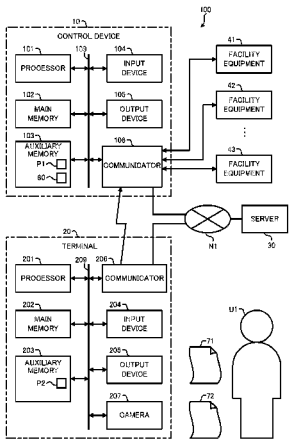
(74) *Attorney, Agent, or Firm* — Posz Law Group, PLC

(57) **ABSTRACT**

A control system is provided with: a control device that controls facility equipment on the basis of previously set control information; and a terminal that communicates with the control device. The terminal has: an image capturer that captures an image; an analyzer that acquires setting-support information for setting the control information in the control device by analyzing the image captured by means of the image capturer; and a transmitter that transmits to the control device the setting-support information acquired by means of the analyzer. The control device has: a receiver that receives the setting-support information transmitted from the transmitter; and a setter that sets the control information on the basis of the setting-support information received by means of the receiver.

6 Claims, 14 Drawing Sheets



(51) **Int. Cl.**

G06Q 50/16	(2012.01)
G05B 19/12	(2006.01)
G06K 7/10	(2006.01)
H04N 5/225	(2006.01)

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CPC ***G06Q 50/16*** (2013.01); ***H04N 5/225*** (2013.01); *G05B 2219/23363* (2013.01)

(58) **Field of Classification Search**
USPC 235/375, 487, 462.09, 462.1
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

2013/0131872	A1	5/2013	Kuroiwa et al.	
2014/0061293	A1*	3/2014	Jayaprakash	G06F 17/30879 235/375
2016/0035246	A1*	2/2016	Curtis	H04L 67/10 434/219

FOREIGN PATENT DOCUMENTS

WO	2011/099346	A1	8/2011
WO	2012/035789	A1	3/2012

OTHER PUBLICATIONS

Office Action dated Jun. 6, 2017 issued in corresponding JP Patent Application No. 2016-530767 (and partial English translation).

* cited by examiner

FIG.1

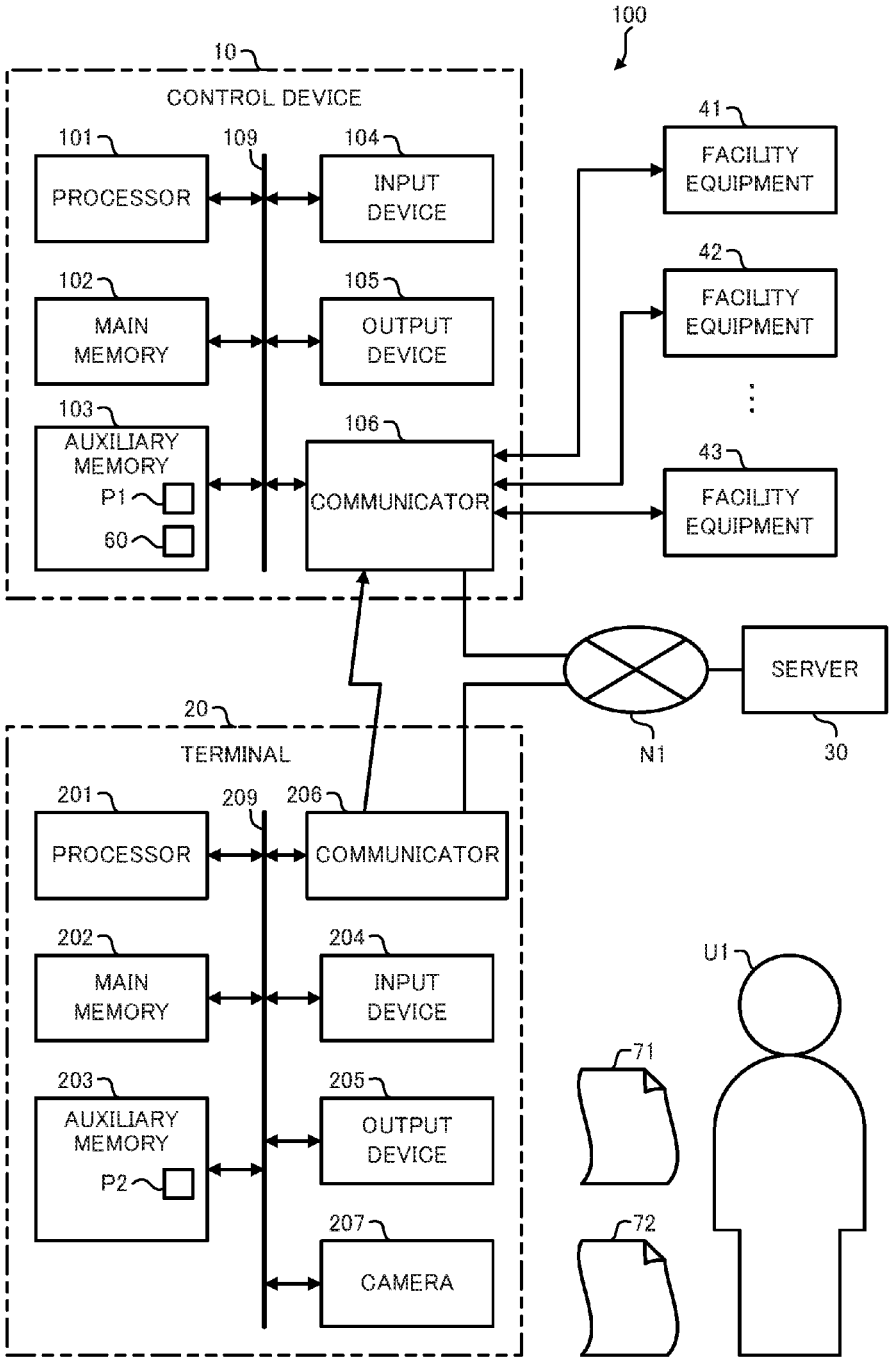

100
10
CONTROL DEVICE
101
PROCESSOR
109
104
INPUT DEVICE
102
MAIN MEMORY
105
OUTPUT DEVICE
103
AUXILIARY MEMORY
P1
60
106
COMMUNICATOR
41
FACILITY EQUIPMENT
42
FACILITY EQUIPMENT
43
FACILITY EQUIPMENT
SERVER
N1
30
20
TERMINAL
201
PROCESSOR
209
206
COMMUNICATOR
202
MAIN MEMORY
204
INPUT DEVICE
203
AUXILIARY MEMORY
P2
205
OUTPUT DEVICE
207
CAMERA
U1
71
72

FIG.2

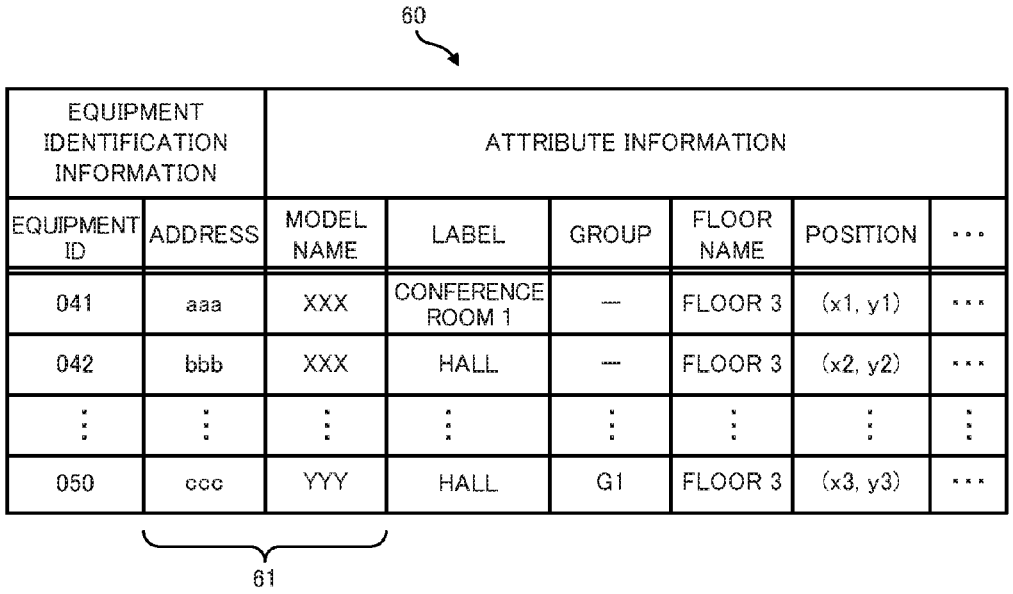

60
EQUIPMENT IDENTIFICATION INFORMATION
ATTRIBUTE INFORMATION
EQUIPMENT ID
ADDRESS
MODEL NAME
LABEL
GROUP
FLOOR NAME
POSITION
041
aaa
XXX
CONFERENCE ROOM 1
—
FLOOR 3
(x1, y1)
042
bbb
XXX
HALL
—
FLOOR 3
(x2, y2)
050
ccc
YYY
HALL
G1
FLOOR 3
(x3, y3)
61

FIG.3

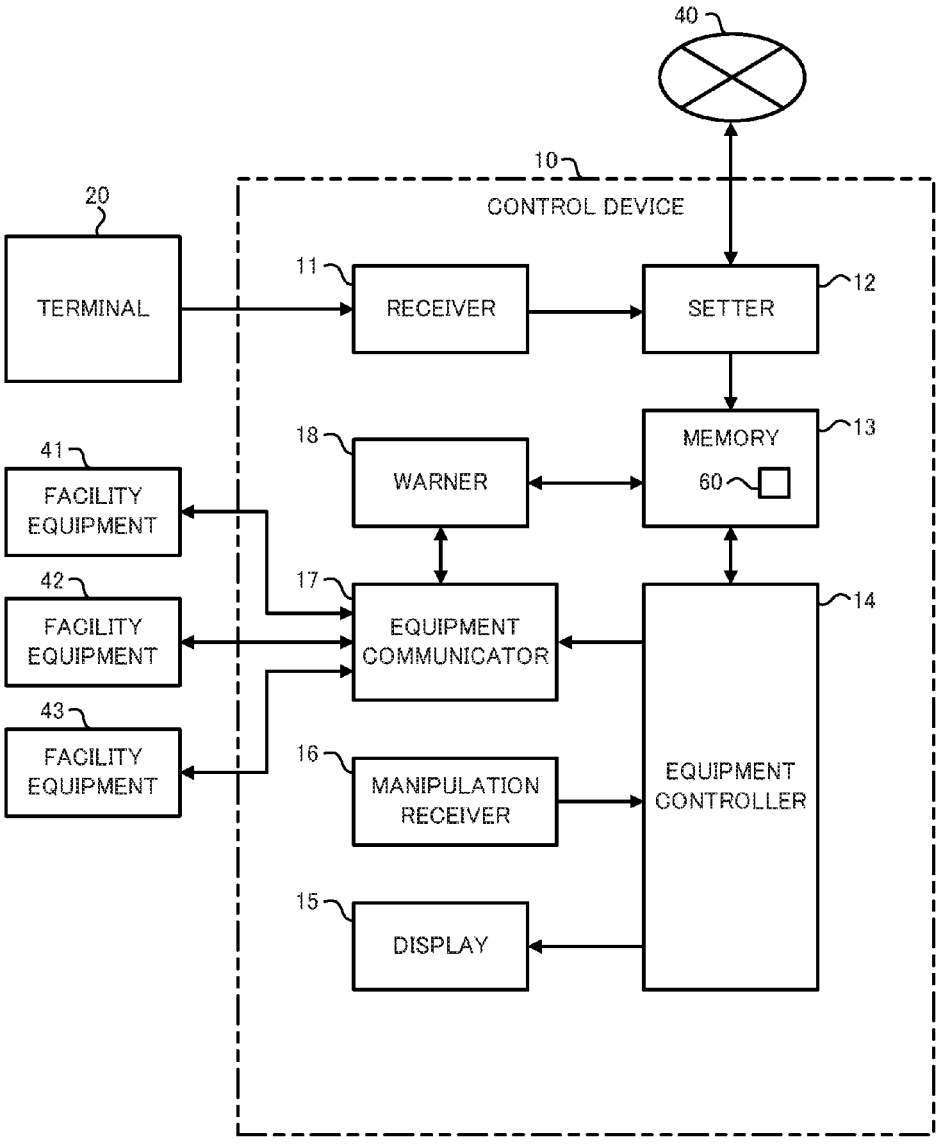

40
10
CONTROL DEVICE
20
TERMINAL
11
RECEIVER
12
SETTER
MEMORY
13
60
18
WARNER
41
FACILITY EQUIPMENT
42
FACILITY EQUIPMENT
43
FACILITY EQUIPMENT
17
EQUIPMENT COMMUNICATOR
14
EQUIPMENT CONTROLLER
16
MANIPULATION RECEIVER
15
DISPLAY

FIG.4

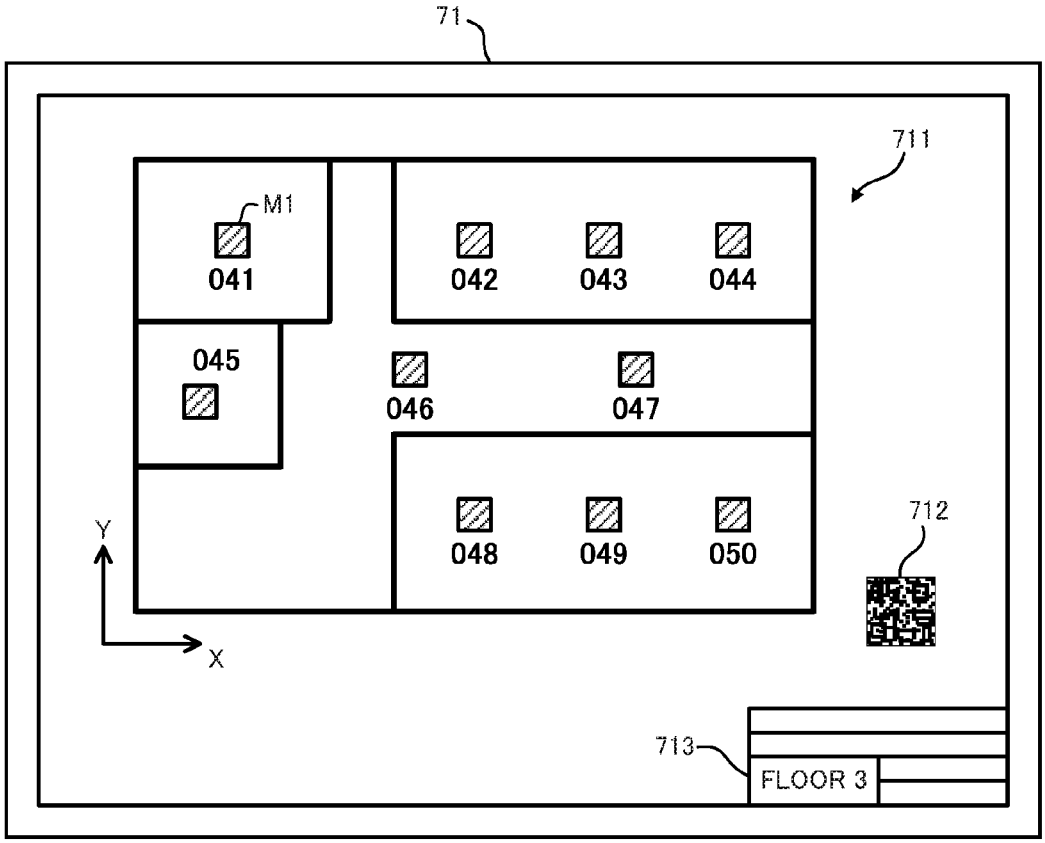
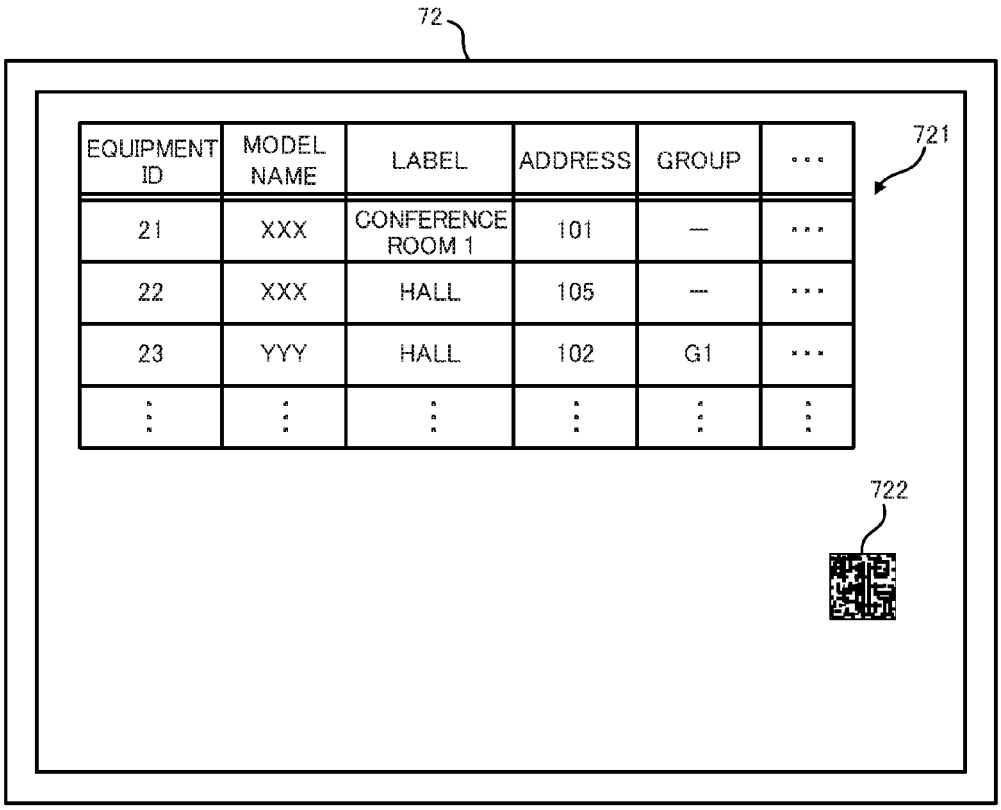

71
711
M1
041
042
043
044
045
046
047
048
049
050
712
Y
X
713
FLOOR 3

FIG.5



EQUIPMENT ID	MODEL NAME	LABEL	ADDRESS	GROUP	...
21	XXX	CONFERENCE ROOM 1	101	—	...
22	XXX	HALL	105	—	...
23	YYY	HALL	102	G1	...
⋮	⋮	⋮	⋮	⋮	⋮

FIG.6

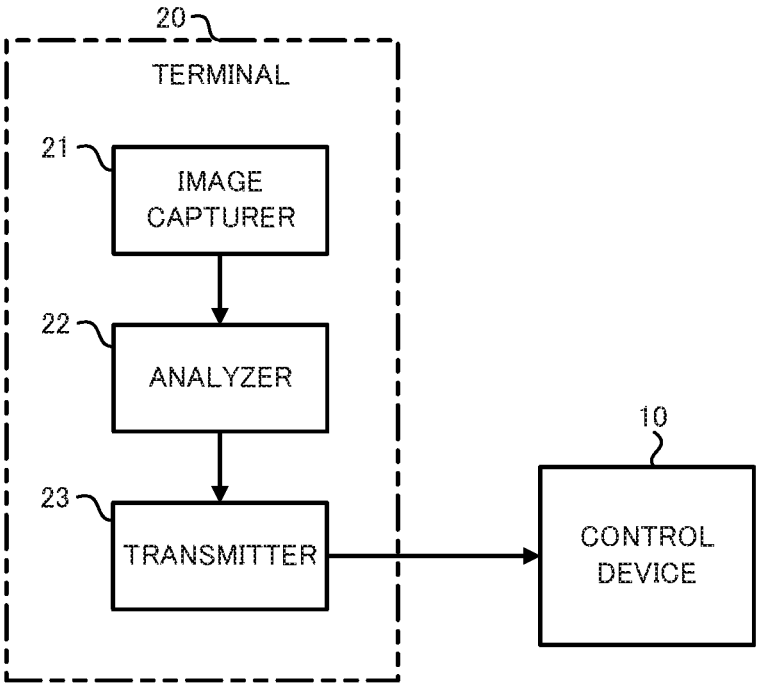

20
TERMINAL
21
IMAGE CAPTURER
22
ANALYZER
23
TRANSMITTER
10
CONTROL DEVICE

FIG.7

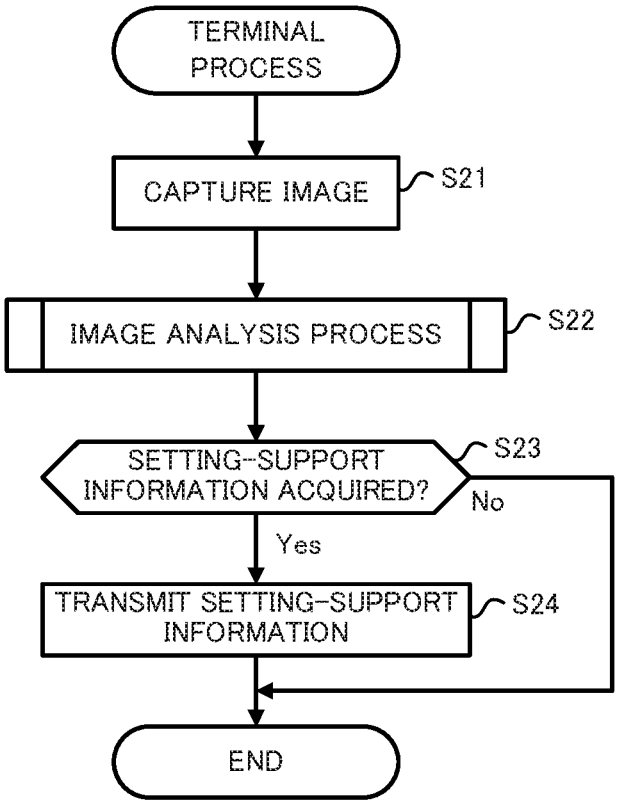

TERMINAL PROCESS
CAPTURE IMAGE
S21
IMAGE ANALYSIS PROCESS
S22
SETTING-SUPPORT INFORMATION ACQUIRED?
S23
No
Yes
TRANSMIT SETTING-SUPPORT INFORMATION
S24
END

FIG.8

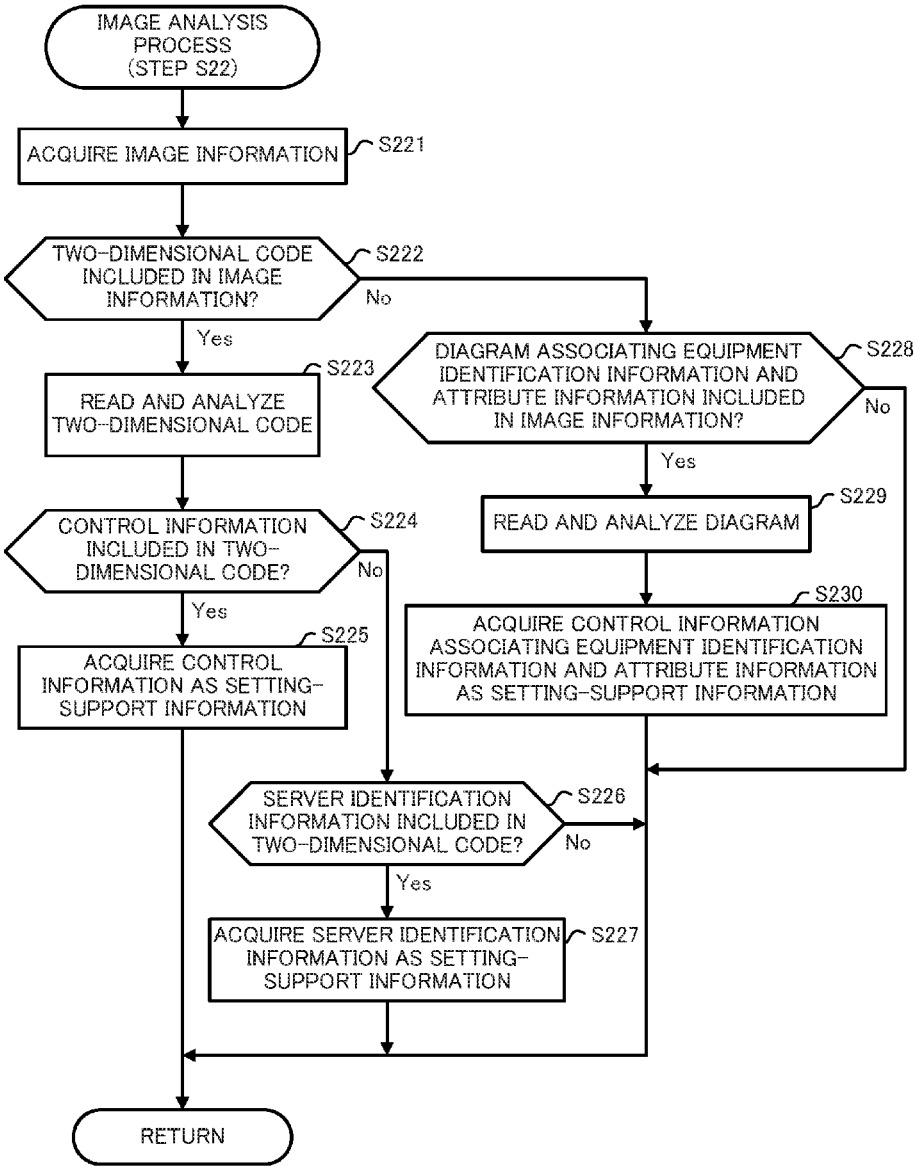


IMAGE ANALYSIS PROCESS (STEP S22)
ACQUIRE IMAGE INFORMATION
S221
TWO-DIMENSIONAL CODE INCLUDED IN IMAGE INFORMATION?
S222
No
Yes
READ AND ANALYZE TWO-DIMENSIONAL CODE
S223
DIAGRAM ASSOCIATING EQUIPMENT IDENTIFICATION INFORMATION AND ATTRIBUTE INFORMATION INCLUDED IN IMAGE INFORMATION?
S228
No
Yes
READ AND ANALYZE DIAGRAM
S229
CONTROL INFORMATION INCLUDED IN TWO-DIMENSIONAL CODE?
S224
No
Yes
ACQUIRE CONTROL INFORMATION AS SETTING-SUPPORT INFORMATION
S225
ACQUIRE CONTROL INFORMATION ASSOCIATING EQUIPMENT IDENTIFICATION INFORMATION AND ATTRIBUTE INFORMATION AS SETTING-SUPPORT INFORMATION
S230
SERVER IDENTIFICATION INFORMATION INCLUDED IN TWO-DIMENSIONAL CODE?
S226
No
Yes
ACQUIRE SERVER IDENTIFICATION INFORMATION AS SETTING-SUPPORT INFORMATION
S227
RETURN

FIG.9

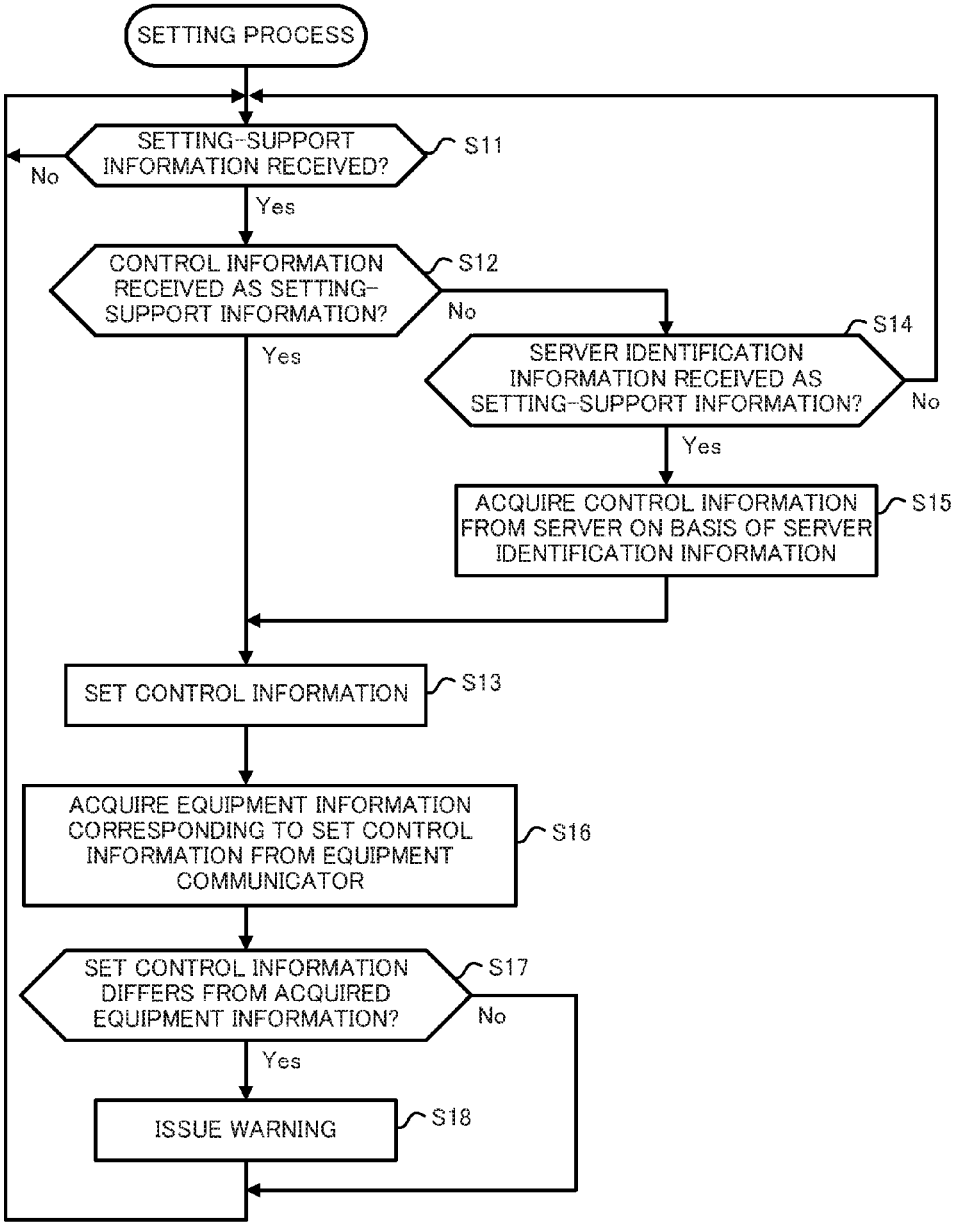

SETTING PROCESS
SETTING-SUPPORT INFORMATION RECEIVED?
S11
No
Yes
CONTROL INFORMATION RECEIVED AS SETTING-SUPPORT INFORMATION?
S12
No
Yes
SERVER IDENTIFICATION INFORMATION RECEIVED AS SETTING-SUPPORT INFORMATION?
S14
No
Yes
ACQUIRE CONTROL INFORMATION FROM SERVER ON BASIS OF SERVER IDENTIFICATION INFORMATION
S15
SET CONTROL INFORMATION
S13
ACQUIRE EQUIPMENT INFORMATION CORRESPONDING TO SET CONTROL INFORMATION FROM EQUIPMENT COMMUNICATOR
S16
SET CONTROL INFORMATION DIFFERS FROM ACQUIRED EQUIPMENT INFORMATION?
S17
No
Yes
ISSUE WARNING
S18

FIG.10

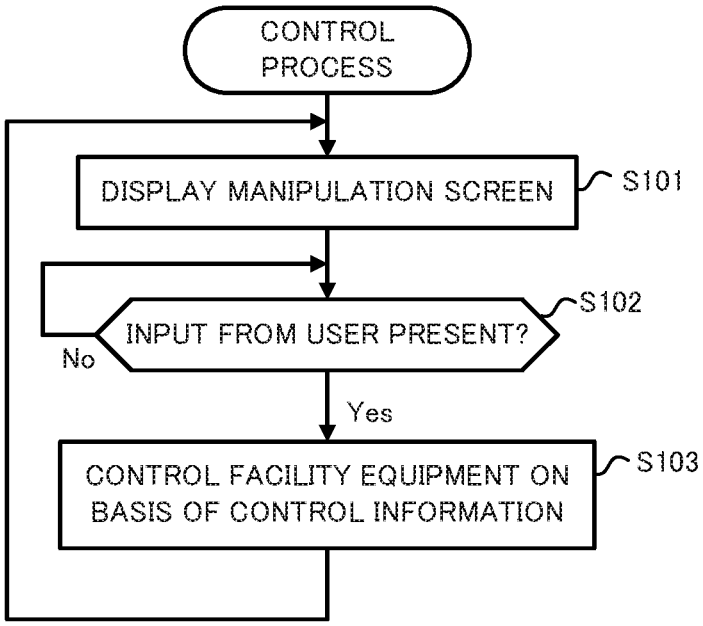

CONTROL PROCESS
DISPLAY MANIPULATION SCREEN
S101
INPUT FROM USER PRESENT?
S102
No
Yes
CONTROL FACILITY EQUIPMENT ON BASIS OF CONTROL INFORMATION
S103

FIG.11

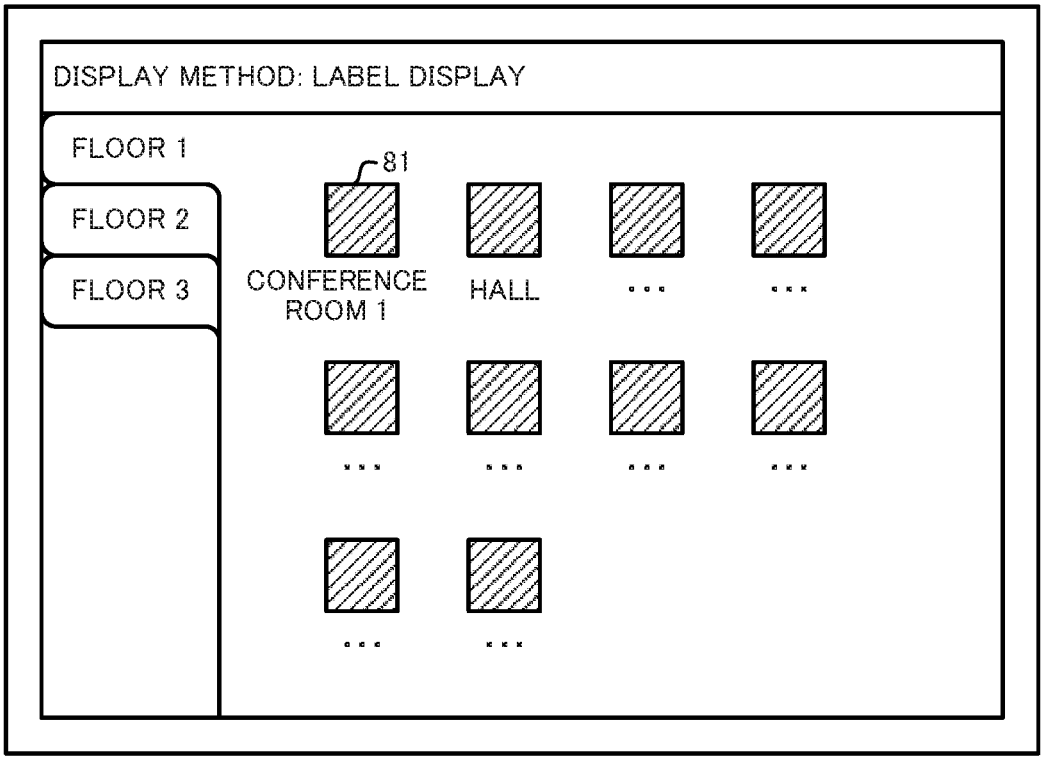

DISPLAY METHOD: LABEL DISPLAY
FLOOR 1
FLOOR 2
FLOOR 3
81
CONFERENCE ROOM 1
HALL

FIG.12

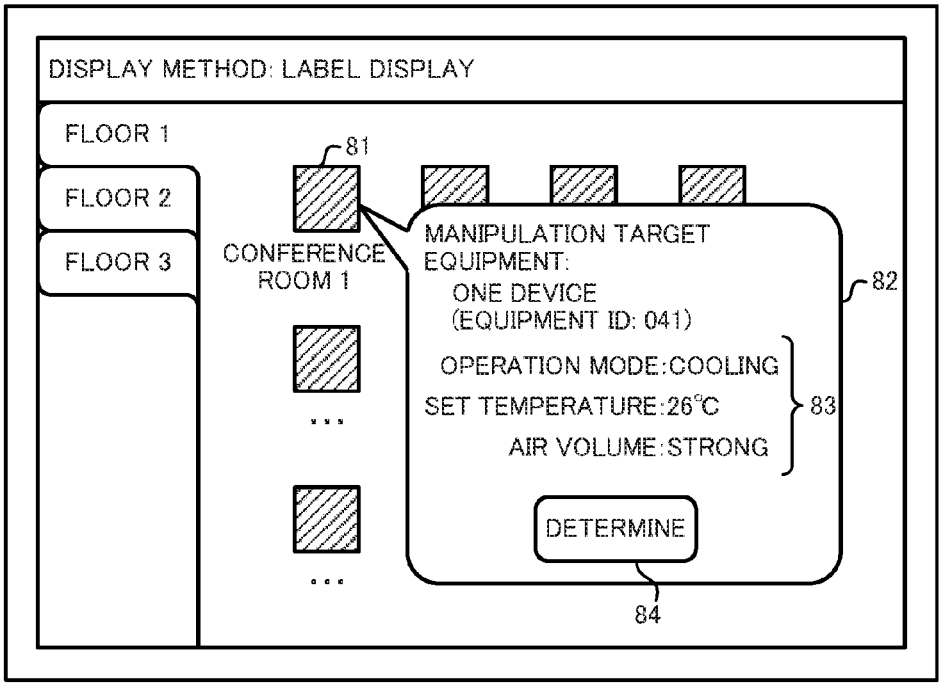

DISPLAY METHOD: LABEL DISPLAY
FLOOR 1
FLOOR 2
FLOOR 3
81
CONFERENCE ROOM 1
MANIPULATION TARGET EQUIPMENT:
ONE DEVICE
(EQUIPMENT ID: 041)
82
OPERATION MODE:COOLING
SET TEMPERATURE:26°C
AIR VOLUME:STRONG
83
DETERMINE
84

FIG.13

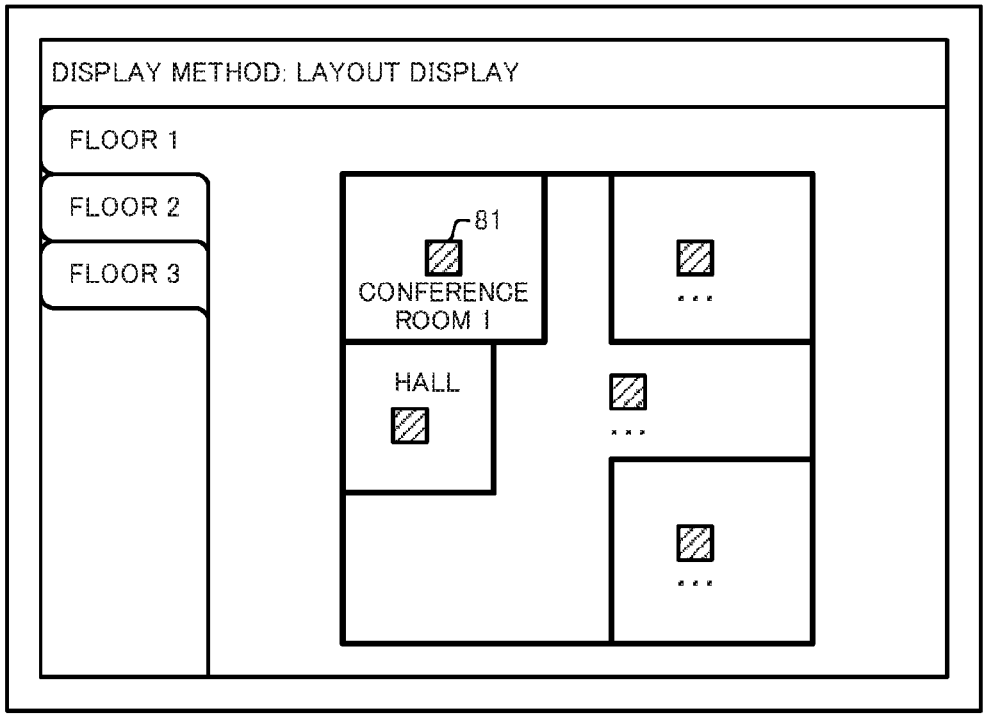

DISPLAY METHOD: LAYOUT DISPLAY
FLOOR 1
FLOOR 2
FLOOR 3
81
CONFERENCE ROOM 1
HALL

FIG.14

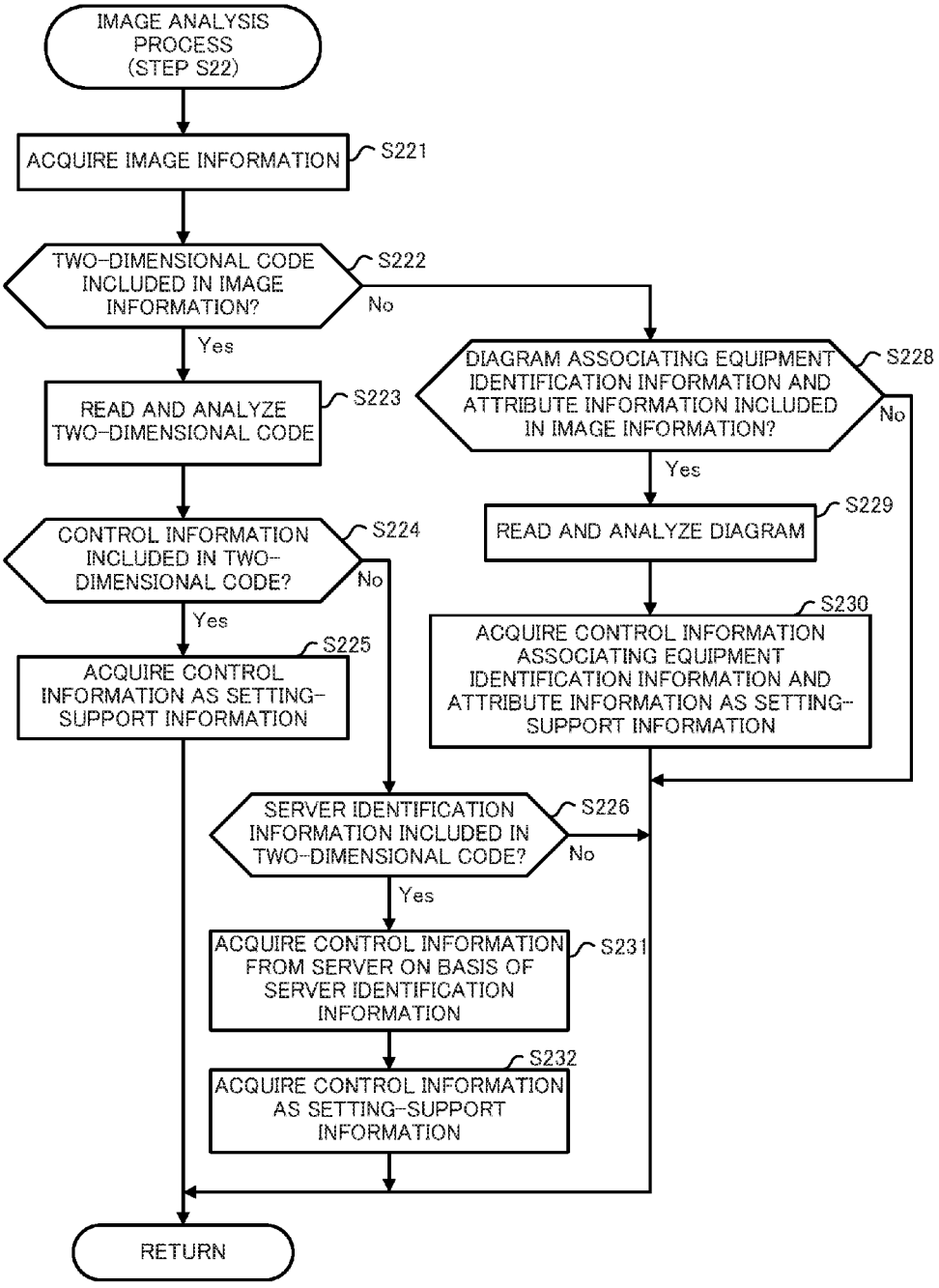


IMAGE ANALYSIS PROCESS (STEP S22)
ACQUIRE IMAGE INFORMATION
S221
TWO-DIMENSIONAL CODE INCLUDED IN IMAGE INFORMATION?
S222
No
Yes
READ AND ANALYZE TWO-DIMENSIONAL CODE
S223
CONTROL INFORMATION INCLUDED IN TWO-DIMENSIONAL CODE?
S224
No
Yes
ACQUIRE CONTROL INFORMATION AS SETTING-SUPPORT INFORMATION
S225
DIAGRAM ASSOCIATING EQUIPMENT IDENTIFICATION INFORMATION AND ATTRIBUTE INFORMATION INCLUDED IN IMAGE INFORMATION?
S228
No
Yes
READ AND ANALYZE DIAGRAM
S229
ACQUIRE CONTROL INFORMATION ASSOCIATING EQUIPMENT IDENTIFICATION INFORMATION AND ATTRIBUTE INFORMATION AS SETTING-SUPPORT INFORMATION
S230
SERVER IDENTIFICATION INFORMATION INCLUDED IN TWO-DIMENSIONAL CODE?
S226
No
Yes
ACQUIRE CONTROL INFORMATION FROM SERVER ON BASIS OF SERVER IDENTIFICATION INFORMATION
S231
ACQUIRE CONTROL INFORMATION AS SETTING-SUPPORT INFORMATION
S232
RETURN

CONTROL SYSTEM, TERMINAL, INFORMATION SETTING METHOD, AND PROGRAM

CROSS REFERENCE TO RELATED APPLICATION

This application is a U.S. national stage application of International Patent Application No. PCT/JP2014/067823 filed on Jul. 3, 2014, the disclosure of which is incorporated herein by reference.

TECHNICAL FIELD

The present disclosure is related to a control system, a terminal, an information setting method and a program.

BACKGROUND ART

When facility equipment such as air conditioners, lighting equipment and/or the like is installed in a structure such as a building and/or the like, there are cases in which a control device for controlling this facility equipment is installed. The control device is a device that controls the facility equipment in accordance with user input and/or the like. Consequently, a user can manipulate the facility equipment via the control device.

In order to support manipulation of the facility equipment by the user, some control devices display the locations where the facility equipment that is the subject of manipulation is installed, through names appended in advance to those locations, a layout diagram and/or the like. In addition, groups of facility equipment that operate in conjunction with each other are set in advance in the control device, and through this bulk manipulation of a plurality of pieces of facility equipment becomes possible (for example, see Patent Literature 1).

CITATION LIST

Patent Literature

Patent Literature 1: International Publication No. WO 2011/099346

SUMMARY OF INVENTION

Technical Problem

In order for the control device to control the facility equipment, typically various control information with which the control device controls the facility equipment must be set in the control device in advance. For example, when the control device controls a plurality of pieces of facility equipment, typically pre-setting information for discriminating each of the various pieces of facility equipment is necessary. When the control device displays the locations where the pieces of facility equipment that are the subject of manipulation are installed, typically pre-setting names appended in advance to those locations, layout diagrams and/or the like is necessary. When the user manipulates a plurality of pieces of facility equipment all together, typically pre-setting a group of facility equipment with linked operation is necessary.

This kind of control information setting was conventionally done through a manual input by a worker and/or the like who installed the control device or the facility equipment, while viewing materials prepared in advance. However, this kind of setting work was complex.

In consideration of the foregoing, an objective of the present disclosure is to make setting of control information for controlling facility equipment easy in a control device.

Solution to Problem

In order to achieve the above objective, a control system according to the present disclosure comprises a control device configured to control facility equipment based on control information that is pre-set, and a terminal configured to communicate with the control device. The terminal comprises an image capturer configured to capture an image, an analyzer configured to analyze the image captured by the image capturer to acquire setting-support information for setting the control information in the control device, and a transmitter configured to transmit the setting-support information acquired by the analyzer to the control device. The control device comprises a receiver configured to receive the setting-support information transmitted from the transmitter, and a setter configured to set the control information based on the setting-support information received by the receiver.

Advantageous Effects of Invention

Through the present disclosure, a terminal, by analyzing a captured image, acquires setting-support information for setting control information in the control device, and transmits the acquired setting-support information to the control device. Through this, control information is set in the control device on the basis of the setting-support information. Consequently, a worker and/or the like can set control information by capturing an image. Accordingly, easily setting control information in the control device becomes possible.

BRIEF DESCRIPTION OF DRAWINGS

FIG. **1** is a drawing showing an exemplary configuration of a control system according to an exemplary embodiment of the present disclosure;

FIG. **2** is a drawing showing one example of control information according to the exemplary embodiment;

FIG. **3** is a drawing showing an exemplary configuration of a control device according to the exemplary embodiment;

FIG. **4** is a drawing showing a first example of design materials according to the exemplary embodiment;

FIG. **5** is a drawing showing a second example of the design materials according to the exemplary embodiment;

FIG. **6** is a drawing showing an exemplary configuration of a terminal according to the exemplary embodiment;

FIG. **7** is a flowchart showing one example of the flow of a terminal process according to the exemplary embodiment;

FIG. **8** is a flowchart showing one example of the flow of an image analysis process according to the exemplary embodiment;

FIG. **9** is a flowchart showing one example of the flow of a setting process according to the exemplary embodiment;

FIG. **10** is a flowchart showing one example of the flow of a control process according to the exemplary embodiment;

FIG. **11** is a drawing showing a first example of a manipulation screen according to the exemplary embodiment;

FIG. **12** is a drawing showing a second example of a manipulation screen according to the exemplary embodiment;

FIG. **13** is a drawing showing a third example of a manipulation screen according to the exemplary embodiment; and

FIG. **14** is a flowchart showing one example of the flow of an image analysis process according to a variation.

DESCRIPTION OF EMBODIMENTS

Exemplary Embodiment

A control system **100** according to this exemplary embodiment is a system for controlling a plurality of pieces of facility equipment **41**, **42**, . . . , **43** installed in an establishment such as a building and/or the like, for example, as shown in FIG. **1**. As shown in this drawing, the control system **100** comprises a control device **10** for controlling the facility equipment **41-43** on the basis of pre-set control information **60**, a terminal **20** for setting the control information **60** in the control device **10**, and a server **30** connected to the control device **10** and the terminal **20** via a network N**1**.

Each of the pieces of facility equipment **41-43** is, for example, air conditioning equipment installed on a different floor, section and/or the like of the establishment. Each of the pieces of facility equipment **41-43** is for example connected so as to be capable of communicating with the control device **10** via a local area network (LAN) that is wired, wireless or a combination of wired and wireless. Each of the pieces of facility equipment **41-43** receives packets including control commands in the payload from the control device **10**. Each of the pieces of facility equipment **41-43** conditions the air in a predetermined target space for example by blowing flowing conditioned air at a temperature indicated by the received control command in a volume indicated by the received control command. The facility equipment **41-43** is not limited to air conditioners, and for example may be lighting equipment, ventilation devices, elevators or surveillance cameras.

The control device **10** is, for example, a computer installed in a management room for managing the facility equipment **41-43**. The control information **60** is set in advance in the control device **10**. For example, a user (a manager) of the control device **10** can do input manipulations using a user interface on the basis of the pre-set control information **60**. The control device **10** controls the facility equipment **41-43** on the basis of the manipulation contents input by the user, the pre-set control information **60** and/or the like.

An example of the control information **60** set in the control device **10** is shown in FIG. **2**. As shown in this drawing, in the control information **60**, equipment identification information for identifying each of the pieces of facility equipment **41-43** and attribute information indicating attributes of each of the pieces of facility equipment **41-43** are associated with each other.

The equipment identification information includes equipment identification data (ID) indicating a unique number assigned to each of the pieces of facility equipment **41-43**, and an address for each of the pieces of facility equipment **41-43** used in communications between the facility equipment **41-43** and the control device **10**. In the example shown in this drawing, the equipment IDs of the facility equipment **41-43** are respectively "041", "042" and "050". In addition, the addresses of the facility equipment **41-43** are, for example, IP addresses used by the LAN for the facility equipment **41-43** and the control device **10** to communicate, and in the example shown in the drawing, are respectively "aaa", "bbb" and "ccc".

The attribute information includes a model name (a model number), a label, a group, a floor name and position information, for each of the pieces of facility equipment **41-43**.

The label is information appropriately appended to each of the pieces of facility equipment **41-43**, and in this exemplary embodiment, is information for specifying a room as the location (region) where the facility equipment **41-43** is installed. In addition, the group is set when there is a group to which each of the pieces of facility equipment **41-43** belongs, and for example, is used in bulk manipulation of a plurality of pieces of equipment. When a group is designated by the user and manipulation contents are input, the control device **10** controls the facility equipment belonging to the designated group. The label and the group are typically determined in advance by a designer who designed the facility system comprising the control device **10** and the facility equipment **41-43**.

The floor name is information for specifying a floor on which each of the pieces of facility equipment **41-43** is installed. The position information is X,Y coordinate values indicating the location of each of the pieces of facility equipment **41-43** on the floor on which each of the pieces of facility equipment **41-43** is installed. The coordinate values are for example values expressed in units of meters when a position equating to the lower left edge of a layout diagram, out of the design documents created by the contractor and/or the like, is taken as the origin (see FIG. **4**). The floor name and position information are determined in advance by the contractor. The contractor is the contractor that constructed the establishment, and is often a different contractor from the designer that determined the label and the group.

Each of the pieces of facility equipment **41-43** retains as equipment information **61** the equipment's own address and model name, out of the control information **60**. Consequently, the control device **10** can obtain the address and the model name of each of the pieces of facility equipment **41-43** by means of inquiries through communication to each of the facility equipment **41-43**.

As described above, in this exemplary embodiment the control information **60** is a table that mutually associates two items of equipment identification information (equipment ID, address) and five items of attribute information (model name, label, group, floor name, position information), but may also be a table that associates at least two items of information. For example, the control information **60** may be a table that associates together one item of equipment identification information and one item of attribute information, or may be a table that mutually associates two items of attribute information. The control information **60** preferably includes at least one item of each of the equipment identification information and the attribute information, and through this enables bulk control of the facility equipment **41-43** having specific attributes. In addition, when the destination of a control command is determined by address, the control information **60** preferably includes an address.

As shown in FIG. **1**, the control device **10** comprises a processor **101**, a main memory **102**, an auxiliary memory **103**, an input device **104**, an output device **105** and a communicator **106**. The main memory **102**, the auxiliary memory **103**, the input device **104**, the output device **105** and the communicator **106** are all connected to the processor **101** via an internal bus **109**.

The processor **101** comprises, for example, a central processing unit (CPU) and/or the like. The processor **101**

executes below-described processes by executing a program P1 stored in advance in the auxiliary memory **103**. In addition, the main memory **102** comprises, for example, random access memory (RAM) and/or the like. The main memory **102** loads the program P1 from the auxiliary memory **103**. In addition, the main memory **102** is used as a work area for the processor **101**.

The auxiliary memory **103** includes non-volatile memory such as a hard disk, flash memory and/or the like. The auxiliary memory **103** stores various types of data used in processes of the processor **101**, besides the program P1. The control information **60** is included in the data stored in the auxiliary memory **103**. The auxiliary memory **103** supplies data for use by the processor **101** to the processor **101** and stores data supplied from the processor **101** in accordance with instructions from the processor **101**.

The input device **104** comprises, for example, input keys, an electrostatic capacitance-type pointing device and/or the like. The input device **104** acquires information input by a user of the control device **10** and communicates the acquired information to the processor **101**. The output device **105** comprises, for example, a liquid crystal display (LCD), a speaker and/or the like. The output device **105** exhibits various types of information to the user by displaying a screen or reproducing sound in accordance with instructions from the processor **101**. The input device **104** and the output device **105** according to this exemplary embodiment are integrally formed and constitute a touch screen.

The communicator **106** comprises, for example, a LAN interface and/or the like. The communicator **106** generates packets including data output from the processor **101**, and sends the packets to the terminal **20**, the facility equipment **41-43** or the server **30**. In addition, the communicator **106** extracts data included in packets received from the terminal **20**, the facility equipment **41-43** or the server **30**, and outputs this data to the processor **101**.

The control device **10** exhibits various functions as a result of having the above-described configuration. A functional configuration of the control device **10** is shown in FIG. **3**. As shown in this drawing, the control device **10** contains a receiver **11** for receiving data from the terminal **20**, a setter **12** for setting the control information **60**, a memory **13** for storing the control information **60**, an equipment controller **14** for controlling the facility equipment **41-43** on the basis of the control information **60**, a display **15** for displaying a manipulation screen for manipulating the facility equipment **41-43**, a manipulation receiver **16** for receiving manipulation contents input by the user, an equipment communicator **17** for communicating with the facility equipment **41-43**, and a warner **18** for warning the user when there is invalid data.

The receiver **11** receives from the terminal **20** setting-support information for setting the control information **60**. There are cases in which the control information **60** is included and cases in which the control information **60** is not included in this setting-support information, and details are discussed below. The receiver **11** is realized by the communicator **106**.

The setter **12** sets the control information **60** on the basis of the setting-support information received by the receiver **11**. To be more detailed, for example when the setting-support information received by the receiver **11** includes the control information **60**, the setter **12** stores the control information **60** in the memory **13**.

In addition, for example when the setting-support information received by the receiver **11** includes the address of the server **30**, the setter **12** acquires the control information **60** from the server **30** via a network **40**, and sets the acquired control information **60**. Instead of setting the control information **60** once, the setter **12**, after setting a portion of the control information **60**, may supplement the control information **60** or may reset the control information **60**. Setting the control information **60** means storing the control information **60** in the memory **13**. The setter **12** is realized through cooperating between the processor **101** and the communicator **106**.

The memory **13** stores the control information **60** that is set. The memory **13** supplies the control information **60** to the equipment controller **14** or the warner **18**, in response to requests from the equipment controller **14** or the warner **18**. The memory **13** is realized by the auxiliary memory **103**.

The equipment controller **14** generates and outputs to the display **15** screen data for displaying a manipulation screen, on the basis of the control information **60**. In addition, the equipment controller **14** determines the control contents and the facility equipment that is the control target, in accordance with manipulation contents input by the user. Furthermore, the equipment controller **14** outputs to the equipment communicator **17** the address of the facility equipment that is the control target and a control command indicating control contents, on the basis of the control information **60**. The control contents indicated by the control command are, for example, instructions to set the operation mode to "cooling", set the temperature to "26° C." and set the air volume to "strong". The equipment controller **14** is realized by the processor **101**.

The display **15** acquires screen data from the equipment controller **14** and displays the manipulation screen. The display **15** is realized by the output device **105**. In addition, the manipulation receiver **16** receives the manipulation contents input from the user and communicates the received manipulation contents to the equipment controller **14**. The manipulation receiver **16** is realized by the input device **104**.

The equipment communicator **17** stores the address output from the equipment controller **14** in a header of a packet, and also stores the control command in a payload of the packet and then sends this packet. In addition, the equipment communicator **17** acquires the equipment information **61** (address, model name) through communication with the facility equipment **41-43**, in response to requests from the warner **18**, and outputs the acquired equipment information **61** to the warner **18**. The equipment communicator **17** is realized by the communicator **106**.

The warner **18** produces a warning when the equipment information **61** acquired from the equipment communicator **17** and the address and the model name out of the control information **60** stored in the memory **13** differ. The warning may be produced for example by a buzzer sound or LED light, or may be the display of a screen promoting caution to the user. The warner **18** is realized through cooperation between the processor **101** and the output device **105**.

Returning to FIG. **1**, the terminal **20** is for example a tablet terminal carried by a worker U1, and communicates with the control device **10** via a LAN.

The worker U1 is typically a worker who installs the facility equipment **41-43** and the control device **10**, and is often a worker differing from both the designer that determined the labels and/or the like and the contractor that determined the position information of the facility equipment **41-43**. The worker U1 carries design materials **71** created by the contractor and design materials **72** created by the designer, and sets the control information **60** in the control device **10** using the terminal **20**. The design materials **71** are documents indicating the floor name and posi-

tion information determined by the contractor. The design materials **72** are documents indicating the label and the group determined by the designer.

As shown in the example of FIG. **4**, a layout diagram **711** created by the contractor, a two-dimensional code **712** and a box **713** indicating the floor name are printed on the design materials **71**.

In the layout diagram **711**, the position of each of the pieces of facility equipment **41-43** is shown along with the equipment ID of each of the pieces of facility equipment **41-43**. That is to say, the layout diagram **711** shows the control information **60** in which the equipment identification information (equipment ID) and attribute information (position information) are linked to each other. For example, surrounding a mark M**1** expressing the facility equipment **41**, the equipment ID "041" of the facility equipment **41** is recorded, and through this the position of the facility equipment **41** is indicated.

The two-dimensional code **712** includes the control information **60** indicated by the layout diagram **711**, or server identification information for identifying the server **30**. In particular, for example the two-dimensional code **712** including the control information **60** is encoded from the control information **60** by the contractor and printed on the design materials **71**. The method of indicating the two-dimensional code **712** is not limited to printing, and for example a seal on which the two-dimensional code **712** is printed may be sealed or affixed to the design materials **71**.

In addition, for example the server identification information is a uniform resource identifier (URI), and the two-dimensional code **712** including this server identification information indicates the whereabouts of the control information **60**. The server **30** stores the control information **60** as described below, so the control device **10** or the terminal **20** can, by reading the server identification information from the two-dimensional code **712**, communicate with the server **30** and acquire the control information **60** from the server **30**.

The two-dimensional code **712** may not be shown in the design materials **71**. When the two-dimensional code **712** is not shown in the design materials **71**, the design materials **71** for example show only the layout diagram **711** and the box **713**.

As shown in FIG. **5**, a table **721** including the labels and the groups determined by the designer, and a two-dimensional code **722** are printed on the design materials **72**. The table **721**, an example of which is shown in this drawing, includes the equipment ID, the model name and the address, in addition to the label and the group. That is to say, the table **721** shows the control information **60** in which two items of equipment identification information (equipment ID, address) and three items of attribute information (model name, label, group) are associated with each other.

The two-dimensional code **722** includes the control information **60** shown by the table **721**, or the server identification information. The two-dimensional code **722** is for example encoded from the control information **60** by the designer, and printed on the design materials **72**. The method of indicating the two-dimensional code **722** is not limited to printing, and for example a seal on which the two-dimensional code **722** is printed may be sealed or affixed to the design materials **72**.

As shown in FIG. **1**, the terminal **20** comprises a processor **201**, a main memory **202**, an auxiliary memory **203**, an input device **204**, an output device **205**, a communicator **206** and a camera **207**. The main memory **202**, the auxiliary memory **203**, the input device **204**, the output device **205**, the communicator **206** and the camera **207** are each connected to the processor **201** via an internal bus **209**.

The processor **201** comprises, for example, a CPU and/or the like. The processor **201** executes below-described processes by executing a program P**2** stored in the auxiliary memory **203**. In addition, the main memory **202** comprises, for example, random access memory (RAM) and/or the like. The main memory **202** loads the program P**2** from the auxiliary memory **203**. In addition, the main memory **202** is used as a work area for the processor **201**.

The auxiliary memory **203** includes non-volatile memory such as a hard disk, flash memory and/or the like. The auxiliary memory **203** stores various types of data used in processes of the processor **201**, besides the program P**2**. Images captured by the camera **207** are included in the data stored in the auxiliary memory **203**. The auxiliary memory **203** supplies data for use by the processor **201** to the processor **201** and stores data supplied from the processor **201** in accordance with instructions from the processor **201**.

The input device **204** comprises, for example, input keys, an electrostatic capacitance-type pointing device and/or the like. The input device **204** acquires information input by the worker U**1** and communicates the acquired information to the processor **201**. In addition, the output device **205** comprises, for example, an LCD, a speaker and/or the like. The output device **205** exhibits various types of information to the worker U**1** by displaying a screen or reproducing sound in accordance with instructions from the processor **201**. The input device **204** and the output device **205** according to this exemplary embodiment are integrally formed and constitute a touch screen.

The communicator **206** comprises, for example, a LAN interface and/or the like. The communicator **206** generates packets including data output from the processor **201**, and sends the packets to the control device **10** or the server **30**. In addition, the communicator **206** extracts data included in packets received from the controller **10** or the server **30**, and outputs this data to the processor **201**.

The camera **207** comprises, for example, a charge-coupled device (CCD) imaging element, a lens and/or the like. The camera **207** captures images in accordance with instructions from the processor **201**, and outputs the captured images to the processor **201**.

By having the above-described configuration, the terminal **20** exhibits various functions. A functional configuration of the terminal **20** is shown in FIG. **6**. As shown in this drawing, the terminal **20** includes an image capturer **21** that captures images, an analyzer **22** that acquires setting-support information through analysis of captured images, and a transmitter **23** for transmitting the setting-support information to the control device **10**.

The image capturer **21** captures images of the design materials **71** and **72** when the worker U**1** points the lens of the camera **207** at the design materials **71** and **72** and presses an image-capture button. The image capturer **21** is realized by the camera **207**.

The analyzer **22** reads the two-dimensional code **712** or **722** or the layout diagram **711** from the image of the design materials **71** or **72**, and by analyzing the two-dimensional code **712**, **722** or the layout diagram **711** that was read, acquires, as setting-support information, the control information **60** or the server identification information. The analyzer **22** is realized by the processor **201**.

The transmitter **23** transmits the setting-support information acquired by the analyzer **22** to the control device **10** via wireless communication. The transmitter **23** is realized by the communicator **206**.

The server **30** is for example a Web server device, as shown in FIG. **1**. The server **30** stores the control information **60** registered in advance by the contractor or the designer. The control information **60** registered in the server **30** typically includes the same content as the control information **60** indicated by the design materials **71** and **72**. The server **30** supplies the stored control information **60** to equipment that accessed the server **30** using the server identification information. The server **30** may authenticate the equipment that accessed the server **30** and supply the control information **60** when conditions are satisfied. For example, the server **30** may accomplish password authentication.

Next, processes executed by the terminal **20** and the control device **10** constituting the control system **100** are described in order with reference to FIGS. **7** to **13**.

FIG. **7** shows a terminal process executed by the terminal **20**. The terminal process is a process for setting the control information **60** in the control device **10**, and is started by the worker U**1** launching a specific application.

In the terminal process, the image capturer **21** captures an image in accordance with pressing of an image-capture button by the worker U**1** (step S**21**). Through this, for example a five megapixel digital image is captured in a state with the focus adjusted by an autofocus function of the image capturer **21**.

The analyzer **22** executes an image analysis process (step S**22**). Details of the image analysis process are shown in FIG. **8**.

As shown in this drawing, the analyzer **22** acquires image information indicating the image captured by the image capturer **21** (step S**221**). The image information is data indicating the image, and for example is digital data in Joint Photographic Experts Group (JPEG) format.

The analyzer **22** determines whether or not the two-dimensional code is included in the image information (step S**222**). For example, the analyzer **22** determines whether or not the two-dimensional code is included in the image information by searching for the two-dimensional code from the image through pattern matching.

When a determination is made that the two-dimensional code is included in the image information (step S**222**: Yes), the analyzer **22** reads and analyzes the two-dimensional code (step S**223**). For example, the analyzer **22** decodes the two-dimensional code, removing noise overlaying the two-dimensional code.

The analyzer **22** determines whether or not the control information **60** is included in the two-dimensional code (step S**224**). For example, the analyzer **22** determines whether or not data in a predetermined table format is included in the two-dimensional code. The analyzer **22** may also determine whether or not data indicating that the control information **60** is included in the two-dimensional code is included in the two-dimensional code along with the control information **60**.

When a determination is made that the control information **60** is included in the two-dimensional code (step S**224**: Yes), the analyzer **22** acquires, as setting-support information, the control information **60** included in the two-dimensional code (step S**225**). Following this, the analyzer **22** concludes the image analysis process.

When a determination is made that the control information **60** is not included in the two-dimensional code (step S**224**: No), the analyzer **22** determines whether or not the server identification information is included in the two-dimensional code (step S**226**). For example, the analyzer **22** determines whether or not a URI (character string data) beginning with "http://" is included in the two-dimensional code.

When a determination is made that the server identification information is not included in the two-dimensional code (step S**226**: No), the analyzer **22** concludes the image analysis process without acquiring setting-support information.

When a determination is made that the server identification information is included in the two-dimensional code (step S**226**: Yes), the analyzer **22** acquires, as setting-support information, the server identification information included in the two-dimensional code (step S**227**). Following this, the analyzer **22** concludes the image analysis process.

When in step S**222** a determination is made that the two-dimensional code is not included in the image information (step S**222**: No), the analyzer **22** determines whether or not a diagram linking equipment identification information and attribute information is included in the image information (step S**228**). For example, the analyzer **22** confirms to the worker U**1** whether or not the layout diagram was captured, by causing a message "Was the layout diagram captured? Yes/No" to be displayed on the screen. The analyzer **22** determines whether or not a diagram linking the equipment identification information and the attribute information is included in the image information on the basis of manipulation by the worker U**1** in response to the message. By pre-setting the format of the diagram, the analyzer **22** may also search for the diagram from the image information and determine whether or not the diagram is included in the image information.

When a determination is made that the diagram is not included in the image information (step S**228**: No), the analyzer **22** concludes the image analysis process without acquiring the setting-support information.

When a determination is made that the diagram is included in the image information (step S**228**: Yes), the analyzer **22** reads and analyzes the diagram (step S**229**). For example, the analyzer **22** recognizes through the image process lines indicating walls or partitions, marks painted over with squares indicating the facility equipment **41**-**43** and characters displayed as equipment IDs and floor names. Through this, the analyzer **22** extracts from the layout diagram the control information **60** associating the equipment IDs, the floor names and the position information. Furthermore, the analyzer **22** extracts from the layout diagram the arrangement and the shapes of walls or partitions.

The analyzer **22** acquires, as setting-support information, the control information **60** associating the equipment identification information and attribute information included in the diagram (step S**230**). Following this, the analyzer **22** concludes the image analysis process.

As shown in FIG. **7**, after conclusion of the image analysis process (step S**22**), the analyzer **22** determines whether or not, as a result of the image analysis process (step S**22**), the setting-support information was acquired (step S**23**).

When a determination is made that the setting-support information was not acquired (step S**23**: No), the analyzer **22** concludes the terminal process without transmitting the setting-support information to the control device **10**. When the terminal process has concluded, the worker U**1** can repeat the setting work of the control information **60** by again executing the terminal process.

When a determination is made that the analyzer **22** acquired the setting-support information (step S**23**: Yes), the transmitter **23** transmits the setting-support information

acquired by the analyzer **22** to the control device **10** (step S**24**). Following this, the terminal **20** concludes the terminal process.

FIG. **9** shows a setting process executed by the control device **10**. The setting process is a process for setting the control information **60**, and is started when the power source of the control device **10** is turned on.

The setter **12** determines whether or not the setting-support information was received from the terminal **20** via the receiver **11** (step S**11**). For example, the setter **12** determines whether or not the setting-support information was received on the basis of whether or not a packet including a transmitter address indicating the terminal **20** was received via the receiver **11**.

When a determination is made that the setting-support information was not received (step S**11**: No), the setter **12** again executes step S**11**. Through this, the setter **12** waits for reception of the setting-support information.

When a determination is made that the setting-support information was received (step S**11**: Yes), the setter **12** determines whether or not the control information **60** was received as the setting-support information (step S**12**). For example, the setter **12** determines whether or not the control information **60** was received on the basis of whether or not the setting-support information is data in a predetermined table format.

When a determination is made that the control information **60** was received as the setting-support information (step S**12**: Yes), the setter **12** sets the control information **60** (step S**13**). Through this, the control information **60** is stored in the memory **13**.

When a determination is made that the control information **60** was not received as the setting-support information (step S**12**: No), the setter **12** determines whether or not the server identification information was received as the setting-support information (step S**14**). For example, the setter **12** determines whether or not the server identification information was received by determining whether or not the setting-support information is character string data beginning with "http://".

When a determination is made that the server identification information was not received as the setting-support information (step S**14**: No), the control device **10** again executes step S**11**.

When a determination is made that the server identification information was received as the setting-support information (step S**14**: Yes), the setter **12** acquires the control information **60** from the server **30** on the basis of the server identification information (step S**15**). Then, the setter **12** sets the control information **60** that was acquired (step S**13**).

The warner **18** acquires from the equipment communicator **17** the equipment information **61** corresponding to the control information **60** that was set (step S**16**). For example, the warner **18** requests transmission of the equipment information **61** by the equipment communicator **17**. The equipment communicator **17**, upon receiving a request from the warner **18**, inquires to the facility equipment **41-43** about addresses and model names, and notifies the warner **18** of the results of the inquiry.

The warner **18** determines whether or not the control information **60** that was set differs from the equipment information **61** acquired from the equipment communicator **17** (step S**17**). For example, the warner **18** determines whether or not the addresses and model names included in the control information **60**, and the addresses and model names included in the equipment information **61**, match. Specifically, when an address or model name not included in the control information **60** that was set is included in the equipment information **61**, the warner **18** determines that the set control information **60** differs from the equipment information **61** acquired from the equipment communicator **17**. In addition, when the combination of addresses and model names contained in the control information **60** and the combination of addresses and model names acquired from the equipment communicator **17** match, the warner **18** determines that the set control information **60** and the equipment information **61** acquired from the equipment communicator **17** do not differ.

When a determination is made that the set control information **60** does not differ from the equipment information **61** acquired from the equipment communicator **17** (step S**17**: No), the control device **10** again executes the process of step S**11**.

When a determination is made that the set control information **60** differs from the equipment information **61** acquired from the equipment communicator **17** (step S**17**: Yes), the warner **18** issues a warning (step S**18**). For example, the warner **18** displays results of comparing the addresses and model names included in the control information **60** and the equipment information **61** acquired from the equipment communicator **17**. When the comparison results are displayed, data that does not match is preferably displayed with emphasis. Through this, the worker U**1** can easily recognize that the set control information **60** and the equipment information **61** retained in the facility equipment **41-43** do not match.

Following this, the control device **10** again executes the process of step S**11**.

FIG. **10** shows a control process executed by the control device **10**. The control process is a process for controlling the facility equipment **41-43**, and is started when the power source of the control device **10** is turned on. This control process may be executed in parallel with the setting process shown in FIG. **9**.

In the control process, the display **15** displays a manipulation screen (step S**101**). FIG. **11** shows an example of the manipulation screen displayed by the display **15**. In the example in this drawing, an overview of labels attached to the facility equipment **41-43** for each floor on which the pieces of facility equipment **41-43** are installed is displayed. This manipulation screen is a screen that the equipment controller **14** generates on the basis of the floor names and the labels out of the control information **60**.

When the manipulation screen shown in this drawing is displayed, when the user touches an icon **81** displayed along with the character string "conference room **1**", the display **15** displays a second example of a manipulation screen including a window **82**, as shown in FIG. **12**. This window **82** is used for manipulating the facility equipment to which the label "conference room **1**" is appended. The window **82** is created by the equipment controller **14** after referencing the equipment IDs associated with the label "conference room **1**", out of the control information **60**. Consequently, the window **82** includes the equipment ID "041" of the facility equipment **41** (manipulation target equipment) to which the label "conference room **1**" is attached.

In addition, the window **82** includes a region **83** for selecting manipulation contents, and a button **84** for determining manipulation contents. When the user touches the button **84**, the manipulation contents for the manipulation target equipment are input into the control device **10**.

FIG. **13** shows a third example of a manipulation screen displayed by the display **15**. In the example shown in this drawing, an icon group expressing labels is positioned, using

the layout diagram **711** read out from the design materials **71**. When the manipulation screen shown in this drawing is displayed, and the user touches the icon **81** expressing "conference room **1**", the display **15** displays the same window as the window **82** shown in FIG. **12**. Through this, the user can input manipulation contents.

As shown in FIG. **10**, following the display of the manipulation screen (step **S101**), the equipment controller **14** determines whether or not there is input from the user (step **S102**). For example, the equipment controller **14** determines whether or not the user has touched the button **84** shown in FIG. **12**.

When a determination is made that there is no input from the user (step **S102**: No), the equipment controller **14** repeats the process of step **S102**. Through this, the equipment controller **14** waits until there is a user input.

When a determination is made that there is input from the user (step **S102**: Yes), the equipment controller **14** controls the facility equipment **41-43** on the basis of the control information **60** (step **S103**). For example, the equipment controller **14** references the control information **60** and acquires the address of the manipulation target equipment. In addition, the equipment controller **14** generates a control command in accordance with the manipulation contents that were input. Then, the equipment controller **14** outputs to the equipment communicator **17** the address of the manipulation target equipment and the generated control command.

Following this, the control device **10** again executes the process of step **S101**.

As described above, the terminal **20** acquires setting-support information for setting the control information **60** in the control device **10** through analysis of the captured image, and transmits the acquired setting-support information to the control device **10**. In addition, the control device **10** sets the control information **60** on the basis of the setting-support information transmitted from the terminal **20**. Consequently, the worker can set the control information **60** in the control device **10**, through capturing the image. Accordingly, easily setting the control information **60** in the control device **10** is possible.

Typically, the designer and the contractor that created the design materials **71**, **72** differ from the worker that sets the control information **60**. Among these designer, contractor and worker, the conventional custom has been to convey information by documents. With the control system **100** according to this exemplary embodiment, the control information **60** is set by capturing documents, so easily setting the control information **60** is possible without forcing a change of conventional customs on the designer, contractor and worker.

In addition, the analyzer **22** of the terminal **20** reads the two-dimensional code from the image and acquires as setting-support information the control information **60** included in the two-dimensional code that was read. Acquisition of the control information **60** from the two-dimensional code enables certain acquisition of the control information **60** with a smaller processing load imposed on the terminal **20**, in comparison to acquisition of the control information **60** from the table **721** indicated in the design materials **72**. Consequently, the possibility of erroneously setting the control information **60** can be reduced.

In addition, the analyzer **22** of the terminal **20** acquires as setting-support information the server identification information included in the two-dimensional code that was read. Then, the setter **12** of the control device **10** acquires the control information **60** from the server **30** on the basis of the server identification information. Because there is a limit to the size of data included in the two-dimensional code (for example, 3 kB), when the size of the control information **60** is large, creating a two-dimensional code including the control information **60** becomes difficult. On the other hand, because the server identification information is used only to simply identify the server **30**, the data size thereof is in general small. Accordingly, control information **60** of large size can easily be set by storing the control information **60** in the server **30**.

In addition, the analyzer **22** of the terminal **20** reads from the image the layout diagram in which the equipment identification information and the attribute information are associated with each other, and acquires as setting-support information the control information **60** in which the equipment identification information and the attribute information are associated with each other. Consequently, the worker U**1** can set the control information **60** in the control device **10** by capturing the layout diagram showing the control information **60**. Accordingly, the control information **60** can be easily set while eliminating the work of adding a two-dimensional code to conventional design materials. In addition, even when the position of the facility equipment **41-43** is not shown in the design materials **72**, the control device **10** can understand the positions of the facility equipment **41-43** and easily create a manipulation screen using the layout diagram.

In addition, for equipment identification information, when one item of attribute information and another item of attribute information are set as the control information **60** by the setter **12**, the display **15** of the control device **10** displays a manipulation screen associating the one item of attribute information and the other item of attribute information. Specifically, the display **15** displays the floor name (the one item of attribute information) and the label (the other item of attribute information) associated with each other, as shown in FIG. **11**. Consequently, the display **15** can display the types of a plurality of pieces of facility equipment **41-43** in a hierarchized form, by using a plurality of items of attribute information. Accordingly, the user of the control device **10** can select and easily manipulate the appropriate equipment from the plurality of pieces of facility equipment **41-43**.

In addition, the attribute information includes the locations of the facility equipment **41-43**. Specifically, the labels (the room names) appended to the facility equipment **41-43** and the position information indicating the positions of the facility equipment **41-43** are included in the attribute information. The user generally identifies the facility equipment **41-43** using these locations of the facility equipment **41-43**. Consequently, a manipulation screen using the locations of the facility equipment **41-43** follows the user's instincts, and the user can easily manipulate the facility equipment **41-43** using the manipulation screen.

In addition, the warner **18** of the control device **10** issues a warning when the addresses and the model names included in the control information **60** that was set and the addresses and the model names included in the equipment information **61** acquired through communication with the facility equipment **41-43** differ. Consequently, the worker can easily recognize that there is some kind of defect in the setting of the control information **60**, without personally confirming the set control information **60** item by item.

The exemplary embodiment may be modified as described below.

Variation

In the above-described exemplary embodiment, an example was described in which the control device **10** acquires the control information **60** from the server **30** when

the server identification information is included in the two-dimensional code. However, in this case, the terminal **20** may acquire the control information **60**.

FIG. **14** shows an image analysis process according to this variation. The processes of steps S**221**~S**226** and S**228**~S**230** in this image analysis process are executed the same as in the above-described exemplary embodiment. However, when a determination is made that the server identification information is included in the two-dimensional code (step S**226**: Yes), in this variation steps S**231** and S**232** are executed in place of step S**227** according to the above-described exemplary embodiment (see FIG. **8**).

Specifically, when a determination is made that the server identification information is included in the two-dimensional code (step S**226**: Yes), the analyzer **22** acquires the control information **60** from the server **30** on the basis of the server identification information (step S**231**).

The analyzer **22** acquires the control information **60** as the setting-support information (step S**232**). Following this, the analyzer **22** concludes the image analysis process.

As described above, with this variation, when the server identification information is included in the two-dimensional code, the terminal acquires the control information **60**. Consequently, there is no need to connect the control device **10** to the network N**1**. Through this, easily setting the control information **60** in the control device **10** via the terminal **20** becomes possible the same as in the exemplary embodiment, even when an environment is not prepared in which the control device **10** is connected to the network N**1** such as the Internet and/or the like.

The functions of the control device **10** and the terminal **20** according to the above-described exemplary embodiment can be realized by dedicated hardware, and also by a typical computer system.

For example, equipment executing the above-described processes can be configured by the programs P**1** and P**2** stored in the auxiliary memories **103** and **203** being stored and distributed on a computer-readable memory medium such as flexible disk, compact disk read-only memory (CD-ROM), digital versatile disk (DVD), magneto-optical disk (MO) and/or the like, and by installing those programs P**1** and P**2** on a computer.

In addition, the programs P**1** and P**2** may be stored on a disk device possessed by a server device on a communication network such as the Internet and/or the like, and for example may be overlaid on carrier waves and downloaded to a computer, and/or the like.

In addition, the above-described processes can be achieved through startup execution while transferring the programs P**1** and P**2** via the network N**1** such as the Internet and/or the like.

Furthermore, the above-described processes can be achieved by executing all or a portion of the programs P**1** and P**2** on a server device, and having a computer execute the programs P**1** and P**2** while sending and receiving information related to those processes via a communication network.

When the above-described functions are realized through allocation by an operating system (OS) or through cooperation between applications and an OS, only the portion other than the OS may be stored and distributed on a medium, be downloaded to a computer, and/or the like.

In addition, the means for realizing the functions of the control device **10** and the terminal **20** may be realized not just through software, but entirely or partially through dedicated hardware (circuits, and/or the like). For example, if the setter **12**, the warner **18** and the analyzer **22** are configured using field programmable gate arrays (FPGA), application specific integrated circuits (ASIC) and/or the like, power conservation in the control device **10** and the terminal **20** is possible.

The foregoing describes some example embodiments for explanatory purposes. Although the foregoing discussion has presented specific embodiments, persons skilled in the art will recognize that changes may be made in form and detail without departing from the broader spirit and scope of the invention. Accordingly, the specification and drawings are to be regarded in an illustrative rather than a restrictive sense. This detailed description, therefore, is not to be taken in a limiting sense, and the scope of the invention is defined only by the included claims, along with the full range of equivalents to which such claims are entitled.

INDUSTRIAL APPLICABILITY

The present disclosure is suitable for setting information in a control system for controlling facility equipment.

REFERENCE SIGNS LIST

100 Control system
10 Control device
11 Receiver
12 Setter
13 Memory
14 Equipment controller
15 Display
16 Manipulation receiver
17 Equipment communicator
18 Warner
101, **201** Processor
102, **202** Main memory
103, **203** Auxiliary memory
104, **204** Input device
105, **205** Output device
106, **206** Communicator
109, **209** Internal bus
20 Terminal
21 Image capturer
22 Analyzer
23 Transmitter
207 Camera
30 Server
40 Network
41-**43** Facility equipment
60 Control information
61 Equipment information
71, **72** Design materials
81 Icon
82 Window
83 Region
84 Button
711 Layout diagram
712, **722** Two-dimensional code
713 Box
721 Table
M**1** Mark
N**1** Network
P**1**, P**2** Program
U**1** Worker

The invention claimed is:

1. A control system comprising:

a control device configured to control facility equipment based on pre-set control information, and to connect to a server storing the control information via a network; and

a terminal configured to communicate with the control device, wherein

the terminal comprises

an image capturer configured to capture an image,

an analyzer configured to read a two-dimensional code from the image captured by the image capturer, and to analyze the two-dimensional code to acquire server identification information for identifying the server as setting-support information for setting the control information in the control device, the server identification information being included in the two-dimensional code, and

a transmitter configured to transmit the setting-support information acquired by the analyzer to the control device, and

the control device comprises

a receiver configured to receive the setting-support information transmitted from the transmitter, and

a setter configured to acquire the control information from the server based on the server identification information received as the setting-support information by the receiver, and to set the control information.

2. The control system according to claim 1, wherein the control device further comprises:

an equipment communicator configured to communicate with the facility equipment; and

a warner configured to acquire, when the facility equipment is configured to retain equipment information corresponding to the control information to be set, the equipment information from the facility equipment via the equipment communicator, and to issue a warning when the control information to be set and the equipment information differ from each other.

3. The control system according to claim 1, wherein the transmitter is configured to transmit the setting-support information acquired by the analyzer Directly to the control device.

4. A terminal that communicates with a control device configured to control facility equipment based on pre-set control information and to connect to a server storing the control information via a network, the terminal comprising:

an image capturer configured to capture an image;

an analyzer configured to read a two-dimensional code from the image captured by the image capturer, and to analyze the two-dimensional code to acquire server identification information for identifying the server included in the two-dimensional code as setting-support information for setting the control information in the control device; and

a transmitter configured to transmit the setting-support information acquired by the analyzer to the control device.

5. An information setting method for setting control information in a control device configured to control facility equipment based on the control information that is pre-set and to connect to a server storing the control information via a network, comprising:

capturing an image;

reading a two-dimensional code from the image and analyzing the two-dimensional code to acquire server identification information for identifying the server included in the two-dimensional code as setting-support information for setting the control information in the control device; and

acquiring the control information from the server based on the server identification information acquired as the setting-support information and setting the control information.

6. A non-transitory computer-readable recording medium storing a program that causes a computer comprising (i) an image capturer configured to capture an image and (ii) a communicator configured to communicate with a control device that controls facility equipment based on pre-set control information and connects to a server storing the control information via a network, to:

capture an image;

read a two-dimensional code from the image and analyze the two-dimensional code to acquire server identification information for identifying the server included in the two-dimensional code as setting-support information for setting the control information in the control device; and

transmit the setting-support information to the control device.

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