



(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
28.12.2011 Bulletin 2011/52

(51) Int Cl.:
F24F 11/02 (2006.01)

(21) Application number: **10743662.8**

(86) International application number:
PCT/JP2010/051827

(22) Date of filing: **08.02.2010**

(87) International publication number:
WO 2010/095535 (26.08.2010 Gazette 2010/34)

(84) Designated Contracting States:
AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR

(72) Inventor: **NINAGAWA, Chuzo**
Kiyosu-shi
Aichi 452-8561 (JP)

(30) Priority: **20.02.2009 JP 2009038393**

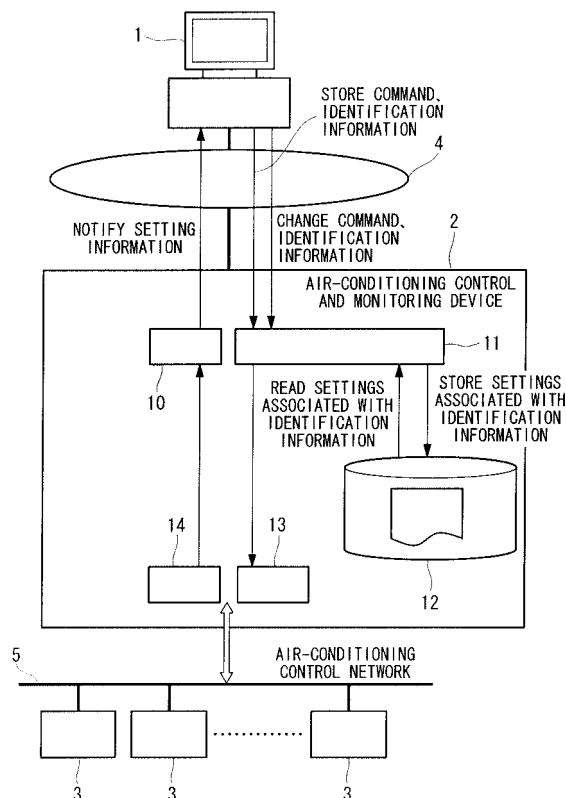
(74) Representative: **Intès, Didier Gérard André et al**
Cabinet Beau de Loménie
158, rue de l'Université
75340 Paris Cedex 07 (FR)

(71) Applicant: **Mitsubishi Heavy Industries, Ltd.**
Tokyo 108-8215 (JP)

(54) **AIR-CONDITIONING CONTROL MONITORING DEVICE, PROGRAM, AND AIR-CONDITIONING CONTROL MONITORING SYSTEM**

(57) An air conditioner setting is easily and immediately stored. In an air-conditioning control and monitoring device (2) that controls the operation of an air conditioner (3) in accordance with a command from a client terminal (1), which remote-controls the air conditioner (3), and that monitors an operating state of the air conditioner (3) so as to provide information regarding the operating state of the air conditioner (3) to the client terminal (1), the device includes a sending unit (10) that sends an air conditioner (3) setting corresponding to a predetermined timing to the client terminal (1); a settings storage unit (12) that stores the setting in association with identification information when the settings storage unit (12) receives the identification information and a store command from the client terminal (1); and a control unit (13) that reads the setting associated with the identification information from the settings storage unit (12) when the control unit (13) receives the identification information and a change command from the client terminal (1), and changes the air conditioner (3) setting to the setting read from the settings storage unit (12).

FIG. 1



Description

{Technical Field}

[0001] The present invention relates to air-conditioning control and monitoring devices and programs, and to air-conditioning control and monitoring systems.

{Background Art}

[0002] In an air-conditioning control and monitoring system in the related art that centrally controls multiple air conditioners installed in a building, control data regarding the operating conditions or the like of air conditioners to be controlled are compiled in a central monitoring device. The control data of each air conditioner is reported to a monitoring terminal disposed at a remote location and connected to the central monitoring device via a LAN or a public line so that the operating conditions of the air conditioner can be monitored from the monitoring terminal.

{Citation List}

{Patent Literature}

[0003]

{PTL 1}

Japanese Unexamined Patent Application, Publication No. Sho 62-266348

{Summary of Invention}

{Technical Problem}

[0004] In the air-conditioning control and monitoring system within the building, when information for designating the settings of each air conditioner is sent thereto from the central monitoring device, the air conditioner is controlled such that the air conditioner operates on the basis of these settings. However, in the related art, when the settings are changed by the user in each room while the air conditioner is in operation, the settings designated by the central monitoring device differ from the settings set for the actual operation in the room.

[0005] In order to provide air-conditioning settings desired by the user to each air conditioner from the central monitoring device, monitoring personnel need to manually set the setting parameters one by one for each air conditioner.

Therefore, for example, in a case where there are multiple parameters for controlling the settings and there are several hundreds of air conditioners in a large-scale environment, such as a building, there would be several thousands of zones where the setting parameters would need to be set. In such a case, there is a problem in that setting several thousands of these setting parameters places a

large burden on the monitoring personnel, and these several thousand setting processes cannot be performed immediately.

[0006] The present invention has been made to solve the aforementioned problem, and an object thereof is to provide an air-conditioning control and monitoring device and program, as well as an air-conditioning control and monitoring system, that can easily and immediately store the settings of an air conditioner.

{Solution to Problem}

[0007] In order to solve the aforementioned problems, the present invention employs the following solutions.

[0008] A first aspect of the present invention provides an air-conditioning control and monitoring device that controls the operation of an air conditioner in accordance with a command from a client terminal, which remote-controls the air conditioner, and that monitors an operating state of the air conditioner so as to provide information regarding the operating state of the air conditioner to the client terminal. The air-conditioning control and monitoring device includes a sending unit that sends an air conditioner setting corresponding to a predetermined timing to the client terminal; a settings storage unit that stores the setting in association with identification information when the settings storage unit receives the identification information and a store command from the client terminal having received the setting sent from the sending unit; and a control unit that reads the setting associated with the identification information from the settings storage unit when the control unit receives the identification information and a change command for changing the air conditioner setting from the client terminal, and changes the air conditioner setting to the setting read from the settings storage unit.

[0009] With such a configuration, the air conditioner setting corresponding to the predetermined (e.g., current) timing is sent to the client terminal by the sending unit. Consequently, for example, the received setting is displayed on a display unit of the client terminal. With regard to the setting, if the store command for storing the setting and the identification information are received from the client terminal, the received identification information and the setting sent to the client terminal are associated with each other and are stored in the settings storage unit. When the change command for changing the air conditioner setting and the identification information are received from the client terminal, the setting associated with the identification information received from the client terminal is read from the settings storage unit, and the control unit operates the air conditioner in accordance with the read setting.

[0010] Because the setting of the air conditioner in operation corresponding to the predetermined timing is stored as setting information on the basis of the command from the client terminal, the air conditioner setting corresponding to the timing designated by the user using the

client terminal can be easily stored. Furthermore, since the setting and the name thereof are associated with each other, the previously stored setting can be readily retrieved by designating the name via the client terminal. Consequently, the air conditioner setting can be changed to the setting corresponding to a point when the setting is stored in the settings storage unit.

[0011] The aforementioned setting is, for example, an operating condition. Examples thereof include an operating day/time, an operating mode, a set temperature, a room temperature, and a setting for permitting or not permitting remote control.

[0012] In the aforementioned air-conditioning control and monitoring device, if multiple air conditioners are to be monitored, the settings storage unit may store the identification information and settings of the multiple air conditioners to be monitored in association with each other when the settings storage unit receives the store command and the identification information from the client terminal.

[0013] When there are multiple air conditioners to be monitored in this manner, the settings of the multiple air conditioners are stored in association with a single piece of identification information. Consequently, when changing the settings of the air conditioners, the user can simply input the single piece of identification information to change the settings of the multiple air conditioners to desired settings. When there are multiple air conditioners to be monitored, air conditioners in which the settings are to be stored may be selectable by the user. Consequently, it is possible to store the settings of only the desired air conditioners in the settings storage unit.

[0014] In the aforementioned air-conditioning control and monitoring device, the setting may include an installation environment of the air conditioner.

[0015] Examples of an installation environment of the aforementioned air conditioner include a room where the air conditioner is installed and a group of separate rooms for different purposes.

[0016] In the aforementioned air-conditioning control and monitoring device, the setting may be changeable by the client terminal.

Consequently, the setting of an air conditioner desired by the user can be stored.

[0017] A second aspect of the present invention provides a client terminal that monitors an operating state of an air conditioner and is connected via a network to an air-conditioning control and monitoring device that controls the operation of the air conditioner. The client terminal includes a receiving unit that receives an air conditioner setting corresponding to a predetermined timing; an identification-information adding unit that adds identification information to the setting received from the receiving unit; and a command sending unit in which, when the air conditioner setting is to be changed, the identification information is designated so that the command sending unit sends a command for controlling the air conditioner on the basis of the setting associated with the

identification information.

[0018] With such a configuration, a name adding unit adds a name to the air conditioner setting corresponding to the predetermined timing received by the receiving unit. When changing the air conditioner setting, information regarding the name associated with the setting is sent so that the command sending unit sends the command for controlling the air conditioner on the basis of the setting associated with the name.

Consequently, the air conditioner setting can be remote-controlled via the air-conditioning control and monitoring device.

[0019] A third aspect of the present invention provides an air-conditioning control and monitoring system that includes the aforementioned air-conditioning control and monitoring device and the aforementioned client terminal.

[0020] A fourth aspect of the present invention provides an air-conditioning control and monitoring program that controls the operation of an air conditioner in accordance with a command from a client terminal, which remote-controls the air conditioner, and that monitors an operating state of the air conditioner so as to provide information regarding the operating state of the air conditioner to the client terminal. The air-conditioning control and monitoring program makes a computer execute first processing for sending an air conditioner setting corresponding to a predetermined timing to the client terminal; second processing for storing the setting in association with identification information when the identification information and a store command are received from the client terminal having received the setting sent by the first processing; and third processing for reading the setting associated with the identification information from the settings storage unit when the identification information and a change command for changing the air conditioner setting are received from the client terminal, and changing the air conditioner setting to the setting read from the settings storage unit.

{Advantageous Effects of Invention}

[0021] The present invention achieves the advantage of having the ability to easily and immediately store the air conditioner setting.

{Brief Description of Drawings}

[0022]

{Fig. 1} Fig. 1 is a block diagram illustrating an example of the configuration of an air-conditioning control and monitoring device according to an embodiment of the present invention.

{Fig. 2} Fig. 2 is a diagram illustrating an example of a screen used when setting the operation settings in the air-conditioning control and monitoring device.

{Fig. 3} Fig. 3 is a diagram illustrating an example of

a screen used when scheduling the settings.

{Description of Embodiments}

[0023] An embodiment of an air-conditioning control and monitoring system to which an air-conditioning control and monitoring device according to the present invention is applied will be described below with reference to the drawings.

{First Embodiment}

[0024] Fig. 1 is a block diagram illustrating the schematic configuration of the air-conditioning control and monitoring system according to this embodiment.

[0025] As shown in Fig. 1, an air-conditioning control and monitoring system 30 according to this embodiment mainly includes a client terminal 1 equipped with a web browser, and an air-conditioning control and monitoring device 2. The air-conditioning control and monitoring device 2 controls the operation of air conditioners 3 in accordance with a command from the client terminal 1, monitors the operating state of each air conditioner 3, and provides the operating state of the air conditioner 3 to the client terminal 1.

[0026] The client terminal 1 receives information regarding the settings of the air conditioner 3 received from the air-conditioning control and monitoring device 2 and performs various operation control on the air conditioner 3 via the air-conditioning control and monitoring device 2. To achieve this, the client terminal 1 includes a CPU (central processing unit), a ROM (read-only memory), a RAM (random access memory), an input unit, a monitor, and the like, which are not shown.

[0027] The client terminal 1 and the air-conditioning control and monitoring device 2 are connected via a building-management communication network 4. The building-management communication network 4 is, for example, a network that uses a standard communications protocol (e.g., TCP/IP) for building management, for example, a LAN (local area network). The air-conditioning control and monitoring device 2 and the air conditioners 3 are connected via an air-conditioning control network 5. The air-conditioning control network 5 is, for example, a network that uses a standard communications protocol for controlling and monitoring the air conditioners.

[0028] Each air conditioner 3 outputs settings regarding its own operation to the air-conditioning control and monitoring device 2 at a predetermined timing. Specifically, an air conditioner 3 installed in a conference room A outputs settings regarding its own operation, i.e., "cooling operation" and "26 degrees", to the air-conditioning control and monitoring device 2 at a predetermined timing.

Regardless of whether in operation or not in operation, each air conditioner 3 outputs its settings to the air-conditioning control and monitoring device 2.

[0029] The settings are, for example, operating condi-

tions. Examples thereof include an operating day/time, an operating mode, a set temperature, a room temperature, and a setting for permitting or not permitting remote control.

[0030] The air-conditioning control and monitoring device 2 is, for example, a computer, and includes a CPU (central processing unit), a ROM (read-only memory), a RAM (random access memory), and the like, which are not shown. A processing sequence for achieving various functions, to be described below, is stored in the ROM or the like in a program format, and the CPU loads the program into the RAM or the like and performs information processing and calculation so as to achieve the various functions, to be described below.

[0031] The air-conditioning control and monitoring device 2 includes a sending unit (sending unit) 10, a combining unit 11, a settings storage unit (settings storage unit) 12, a control unit (control unit) 13, and a receiving unit (receiving unit) 14.

[0032] The receiving unit 14 receives the settings of each air conditioner 3 and information regarding the installation environment of the air conditioner 3 at a predetermined timing from the air conditioner 3, and outputs the information to the sending unit 10.

[0033] The sending unit 10 associates the settings of each air conditioner 3, corresponding to the predetermined timing, received from the receiving unit 14 with the information regarding the installation environment of the air conditioner 3, and outputs the information to the client terminal 1. The installation environment of the air conditioner 3 is information for identifying an air-conditioning cell in which the air conditioner is installed or information for identifying the air conditioner, and is, for example, a number assigned to the air conditioner 3 in advance or a name that indicates a specific room.

[0034] The sending unit 10 sends the settings of the air conditioner 3 corresponding to a freely-chosen timing to the client terminal 1, regardless of whether the air conditioner 3 is in operation or not in operation.

[0035] Specifically, the sending unit 10 receives, from the air conditioner 3 in the conference room A, "conference room A (e.g., identification information of the air conditioner 3 in the conference room A)" as the installation environment and "cooling operation" and "26 degrees" as the settings at a predetermined timing, and sends the information to the client terminal 1.

[0036] When the combining unit 11 receives a store command and identification information from the client terminal 1 having received the settings and the information regarding the installation environment sent from the sending unit 10, the combining unit 11 associates the identification information with the information regarding the installation environment and the settings and stores the information in the settings storage unit 12. Specifically, the combining unit 11 associates the identification information with the information regarding the installation environment and the settings on the basis of the store command sent from the client terminal 1 and stores the

information in the settings storage unit 12.

[0037] The store command is sent at a freely-chosen timing (time) from the client terminal 1, and the combining unit 11 stores the setting information and the identification information in the settings storage unit 12 on the basis of the timing at which the store command is received from the client terminal 1.

[0038] Furthermore, when the combining unit 11 receives a change command for changing the settings of the air conditioner 3 and the identification information from the client terminal 1, the combining unit 11 reads the information regarding the installation environment and the settings that correspond to the identification information from the settings storage unit 12, and outputs the information to the control unit 13.

[0039] More specifically, when the combining unit 11 receives, from the client terminal 1, the identification information (e.g., "optimal summer temperature setting for conference room A") associated with the information regarding the installation environment of the air conditioner 3 (e.g., "conference room A") and the settings (e.g., "cooling operation" and "26 degrees") and the store command (e.g., a command output when a register button is pressed by a user), the combining unit 11 stores the information, for example, "conference room A", "cooling operation", "26 degrees", and "optimal summer temperature setting for conference room A", in association with each other in the settings storage unit 12.

[0040] Furthermore, for example, when the combining unit 11 receives the change command and the identification information (e.g., "optimal summer temperature setting for conference room A") from the client terminal 1, the combining unit 11 reads the information regarding the installation environment, i.e., "conference room A", and the setting information, i.e., "cooling operation" and "26 degrees", associated with the "optimal summer temperature setting for conference room A" and outputs the information to the control unit 13.

[0041] By storing the desired settings of the air conditioner 3 (in this case, the air conditioner 3 in the conference room A) in association with the identification information in this manner, the desired settings can be readily retrieved on the basis of the identification information without the need for monitoring personnel to memorize the desired settings for the conference room A.

[0042] The control unit 13 outputs the settings read from the settings storage unit 12 and acquired from the combining unit 11 to the air conditioner 3 associated with the identification information acquired from the combining unit 11. Specifically, the settings "cooling operation" and "26 degrees" are output to the air conditioner 3 in the conference room A.

[0043] Fig. 2 is an example of a screen showing a list of settings sent from the air-conditioning control and monitoring device 2 and displayed on the client terminal 1 when setting the identification information in association with the settings.

As shown in Fig. 2, for example, the list of settings is

displayed in the form of a table. Fig. 2 shows the current settings of multiple air conditioners in a certain arrangement. On this screen, the user can input, in a name input section, identification information to be associated with the current settings of each of the multiple air conditioners. Moreover, by selecting an operating section (e.g., a register button) on the screen for storing these settings in the air conditioners 3, the settings for the multiple air conditioners shown in Fig. 2 can be collectively stored in the settings storage unit 12.

[0044] When the combining unit 11 receives the identification information from the client terminal 1, the combining unit 11 reads the setting information associated with the identification information from the settings storage unit 12 and sends this information to the client terminal 1; in this case, the screen to be displayed on the client terminal is identical to the screen shown in Fig. 2. When an operating section (e.g., a send button) on the screen for sending the settings to the corresponding air conditioner 3 is selected, the combining unit 11 outputs the setting information associated with the identification information to the control unit 13, and the control unit 13 sends the settings to the air conditioner 3 to be controlled.

[0045] An operation of the air-conditioning control and monitoring system of this embodiment will be described below.

When the settings "cooling operation" and "26 degrees" and the information regarding the environment "conference room A" in which the corresponding air conditioner 3 is installed are output from the air conditioner 3 to the air-conditioning control and monitoring device 2, the information is received by the receiving unit 14. The information regarding the installation environment "conference room A" and the information regarding the settings "cooling operation" and "26 degrees" received by the receiving unit 14 are sent to the client terminal 1 via the sending unit 10. Thus, a screen for registering the settings is displayed on the screen of the client terminal 1. Upon confirming this screen, if the user desires to register the settings "conference room A", "cooling operation", and "26 degrees", the user can input, for example, "optimal summer temperature setting for conference room A" as identification information corresponding to the settings and can perform a register command operation on the client terminal 1.

[0046] Consequently, the identification information "optimal summer temperature setting for conference room A" and a store command are sent from the client terminal 1 to the air-conditioning control and monitoring device 2. Thus, the combining unit 11 associates the identification information "optimal summer temperature setting for conference room A", the settings "cooling operation" and "26 degrees", and the information regarding the installation environment "conference room A" with each other, and stores the information in the settings storage unit 12.

[0047] If the user desires to change the current settings to the settings stored in the air-conditioning control and

monitoring device 2, the user can input identification information corresponding to the settings to be changed, e.g., identification information "optimal summer temperature setting for conference room A", via the client terminal 1 so as to instruct changing of the settings. Thus, the change command and the identification information "optimal summer temperature setting for conference room A" are sent to the air-conditioning control and monitoring device 2. When the combining unit 11 receives the change command and the identification information "optimal summer temperature setting for conference room A", the settings "cooling operation" and "26 degrees" and the information regarding the installation environment "conference room A" associated with the identification information "optimal summer temperature setting for conference room A" are read from the settings storage unit 12. Moreover, the combining unit 11 sends, to the control unit 13, a control command for setting the settings to "cooling operation" and "26 degrees" for the conference room A corresponding to the air conditioner in the read installation environment.

When the control unit 13 receives the control command, the settings "cooling operation" and "26 degrees" are sent to the air conditioner 3 in the conference room A, whereby the settings for the air conditioner 3 in the conference room A are changed to "cooling operation" and "26 degrees".

[0048] As described above, with the air-conditioning control and monitoring device and program and the air-conditioning control and monitoring system of the present invention, the settings of an air conditioner corresponding to a predetermined (e.g., current) timing are sent to the client terminal 1 by the sending unit 10. Consequently, for example, the received settings are displayed on a display unit of the client terminal 1. With regard to the settings, when a store command for storing the settings and identification information are received from the client terminal, the received identification information and the settings sent to the client terminal are associated with each other and are stored in the settings storage unit 12. When the combining unit 11 receives a change command for changing the settings in the air conditioner and the identification information from the client terminal, the settings corresponding to the identification information received from the client terminal are read from the settings storage unit 12, and the control unit 13 performs the operation of the air conditioner in accordance with the read settings.

[0049] Because the settings of the air conditioner in operation corresponding to the predetermined timing are stored as setting information on the basis of the command from the client terminal 1, the settings of the air conditioner corresponding to the timing designated by the user using the client terminal 1 can be easily stored. Furthermore, since the settings and the name thereof are associated with each other, the previously stored settings can be readily retrieved by designating the name via the client terminal. The retrieved settings can be sent to the air

conditioner 3 in accordance with the change command from the client terminal 1. Consequently, the settings of the air conditioner 3 can be immediately changed to the settings corresponding to a point when the settings are stored in the settings storage unit 12.

[0050] Furthermore, unlike a case where data is stored on a regular basis, the air-conditioning control and monitoring device 2 according to this embodiment stores data at a desired timing so as to avoid unnecessary data accumulation.

[0051] The user can also make the air-conditioning control and monitoring device 2 store settings that do not cause a contracted power demand to be exceeded via the client terminal 1 by using identification information such as "peak cut level A". For example, if it is predicted that the aforementioned contracted power demand might be exceeded, the preliminarily stored identification information "peak cut level A" is selected so as to send and apply the settings to the corresponding air conditioner.

[0052] In an emergency situation such as when the contracted power demand is exceeded, there is no time for the user (monitoring personnel) to individually edit the settings of the multiple air conditioners since the contracted power demand can possibly be exceeded while the editing is being performed. Therefore, by preliminarily storing the settings that do not cause the contracted power demand to be exceeded, the changed settings can be immediately sent when a critical situation is about to arise, whereby a process for avoiding such a critical situation can be easily performed.

{First Modification}

[0053] In the air-conditioning control and monitoring device 2 according to this embodiment, although the change command for changing the settings in each air conditioner on the basis of the identification information stored in the settings storage unit 12 is sent from the client terminal 1, it is not limited to this.

For example, a predetermined condition may be stored in association with the identification information stored in the settings storage unit 12 so that, when the predetermined condition is satisfied, the settings associated with the identification information stored in association with the predetermined condition may be output to the control unit 13.

[0054] An example to be set as the predetermined condition is, for example, a day/time setting for scheduling the operation. Specifically, in an environment where there are several hundreds of air conditioners within an entire building, this is used when operating all of the air conditioners in the entire building in an energy-saving mode during lunchtime.

[0055] More specifically, the settings storage unit 12 of the air-conditioning control and monitoring device 2 stores information set as an energy-saving mode. The user uses the client terminal 1 to set identification information "energy-saving mode" relative to the settings

"cooling operation", "28 degrees", and "low airflow" and to store the information in the settings storage unit 12.

[0056] Fig. 3 illustrates an example of a scheduling screen sent from the air-conditioning control and monitoring device 2 and displayed on the client terminal 1 when setting the schedule for the air conditioners. Specifically, as shown in Fig. 3, information regarding a target installation environment "entire building" is selected in an air-conditioning cell, a scheduled operating time frame "12:00 to 12:55" is set, identification information "energy-saving mode" corresponding to the settings to be changed is selected, and a set button is pressed. Consequently, even when the air conditioners in the entire building are in different operating states, the settings storage unit 12 sends the settings for the energy-saving mode to the air conditioners in the entire building for the timeframe between 12:00 and 12:55.

[0057] In the case of educational facilities or the like, the schedule for using the air conditioners is frequently changed depending on semesters, classrooms, classes, and the like. For example, the air conditioners are switched between a summer setting mode and a winter setting mode, or are switched between a weekday-class-session setting mode and a long-vacation setting mode. In this case, if the settings that have previously been changed are to be reset back to the previous settings, it is necessary to memorize the settings of the individual air conditioners. In addition, the process for restoring the original settings of the multiple air conditioners is time-consuming. With the air-conditioning control and monitoring device 2 according to this embodiment, the settings for each condition are stored together with the identification information, and the reading of the stored identification information is scheduled (by, for example, designating a specific day/time and reading the identification information at the aforementioned day/time), thereby sending desired settings to the air conditioners at a desired timing. Consequently, changing of the settings can be automatically performed in accordance with the schedule, and the settings of the air conditioners can be easily changed.

[0058] By scheduling the changing of the settings on the basis of the identification information preliminarily stored in the settings storage unit 12 of the air-conditioning control and monitoring device 2 in this manner, desired settings for a specific day/time can be reliably and easily sent to the air conditioners. In a large-scale building having several hundreds of air conditioners in the entire building, it is necessary to set several thousands of settings, and the process for changing several thousands of settings involves an enormous amount of time and labor for the monitoring personnel. With the air-conditioning control and monitoring device 2 according to this embodiment, the changing of the settings is scheduled, as mentioned above, and the process for changing several thousands of settings is collectively performed on the basis of the identification information, whereby desired settings can be easily and immediately sent to the air con-

ditioners.

{Second Modification}

[0059] In the air-conditioning control and monitoring device 2 according to the embodiment of the present invention, the settings may be changed in association with other actions, instead of being changed manually by the monitoring personnel or changed in accordance with a schedule set to a specific day/time.

[0060] For example, based on the store command from the client terminal 1, the settings storage unit 12 of the air-conditioning control and monitoring device 2 stores a setting "stop operation" for the air-conditioning cell "entire building" in association with identification information "fire", as a setting when a fire occurs. Moreover, the air-conditioning control and monitoring device 2 operates in cooperation with other software, and when a message indicating that a fire is detected is received from that software, the identification information "fire" is selected. Accordingly, when a fire occurs, a notification that the fire has occurred is received by the air-conditioning control and monitoring device 2, and the identification information "fire" is read from the settings storage unit 12 so that "entire building" and "stop operation" associated with "fire" are selected. Furthermore, the control unit 13 sends the setting "stop operation" to the air conditioners corresponding to the air-conditioning cell "entire building".

[0061] By operating in cooperation with the information detected by the software and changing the settings on the basis of an event that has occurred, a high-risk operating state can be avoided. If a hazardous event occurs while the monitoring personnel are remote from the client terminal 1, the settings associated with the pre-registered identification information are automatically sent, whereby the air conditioners can be controlled to a desired operating state even when the monitoring personnel are not present.

[0062] Although the settings storage unit 12 in the air-conditioning control and monitoring device 2 according to this embodiment described above is configured to set and store the identification information related to the setting information of a single air conditioner, it is not limited to this. For example, the identification information may be set for the setting information of multiple air conditioners to be monitored, or air conditioners in which the settings are to be stored may be selected from among multiple air conditioners by the user.

Consequently, it is possible to store the settings of only the desired air conditioners in the settings storage unit 12.

[0063] In the air-conditioning control and monitoring device 2 according to this embodiment, although the settings storage unit 12 is configured to store the settings sent to the client terminal 1 from the sending unit 10 when the settings storage unit 12 receives the store command and the identification information from the client terminal 1, it is not limited to this. For example, the settings may

be changeable by the client terminal 1. Thus, the settings of desired air conditioners can be stored in the settings storage unit 12.

[0064] Although the embodiment of the present invention has been described above in detail with reference to the drawings, the detailed configuration is not limited to that in this embodiment, and design modifications are permissible so long as they do not depart from the spirit of the invention.

{Reference Signs List}

[0065]

- 1 client terminal
- 2 air-conditioning control and monitoring device
- 3 air conditioner
- 10 sending unit
- 11 combining unit
- 12 settings storage unit
- 13 control unit

Claims

1. An air-conditioning control and monitoring device that controls the operation of an air conditioner in accordance with a command from a client terminal, which remote-controls the air conditioner, and that monitors an operating state of the air conditioner so as to provide information regarding the operating state of the air conditioner to the client terminal, the air-conditioning control and monitoring device comprising:

a sending unit that sends an air conditioner setting corresponding to a predetermined timing to the client terminal;

a settings storage unit that stores the setting in association with identification information when the settings storage unit receives the identification information and a store command from the client terminal having received the setting sent from the sending unit; and

a control unit that reads the setting associated with the identification information from the settings storage unit when the control unit receives the identification information and a change command for changing the air conditioner setting from the client terminal, and changes the air conditioner setting to the setting read from the settings storage unit.

2. The air-conditioning control and monitoring device according to Claim 1, wherein if multiple air conditioners are to be monitored, the settings storage unit stores the identification information and settings of the multiple air conditioners to be monitored in as-

sociation with each other when the settings storage unit receives the store command and the identification information from the client terminal.

3. The air-conditioning control and monitoring device according to Claim 1 or 2, wherein the setting includes an installation environment of the air conditioner.

4. The air-conditioning control and monitoring device according to any one of Claims 1 to 3, wherein the setting is changeable by the client terminal.

5. A client terminal that monitors an operating state of an air conditioner and is connected via a network to an air-conditioning control and monitoring device that controls the operation of the air conditioner, the client terminal comprising:

a receiving unit that receives an air conditioner setting corresponding to a predetermined timing;

an identification-information adding unit that adds identification information to the setting received from the receiving unit; and

a command sending unit in which, when the air conditioner setting is to be changed, the identification information is designated so that the command sending unit sends a command for controlling the air conditioner on the basis of the setting associated with the identification information.

6. An air-conditioning control and monitoring system comprising:

the air-conditioning control and monitoring device according to any one of Claims 1 to 4; and the client terminal according to Claim 5.

7. An air-conditioning control and monitoring program that controls the operation of an air conditioner in accordance with a command from a client terminal, which remote-controls the air conditioner, and that monitors an operating state of the air conditioner so as to provide information regarding the operating state of the air conditioner to the client terminal, the air-conditioning control and monitoring program making a computer execute:

first processing for sending an air conditioner setting corresponding to a predetermined timing to the client terminal;

second processing for storing the setting in association with identification information when the identification information and a store command are received from the client terminal having received the setting sent by the first process-

ing; and

third processing for reading the setting associated with the identification information from the settings storage unit when the identification information and a change command for changing the air conditioner setting are received from the client terminal, and changing the air conditioner setting to the setting read from the settings storage unit.

5

10

15

20

25

30

35

40

45

50

55

FIG. 1

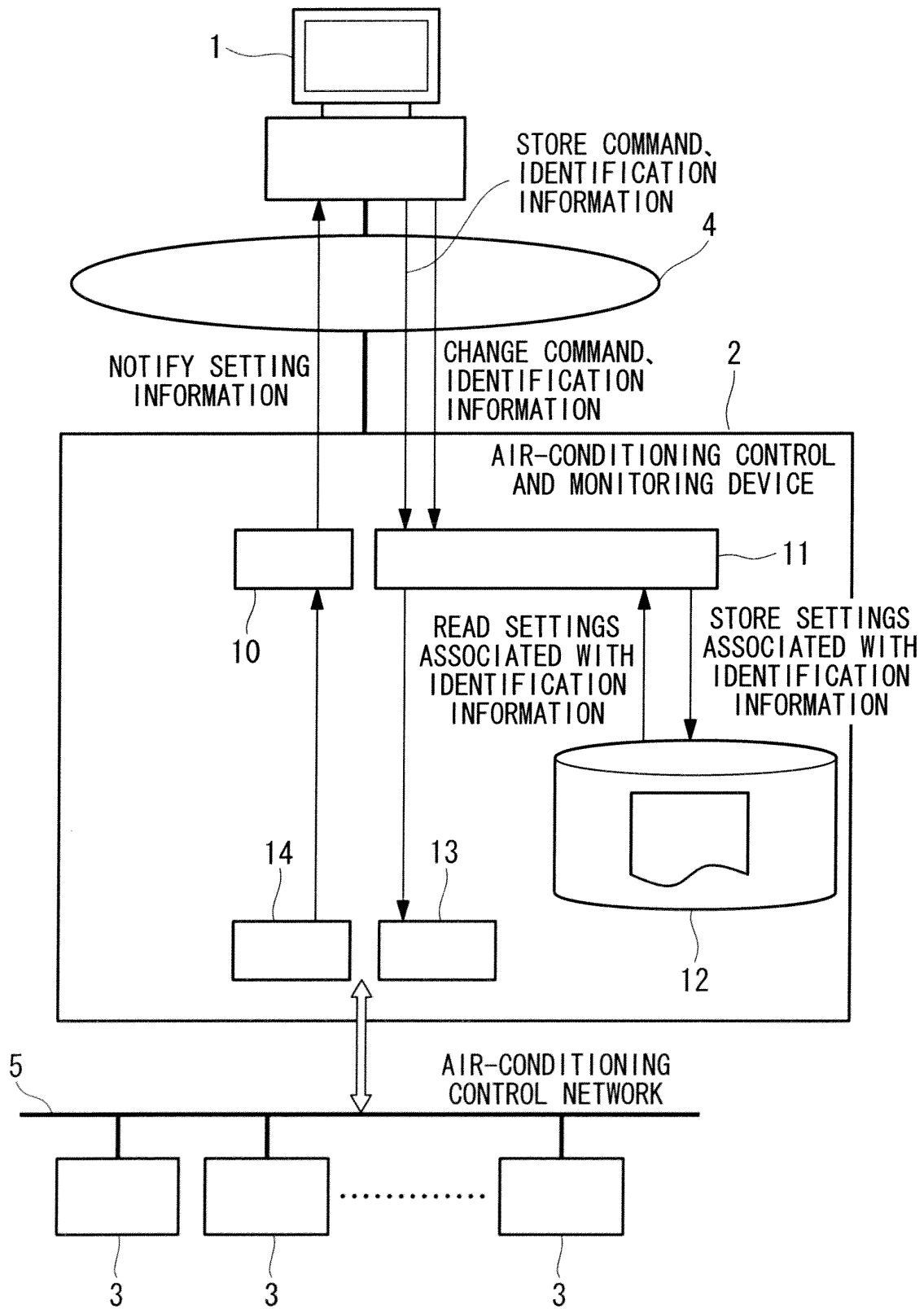


FIG. 2

AIR-CONDITIONER CONTROL SCREEN									
AIR-CONDITIONER NAME	ON/OFF	OPERATING MODE	AIRFLOW	SET TEMPERATURE	REMOTE CONTROL				
EXECUTIVE ROOM	ON	HEATING	HIGH	25	YES				
OFFICE ROOM	ON	HEATING	HIGH	30	YES				
FRONT DESK	OFF	COOLING	HIGH	25	NO				
RECEPTION ROOM 1	ON	HEATING	HIGH	30	YES				
RECEPTION ROOM 2	ON	COOLING	LOW	21	YES				
RECEPTION ROOM 3	ON	COOLING	HIGH	23	YES				
ADMINISTRATION DEPARTMENT, ADMINISTRATION DIVISION	OFF	COOLING	HIGH	21	YES				
ACCOUNTING DEPARTMENT, ACCOUNTING DIVISION	OFF	HEATING	LOW	25	NO				
ACCOUNTING DEPARTMENT, PLANNING DIVISION	ON	HEATING	INTENSE	21	NO				
GENERAL AFFAIRS DEPARTMENT, GENERAL AFFAIRS DIVISION	ON	COOLING	INTENSE	23	NO				
.									
.									
.									

SETTINGS ENTER NAME :	
SETTINGS REGISTER :	REGISTER
	SEND

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/051827

A. CLASSIFICATION OF SUBJECT MATTER F24F11/02 (2006.01) i		
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) F24F11/02		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2010 Kokai Jitsuyo Shinan Koho 1971-2010 Toroku Jitsuyo Shinan Koho 1994-2010		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2004-191037 A (LG Electronics Inc.), 08 July 2004 (08.07.2004), entire text; all drawings & US 2004/0107717 A1 & EP 1429082 A2 & KR 10-2004-0050483 A & KR 10-2004-0078811 A & CN 1506634 A	1-7
A	JP 2004-178156 A (Yokogawa Electric Corp.), 24 June 2004 (24.06.2004), paragraphs [0049], [0073] to [0074] (Family: none)	1-7
A	JP 2007-327708 A (Hitachi Appliances, Inc.), 20 December 2007 (20.12.2007), paragraphs [0015] to [0024] (Family: none)	1-7
☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "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) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 25 March, 2010 (25.03.10)		Date of mailing of the international search report 06 April, 2010 (06.04.10)
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer
Facsimile No.		Telephone No.

Form PCT/ISA/210 (second sheet) (July 2009)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2010/051827

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2007-032875 A (Toshiba Carrier Corp.), 08 February 2007 (08.02.2007), paragraph [0025] (Family: none)	1-7
A	JP 2005-337532 A (Sanyo Electric Co., Ltd.), 08 December 2005 (08.12.2005), entire text; all drawings (Family: none)	1-7
A	JP 7-180894 A (Matsushita Seiko Co., Ltd.), 18 July 1995 (18.07.1995), entire text; all drawings (Family: none)	1-7
A	JP 2003-004281 A (Toho Gas Co., Ltd., Tokyo Gas Co., Ltd., Osaka Gas Co., Ltd.), 08 January 2003 (08.01.2003), entire text; all drawings (Family: none)	1-7
A	JP 2008-170065 A (Toshiba Corp.), 24 July 2008 (24.07.2008), entire text; all drawings (Family: none)	1-7

Form PCT/ISA/210 (continuation of second sheet) (July 2009)

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- JP SHO62266348 B [0003]