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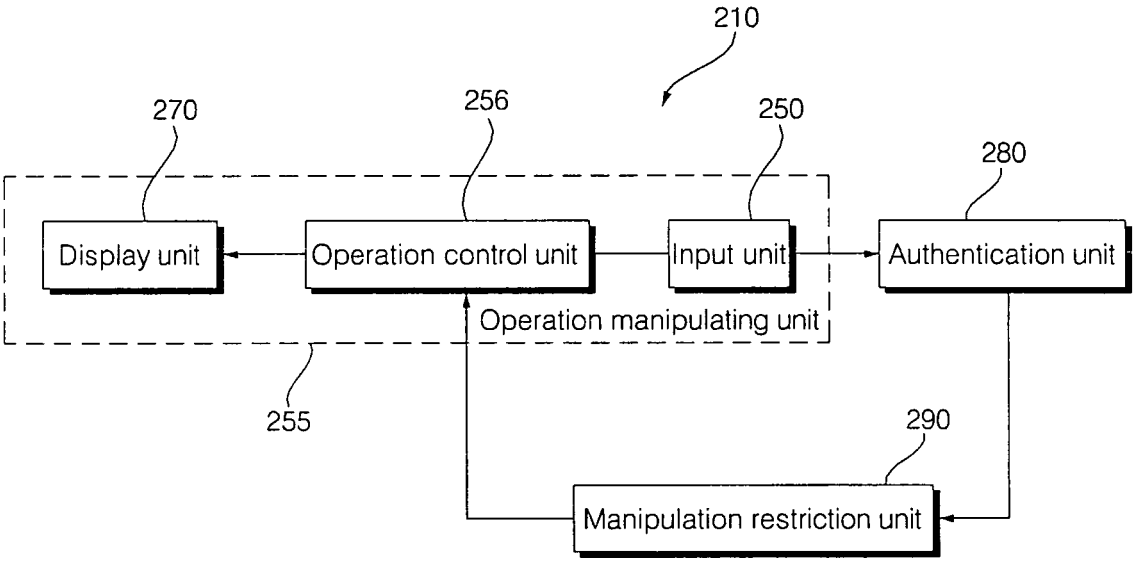
(54) Air conditioning system with operation restriction of local controller via remote controller and authentication unit

(57) A remote controller (315, 511), and (517) can restrict the operation and manipulation of a local controller (110, 310, 410, 511, 512), and (517), or the local controller itself can be manipulated so as to restrict operation and manipulation. Accordingly, it is possible to prevent a certain user from manipulating the operation settings of an air conditioner (110, 340), and (540) at his or her own will.

Fig. 3



EP 2 031 318 A1

Description

FIELD OF THE INVENTION

[0001] The present invention relates to an air conditioning system, and more particularly, to an air conditioning system, which can restrict the manipulation of a local controller controlling the operation of an air controller.

BACKGROUND INFORMATION

[0002] Generally, an air conditioner is controlled by a remote controller. As the remote controller has operation setting keys such as an operate/stop key, a temperature up/down key, etc. a user controls the operation of the air conditioner by the operation setting keys.

[0003] However, in a case where a certain user manipulates the operation of the air conditioner by the remote controller, there is a problem that a room set temperature is set to an excessively high or low level, thus deteriorating the performance of the air conditioner.

SUMMARY OF THE INVENTION

[0004] It would be desirable to provide an air conditioning system, which can restrict the manipulation of a local controller controlling the operation of an air conditioner

[0005] The present invention provides an air conditioning system, comprising: an air conditioner; a local controller for controlling the operation of the air conditioner; and a remote controller for remotely controlling the air conditioner and restricting the manipulation of the local controller.

[0006] In accordance with another aspect of the present invention, the present invention provides an air conditioning system, comprising: an air conditioner; a local controller for controlling the operation of the air conditioner; and a remote controller for remotely controlling the air conditioner and restricting the operation of the local controller.

[0007] The local controller has an input unit for inputting information restricting the manipulation of the local controller. The local controller may perform a plurality of operation settings of the air conditioner, and information restricting at least one of the plurality of operation settings may be inputted into the input unit. Further, the input unit may include a plurality of input keys for performing the plurality of operating settings of the air conditioner, and information restricting the inputting of operation setting information by at least one of the plurality of keys may be inputted into the input unit. The local controller may control a set value of one operating parameter within an operation setting range, and information for varying the operation setting range may be inputted into the input unit. At this time, at least one of the plurality of operation settings may be restricted by manipulating at least two of the plurality of input keys. However, the input unit includes a plurality of input keys for performing the plurality of operation settings of the air conditioner and a function key. At least one of the plurality of operation settings may be restricted by manipulating at least one of the plurality of input keys and the function key. At this time, the plurality of input keys performs independent operation settings of the air conditioner, and when one of the plurality of input keys is manipulated before and after the manipulation of the function key or during the manipulation thereof, the inputting of information by the one input key may be restricted. Furthermore, the local controller may include an operation manipulating unit for controlling the operation of the air conditioner; an authentication unit for performing user authentication; and a manipulation restriction unit for restricting the manipulation of the operation manipulating unit when the user authentication is confirmed.

[0008] In the air conditioning system in accordance with the present invention, the manipulation of the local controller may be restricted by the remote operation of the remote controller. Accordingly, it is possible to prevent a certain user from manipulating the operation settings of the air conditioner at his or her own will, thereby improving the operation characteristics of the air conditioner.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this application, illustrate embodiment(s) of the invention and together with the description serve to explain the principle of the invention. In the drawings:

FIG. 1. is a block diagram illustrating the construction of an air conditioning system in accordance with one embodiment of the present invention;

FIG. 2 is a schematic plane view of a local controller as shown in FIG. 1;

FIG. 3 is a block diagram of a local controller of an air conditioning system in accordance with another embodiment of the present invention;

FIG. 4 is a block diagram illustrating the construction of an air conditioning system in accordance with still another embodiment of the present invention;

FIG. 5 is a schematic plane view of a local controller of the air conditioning system in accordance with still another embodiment of the present invention;

FIG. 6 is a plane view showing a state in which some objects are deleted on the screen of a display unit of FIG. 5;

FIG. 7 is a schematic plane view of the air conditioning system in accordance with still another embodiment of the present invention; and

FIG. 8 is a block diagram of a remote controller of the air conditioning system in accordance with still another embodiment of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0010] FIG. 1 is a block diagram illustrating the construction of an air conditioning system 100 in accordance with one embodiment of the present invention. FIG. 2 is a schematic plane view of a local controller 110 as shown in FIG. 1.

[0011] Referring to FIG. 1, the air conditioning system 100 includes an air conditioner 140 and a local controller 110. The air conditioner 140 includes an indoor unit 130 disposed in an indoor space and an outdoor unit 120 disposed in an outdoor space. The indoor unit 130 and the outdoor unit 120 are communicatively connected to each other via a network 161. The air conditioner 140 includes one outdoor unit 120 and one indoor unit 130, but the present invention is not limited thereto. The air conditioner may include one outdoor unit and a plurality of indoor units, or may include a plurality of outdoor units and a plurality of indoor units.

[0012] Referring to FIG. 2, the local controller 110 controls the operation of the air conditioner 140, and includes an operation control unit (not shown), an input unit 150, and a display unit 170. The input unit 150 receives an input of user operation and manipulation information, and includes a plurality of input keys and function keys. A user enters operation settings of the air conditioner 140 by using the input keys. For example, the user can increase or decrease a set temperature by using a first input key 151 and a second input key 152, and can set a ventilation mode by using a third input key 153. Further, the user can change an air flow 154 by using a fourth input key 154. Further, the user can start or finish the operation of the air conditioner 140 by using a fifth key 157. The function keys are not used when operation settings are directly performed, but they are used when the setting of the local controller 110 is performed or operation settings are performed along with the input keys. For example, the user can access to a function setting mode by the first function key 155, and enter an input signal corresponding to up/down/left/right by the second function keys 156. The display unit 170 displays operation information of the air conditioner 140, and has an LCD panel structure. If the user enters operation information by the input keys and the function keys, an operation control unit (not shown) controls the air conditioner 140 so as to correspond to the operation information, and outputs a signal corresponding to the operation information to the display unit 170.

[0013] Information restricting the manipulation of the local controller 110 may be inputted into the input unit 150. The user can restrict at least one of a plurality of operation settings through the local controller 110 by entering a manipulate signal by the input unit 150. That is, by means of the manipulate signal entered by the user, the inputting of operation setting information by at least one of the input keys can be restricted. If the user sets to restrict the manipulation by the first input key 151 and the second input key 152, the user cannot enter a manipulate signal by the first input key 151 and the second input key 152, thereby making it impossible to decrease or increase a set temperature.

[0014] A method of restricting operation settings by the input keys and the function keys may be set in various ways. The user can restrict the setting of a specific operation by manipulating at least two of the plurality of input keys. For example, if the user presses the first input key 151 and the third input key 153 at the same time, and then presses the first input key 151 again, the manipulation by the first input key 151 may be restricted. However, any one of the input keys is manipulated before and after the manipulation of a specific function key or during the manipulation thereof, the inputting of information by the input key may be set to be restricted. At this time, it is possible to set such that the manipulation of the input key may be restricted in the manipulation of pressing a function key for a long time.

[0015] In the above, the operation of a specific input key is disabled, thus disabling the setting of a specific operation by the specific input key. However, it is possible to control such that the setting range of a specific parameter of the air conditioner 140 can be restricted within the operation setting range. A room temperature can be considered as a specific operation parameter of the air conditioner 140. If an operation setting range is inputted so as to be set to a lower limit temperature or an upper limit temperature, the user can start the air conditioner 140 only when the room temperature is lower than the lower limit temperature or higher than the upper limit temperature. That is, if the room temperature is within the range of a lower limit or an upper limit, it is impossible for the user to enter a manipulate signal by the fifth function key 157. Accordingly, the user can restrict unnecessary operation of the air conditioner 140 using the local controller 110 by performing the setting for changing the operation setting range.

[0016] Referring to FIG. 3, a block diagram of a local controller 210 of an air conditioning system in accordance with another embodiment of the present invention is shown. The local controller 210 includes an operation manipulating unit 255, an authentication unit 280, and a manipulation restriction unit 290. The operation manipulating unit 255 has a display unit 270, an operation control unit 256, and an input unit 250. The structures and operations of the display unit 270, operation control unit 256, and input unit 250 are similar to those of the display unit 170, operation control unit (not shown), and input unit 150, so a detailed description thereof will be omitted.

[0017] The difference between the local controller 210 and the local controller 110 described above of FIG. 1 is that a separate authentication procedure is required for setting restrictions on the manipulation of the local controller 210. The authentication unit 280 receives authentication information inputted from the input unit 250 and performs user authentication. If user authentication is confirmed, the manipulation restriction unit 290 receives

an input of information restricting the manipulation of the operation manipulating unit 255 again, and restricts the manipulation of the operation manipulating unit 255. However, the present invention is not limited thereto, and if user authentication is performed, the manipulation of the operation manipulating unit 255 may be restricted according to stored information. Details about restrictions on the manipulation of the operation manipulating unit 255 will be discussed with reference to the above description of the local controller.

[0018] Since the manipulation of the operation manipulating unit 255 is restricted only after a user performs authentication, there is an advantage that only a specific user can restrict the manipulation of the operation manipulating unit 255. At this time, various authentication information can be used as user authentication information, and a password can be used. However, the present invention is not limited thereto, and voice information, iris information, card key information and so on can be used.

[0019] FIG. 4 is a block diagram illustrating the construction of an air conditioning system 300 in accordance with still another embodiment of the present invention. Referring to FIG. 4, the air conditioning system 300 includes air conditioners 340, local controllers 310, and a remote controller 315. Each of the air conditioners 340 includes a plurality of indoor units 330 and an outdoor unit 320. However, the present invention is not limited thereto, but the construction of each air conditioner 340 can be various selected. Each air conditioner 340 may include a plurality of indoor units 330 and an plurality of outdoor units 320.

[0020] The indoor units 330 are disposed in indoor spaces, respectively, and the outdoor unit 320 is disposed in an outdoor space. In each air conditioner 340, the indoor units 330 and the outdoor unit 320 are communicatively connected to each other via a first network 361. Also, the outdoor units 320 are communicatively connected to each other via a second network 362. RS-485 communication is performed on the first network 361, and RS-485 communication is performed on the second network 362. However, the present invention is not limited to the above communication methods.

[0021] Each local controller 310 is disposed in each indoor space, and each local controller 310 controls the operation of the air conditioners 340 by wired or wireless communication with the indoor units 330 disposed in indoor spaces. The structure and operation of the local controller 310 are similar to those of the local controller 110 described above of FIG. 2, so a detailed description thereof will be omitted below.

[0022] The local controller 110 of FIG. 2 can set restrictions on manipulation by itself. However, the local controller 310 of FIG. 4 may have a structure in which restrictions on manipulation are set by itself or may have a structure in which restrictions on manipulation are not set by itself.

[0023] The remote controller 315 is communicatively connected to the air conditioners 340 via the second network 362, and controls the air conditioners 340 independently from the local controllers 310. In order to perform operation settings, the local controllers 310 include a plurality of input keys (not shown) similarly to the input unit 170 of the local controller 110 of FIG. 2. The remote controller 310 restricts the manipulation by at least one of the input keys, so that the user cannot make a specific setting by the local controllers.

[0024] The remote controller 315 can vary the setting range of a specific operation parameter of the air conditioners 340. Thus, the user is allowed to select a set value of the specific operation parameter only within the above setting range by the local controllers 310.

[0025] The remote controller 314 can set the operation range of a specific operation parameter of the air conditioners 340. Hence, only when the specific operation parameter of the air conditioners 340 is beyond the above operation range, the user can perform operation and manipulation on the specific operation parameter by the local controllers 310. Also, if a specific operation parameter of the air conditioners 340 is within the above operation range, the remote controller 315 may make impossible the operation and manipulation of the local controllers 310. In other words, if the temperature of a room where the air conditioner 340 is installed is between a set lower limit temperature and a set upper limit temperature, the local controllers 310 is unable to start the air conditioners 340. If the temperature of a room where the air conditioner 340 is installed is beyond a set lower limit temperature and a set upper limit temperature, the local controllers 310 is able to start the air conditioners 340. At this time, the remote controller 315 may set such that the manipulation of all of the local controllers 310 may be restricted, or such that the manipulation of some of the local controllers 310 may be restricted.

[0026] Although the local controllers 310 include input keys (not shown) having a physical structure, the input keys of the local controllers may have a touch panel structure. That is, rather than entering a manipulate signal by the user' s manipulation of pressing the physical input keys, a manipulate signal may be entered by the user' s manipulation of touching the input keys on the touch panel. The input keys are not mechanistic expression but a functional expression representing parts that the user can enter on the display unit 470. Referring to FIG. 5, the local controller 410 is shown. The local controller 410 includes a touch panel type display unit 470. The user generates an event by touching objects on the display unit 470. Here, the objects correspond to the input keys, respectively, and include a " cooling" object 451, a " heating" object 452, a " dehumidication" object 453, a "fan" object 454, and so forth. The screen of the display unit 470 is changeable, and thus the number of input keys of the local controller 410 is not limited.

[0027] In a case where the local controller 410 of FIG. 5 is applied to the air conditioning system 300 of FIG. 3, the remote controller 315 allows only the input keys permitted by the remote controller 315 among the plurality

of input keys (i.e., objects) of the local controller 410 to be displayed on the screen of the display unit 470. Also, the remote controller 315 can remove at least one of the input keys being displayed on the screen of the display unit 470. FIG. 6 illustrates a state in which a temperature up object 455 and a temperature down object 456 for setting a desired temperature are deleted from the screen of the display unit 470 of FIG. 5.

[0028] FIG. 7 is a schematic plane view of the air conditioning system 500 in accordance with still another embodiment of the present invention. Referring to FIG. 7, the air conditioning system 500 includes air conditioners 540, first local controllers 511, second local controllers 512, a first remote controller 515, and second remote controllers 517. Each of the air conditioners 540 includes a plurality of indoor units 530 and an outdoor unit 520. The indoor units 530 are disposed in indoor spaces, respectively, and the outdoor unit 520 is disposed in an outdoor space. In each air conditioner 540, the indoor units 530 and the outdoor unit 520 are communicatively connected to each other via a first network 561. Also, the outdoor units 520 are communicatively connected to each other via a second network 562. RS-485 communication is performed on the first network 561, and RS-485 communication is performed on the second network 562. However, the present invention is not limited to the above communication methods.

[0029] Each of the second remote controllers 517 controls the air conditioners 540 connected by the second network 562. The second remote controllers 517 perform communication with the first remote controller 515 by means of a branching means 565 and a third network 563. The branching means 565 may be a hub, and the third network 563 may be a local area network (LAN). The first remote controller 515 may control the air conditioners 540 independently, and may control the second remote controllers 517. The first local controllers 511 are respectively connected onto the second networks 562. Each of the first local controllers 511 controls the air conditioners 540 connected to the second remote controller 517. Further, the second local controllers 512 are disposed so as to correspond to the indoor units 530, respectively, and control the indoor units 530.

[0030] The first remote controller 515, the second remote controllers 517, the first local controllers 511, and the second local controllers 512 can independently control the operation of the air conditioners 540 that are communicatively connected respectively. The first remote controller 515 can restrict the operation and manipulation of the second remote controllers 517, the first local controllers 511, and the second local controllers 512. The second remote controllers 517 can restrict the operation and manipulation of the first local controllers 511 and the second local controllers 512 that are communicatively connected. Also, the first local controllers 511 can restrict the operation and manipulation of the second local controllers 512 that are communicatively connected. Details about restrictions on operation and manipulation will be described with reference to the foregoing embodiments.

[0031] Referring to FIG. 8, a block diagram of a remote controller 615 of the air conditioning system in accordance with still another embodiment of the present invention is shown. The construction of the air conditioning system is similar to the construction of the air conditioning system 300 of FIG. 4 except for the remote controller 615, so the following description will be made with respect to the differences with the air conditioning system 300 of FIG. 4.

[0032] The remote controller 615 includes an operation manipulating unit 655, an authentication unit 680, and a manipulation restriction unit 690. The difference between the remote controller 615 and the remote controller 315 described above of FIG. 4 is that a separate authentication procedure is required for setting restrictions on the manipulation of the local controller (not shown). The authentication unit 680 receives authentication information entered by the user and performs user authentication. If user authentication is confirmed, the manipulation restriction unit 690 receives an input of information restricting the manipulation of the operation manipulating unit 655 again, and restricts the manipulation of the operation manipulating unit 655. However, the present invention is not limited thereto, and if user authentication is performed, the manipulation of the operation manipulating unit 655 may be restricted according to stored information. At this time, various authentication information can be used as user authentication information, and a password can be used.

[0033] Although the present invention has been described with reference to the embodiments shown in the drawings, these are merely illustrative, and those skilled in the art will understand that various modifications and equivalent other embodiments of the present invention are possible. Consequently, the true technical protective scope of the present invention must be determined based on the technical spirit of the appended claims.

Claims

1. An air conditioning system (300) and (500), comprising:

   an air conditioner (110, 340), and (540);
   a local controller (110, 310, 410, 511, 512), and (517) for controlling the operation of the air conditioner; and
   a remote controller (315, 511), and (517) for remotely controlling the air conditioner and restricting the operation of the local controller.

2. The air conditioning system of claim 1, wherein the local controller performs a plurality of operation settings for control of the operation of the air conditioner, and
   the remote controller restricts at least one of the plu-

rality of operation settings.

3. The air conditioning system of claim 1, wherein the local controller includes an input unit (250) having a plurality of input keys (151, 152, 153, 154, 451, 452, 453, 454, 455), and (456) for control of the operation of the air conditioner, and
the remote controller restricts the manipulation by at least one of the plurality of input keys.

4. The air conditioning system of claim 1, wherein the local controller controls a set value of one operating parameter within an operation setting range, and
the remote controller varies the operation setting range.

5. The air conditioning system of claim 1, wherein the remote controller sets the operation range of an operation parameter of the air conditioner, and
If the operation parameter of the air conditioner is beyond the operation range, the local controller is able to perform manipulation for the operation parameter of the air conditioner.

6. The air conditioning system of claim 5, wherein the operation parameter is a temperature of a room where the air conditioner is installed and the operation range is between a lower limit range and an upper limit range, and
the local controller is able to start the air conditioner only when the room temperature is lower than the lower limit temperature or higher than the upper limit temperature.

7. The air conditioning system of claim 1, wherein the local controller includes a display unit (270) and (470) for displaying a plurality of input keys for control of the operation of the air conditioner, and
the local controller displays only the input keys permitted by the remote controller among the plurality of input keys on the screen of the display unit.

8. The air conditioning system of claim 1, wherein the local controller includes a display unit (270) and (470) for displaying a plurality of input keys for control of the operation of the air conditioner, and
the remote controller removes at least one of the input keys being displayed from the screen of the display unit.

9. The air conditioning system of claim 1, wherein the remote controller includes:

an operation manipulating unit (255) and (655) for remotely controlling the air conditioner;
an authentication unit (280) and (680) for performing user authentication; and
a manipulation restriction unit (290) and (690) for restricting the manipulation of the operation manipulating unit only when the user authentication is confirmed.

Fig. 1

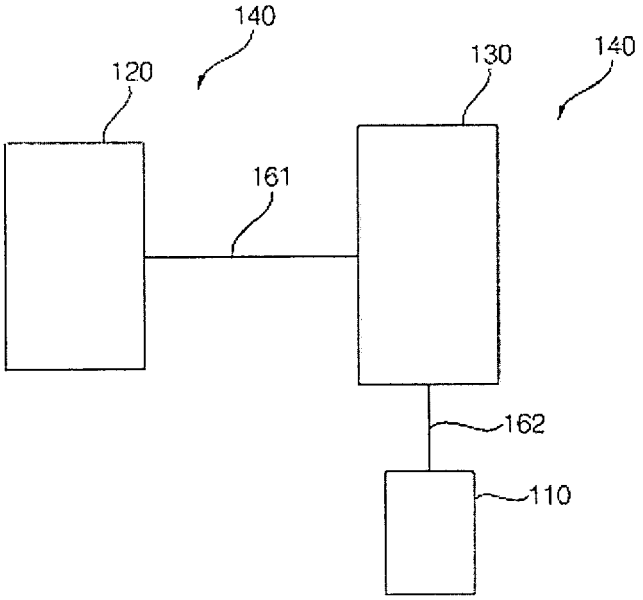
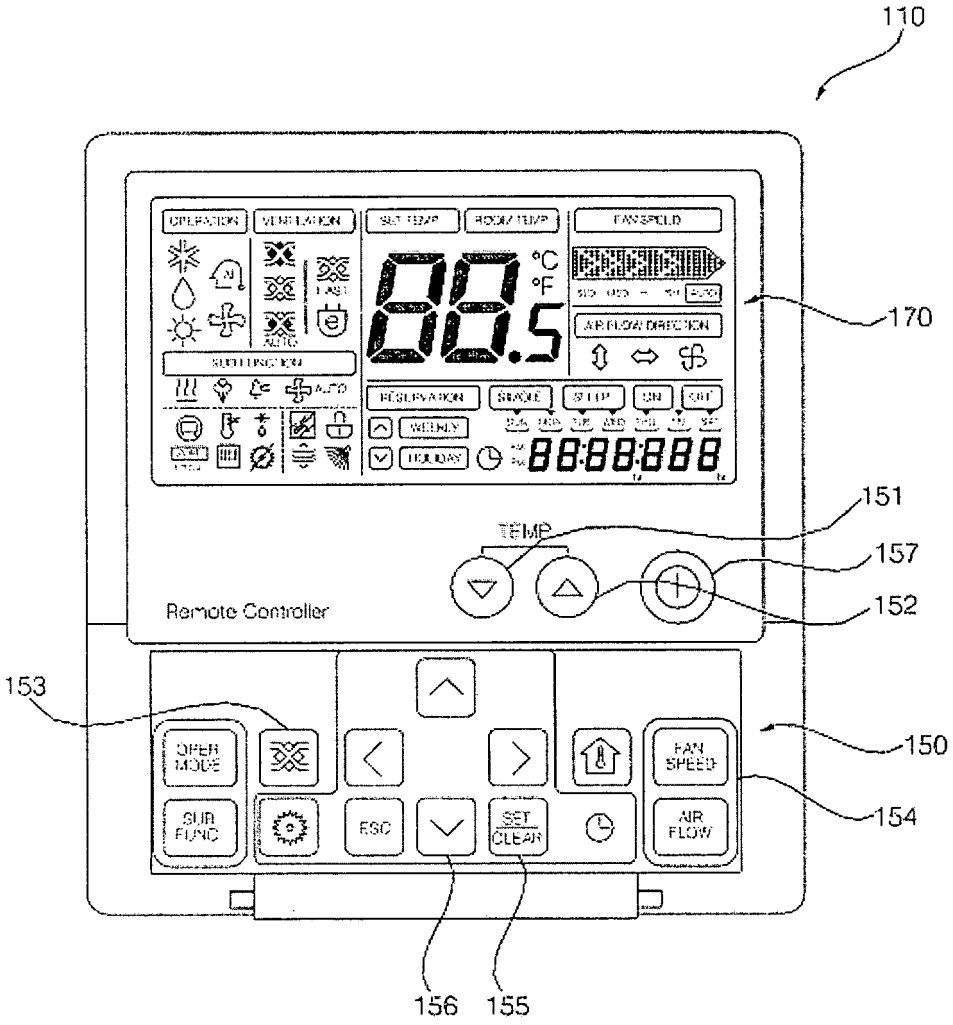


Fig. 2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170
151
157
152
153
150
154
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155
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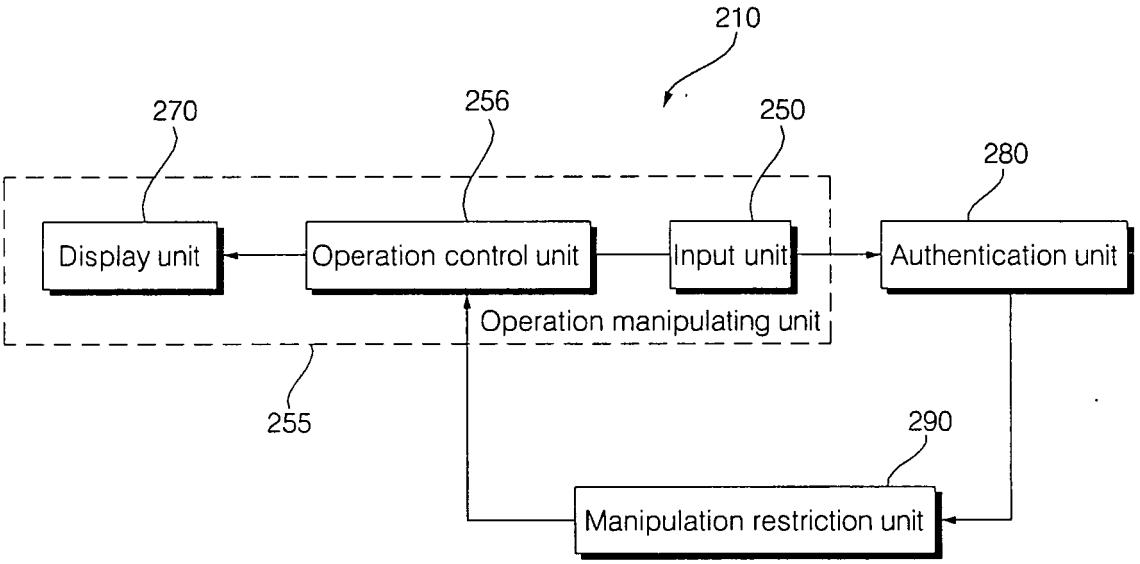
Remote Controller
OPER MODE
SUB FUNC
ESC
SET CLEAR
FAN SPEED
AIR FLOW

Fig. 3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280
Display unit
Operation control unit
Input unit
Authentication unit
Operation manipulating unit
255
290
Manipulation restriction unit

Fig. 4

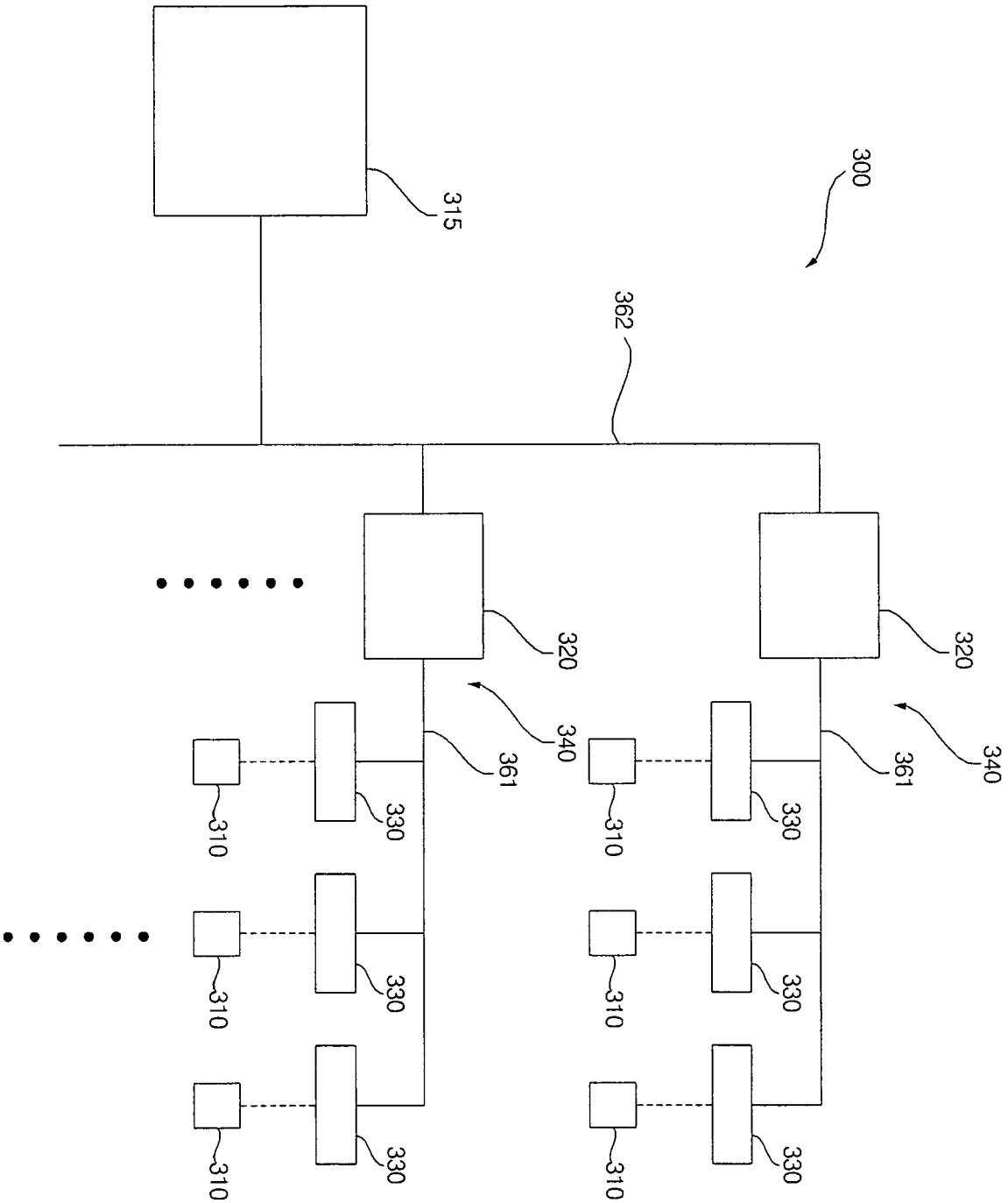
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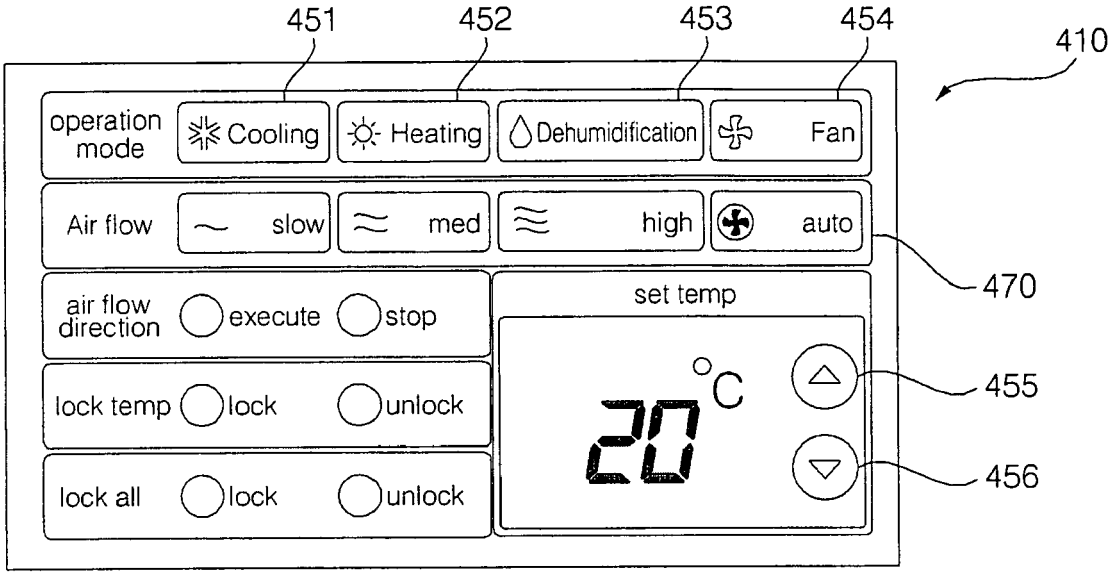
Fig. 5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lock all
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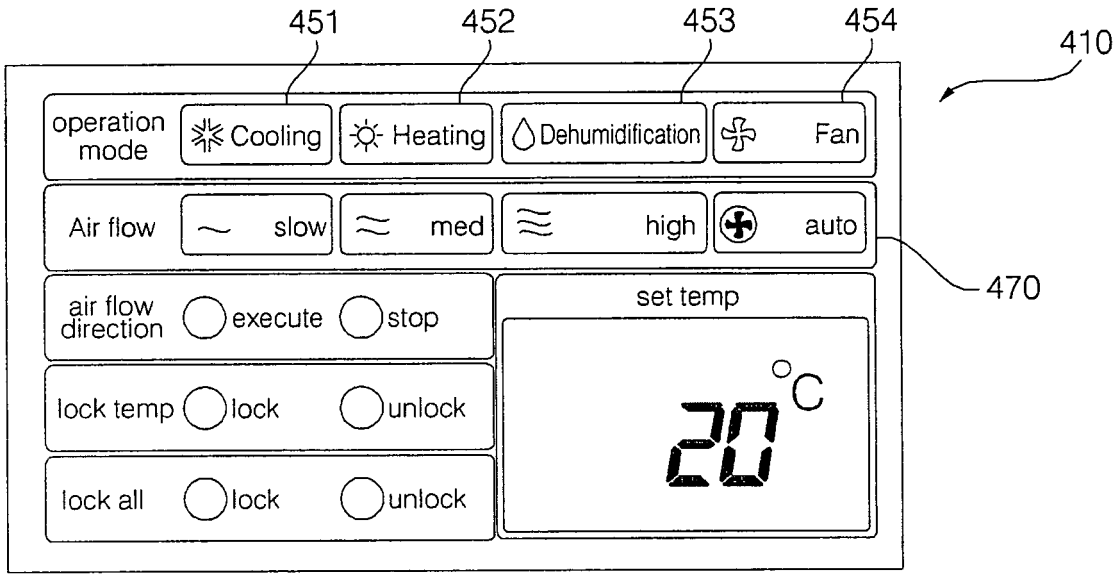
Fig. 6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lock
unlock
lock all
lock
unlock
°C
20

Fig. 7

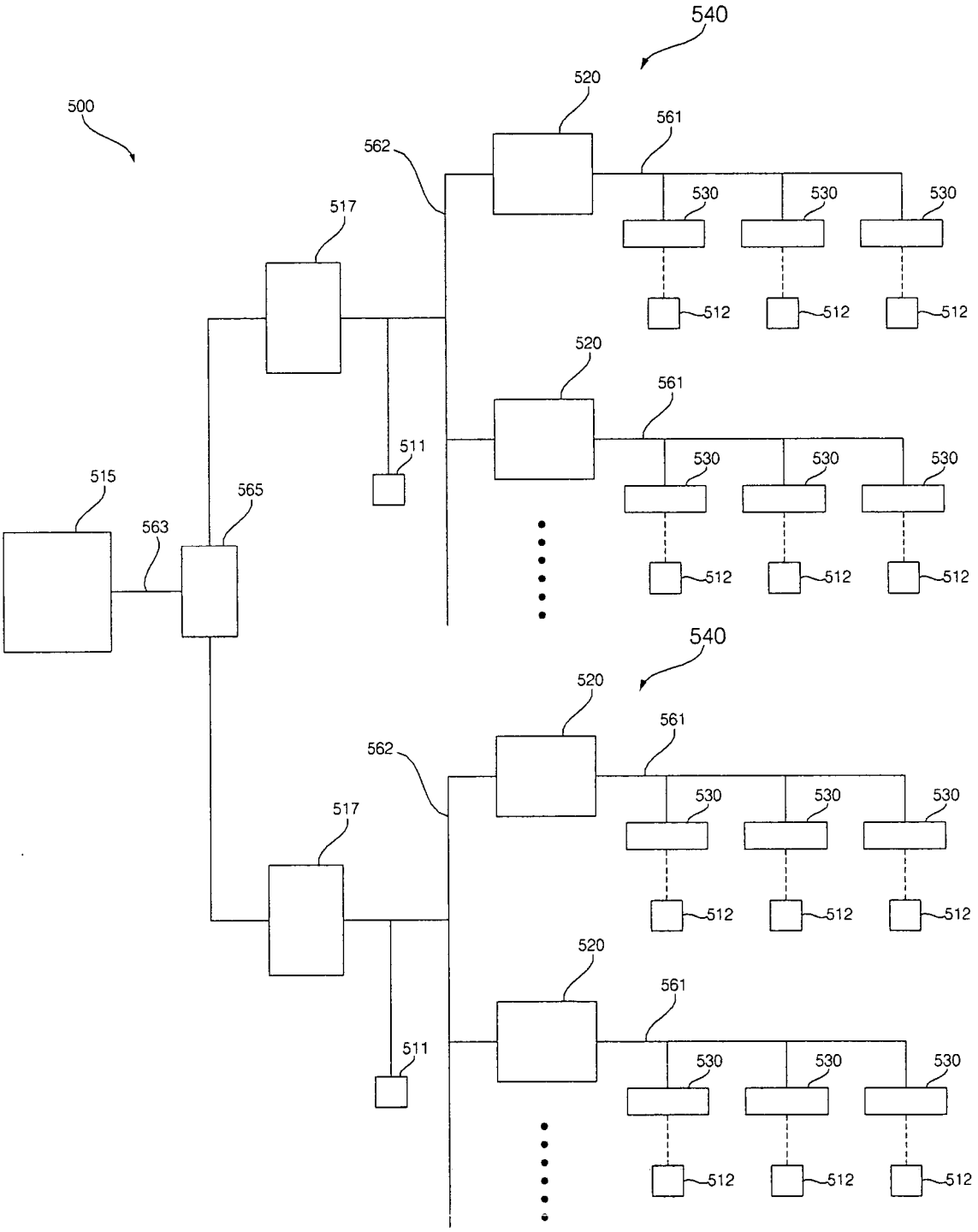
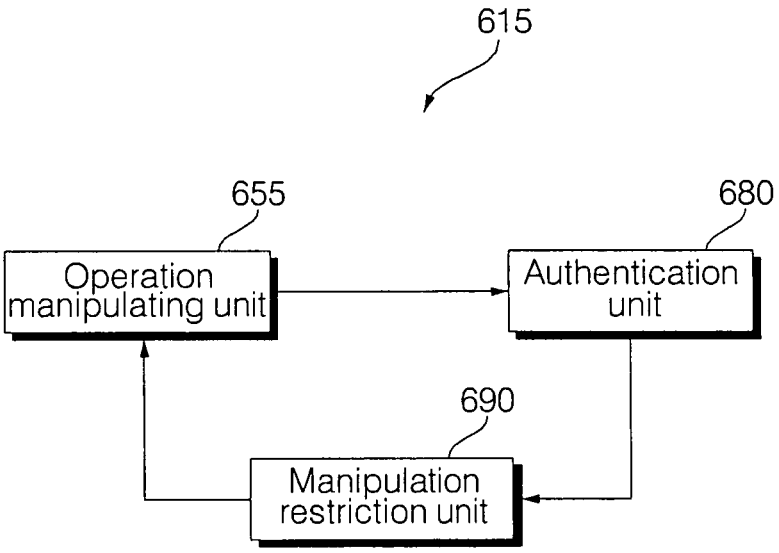


Fig. 8


615
655
680
Operation manipulating unit
Authentication unit
690
Manipulation restriction unit

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 08 25 1715

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y	US 5 682 949 A (RATCLIFFE EDWARD L [CA] ET AL) 4 November 1997 (1997-11-04) * columns 3-4 - column 6, lines 23-26; claim 1; figures 1,21b * * column 13, lines 29-53 * -----	1-6 7-9	INV. F24F11/00
Y	US 7 028 912 B1 (ROSEN HOWARD [CA]) 18 April 2006 (2006-04-18) * columns 1-3 - paragraphs; figures 1,8-24 * -----	7,8	
Y	EP 1 327 832 A (DAIKIN IND LTD [JP]) 16 July 2003 (2003-07-16) * columns 1-2; claims 1-17; figures 1,2 * -----	9	
A	US 5 279 458 A (DEWOLF THOMAS L [US] ET AL) 18 January 1994 (1994-01-18) * abstract; claims 1-3; figure 1 * -----	1-9	
			TECHNICAL FIELDS SEARCHED (IPC) F24F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	18 December 2008	Decking, Oliver

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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L : document cited for other reasons

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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 08 25 1715

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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18-12-2008

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82