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(54) **OPERATION PANEL OF ELEVATOR CAR AND OPERATION METHOD THEREOF**

(57) The present invention relates to an operation panel for an elevator car having at least two car doors, the operation panel includes: a numeric keypad for entering a destination floor number; at least two confirmation buttons respectively corresponding to the at least two car doors, and the confirmation buttons are configured to confirm the entered destination floor number and the car door to be opened after being pressed, so that: by only entering the destination floor number via the numeric keypad, the elevator car does not start; after entering the destination floor number via the numeric keypad and pressing one of the at least two confirmation buttons, the elevator car starts to reach the destination floor, and opens the car door corresponding to the confirmation button.

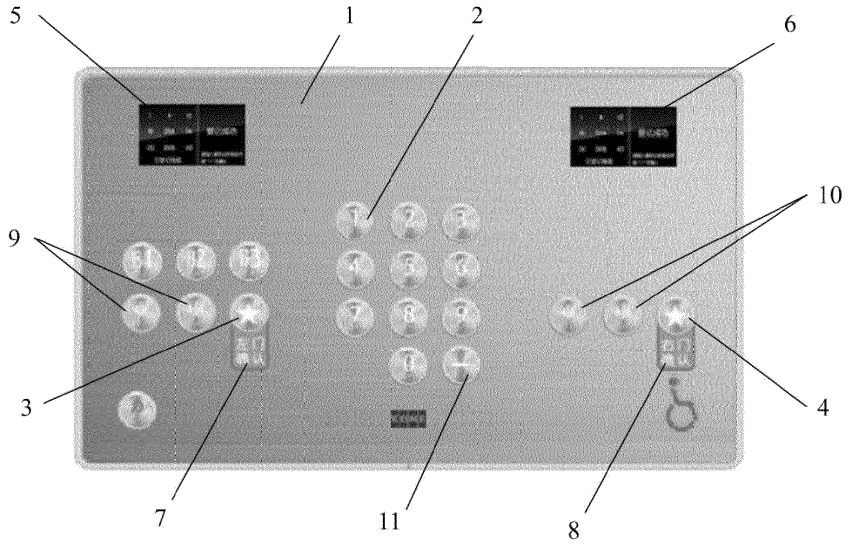

FIG. 1

EP 3 889 089 A1

Description

Technical field

[0001] The present invention relates to an operation panel for an elevator car having at least two car doors and an operation method thereof, an elevator control system including the operation panel and an elevator including the elevator control system.

Background

[0002] The elevator car is usually provided with an operation panel, which includes a floor button for passengers to register the destination floor and a door opening and closing button for passengers to open and close the elevator door. In some applications, an elevator car includes more than one car door, such as two car doors, to provide different access areas on the same floor. For safety reasons, elevator cars usually only open one of a plurality of car doors.

[0003] For this application, there is a need for an operation panel, which can register which car door of the plurality of car doors is to be opened while registering floors, and prevent more than two car doors from being opened at the same time. Furthermore, there is a need for an elevator control system including the operation panel and an elevator including the elevator control system.

Summary

[0004] An object of the present invention is to provide an operation panel for an elevator car having at least two car doors. According to the operation panel, destination floor information and car door opening information are registered through at least two confirmation buttons respectively corresponding to the at least two car doors, thereby providing a cost-effective and simple operation panel for an elevator car with at least two car doors. In addition, with only one decimal numeric keypad, passengers can input any desired floor number, and the operation panel can be relatively cheap and save panel space to expand other functions, for example, a card reader can be further installed.

[0005] An embodiment of the present invention provides an operation panel for an elevator car having at least two car doors, the operation panel includes: a numeric keypad for entering a destination floor number; at least two confirmation buttons respectively corresponding to the at least two car doors, and the confirmation buttons are configured to confirm the entered destination floor number and the car door to be opened after being pressed, so that: by only entering the destination floor number via the numeric keypad, the elevator car does not start; after entering the destination floor number via the numeric keypad and pressing one of the at least two confirmation buttons, the elevator car starts to reach the destination floor, and opens the car door corresponding to the confirmation button.

[0006] In some examples, the operation panel is configured to store a plurality of confirmed destination floor numbers, in order to start the elevator car to reach the plurality of destination floors in sequence, and then open the car doors corresponding to the pressed confirmation button each time.

[0007] In some examples, the operation panel further includes: a display showing the entered destination floor numbers and the confirmed destination floor numbers.

[0008] In some examples, the display displays an operation tips prompting the passenger to press one of the at least two confirmation buttons to confirm the destination floor when the destination floor number has been entered but the confirmation button has not been pressed.

[0009] In some examples, the operation panel further includes: a modification button configured to cancel or re-enter the destination floor number after being pressed.

[0010] In some examples, the operation panel further includes: at least two labels provided around the at least two confirmation buttons to indicate which of the at least two car doors each of the at least two confirmation buttons corresponds to.

[0011] In some examples, the numeric keypad is a decimal numeric keypad.

[0012] In some examples, the operation panel further includes: a card reader for reading an electronic card storing passenger identification information, access floor information, and/or car door opening information.

[0013] An embodiment of the present invention provides an elevator control system, including a control box and the operation panel described above, and the control box is configured to receive instructions input from the operation panel to control the elevator car.

[0014] An embodiment of the present invention provides an elevator, including an elevator car having at least two car doors and the elevator control system described above.

[0015] An embodiment of the present invention provides an operating method for an operation panel of an elevator car having at least two car doors, the method including: entering a destination floor number via a numeric keypad; pressing one of at least two confirmation buttons to start the elevator car to reach the destination floor, and open the car door corresponding to the confirmation button, wherein the at least two confirmation buttons respectively correspond to the at least two car doors.

[0016] In some examples, the method further includes: entering a plurality of destination floor numbers via the numeric keypad; after the destination floor number being entered each time, pressing one of the at least two confirmation buttons, in order to start the elevator car to reach the plurality of destination floors in sequence, and then open the car doors corresponding to the pressed confirmation button each time.

[0017] In some examples, the method further includes:

showing the entered destination floor numbers and the confirmed destination floor numbers by a display.

[0018] In some examples, the method further includes: displaying on a screen of the display operation tips prompting the passenger to press one of the at least two confirmation buttons to confirm the destination floor when the destination floor number has been entered but the confirmation button has not been pressed.

[0019] In some examples, the method further includes: pressing a modification button to cancel or re-enter the destination floor number.

[0020] In some examples, the method further includes: reading an electronic card storing passenger identification information, access floor information, and/or car door opening information via a card reader.

[0021] The beneficial technical effects of the technical solution of the present invention are: the operation panel registers the destination floor information and car door opening information by at least two confirmation buttons respectively corresponding to the at least two car doors, prevents a plurality of car doors from opening at the same time, and the destination floor is input by only one numeric keypad, thus the operation panel having low manufacturing cost, simple operation and saving panel space.

Brief description of the drawings

[0022] In order to explain the technical solutions of the embodiments of the present invention more clearly, a brief description about the drawings of the embodiments will be given below. Obviously, the drawings described below merely concern some of the embodiments of the present invention, rather than limitation to the present invention.

FIG. 1 illustrates a front view of an operation panel according to an embodiment of the present disclosure;

FIG. 2 illustrates a plan view of an elevator car having at least two car doors according to an embodiment of the present disclosure;

FIG. 3 illustrates a schematic diagram that a display displays operation tips when the confirmation button has not been pressed;

FIG. 4 illustrates a schematic diagram that a display displays operation tips of another embodiment when the confirmation button has not been pressed;

FIG. 5 illustrates a front view of an operation panel according to another embodiment of the present disclosure;

FIG. 6 illustrates a schematic diagram of an elevator control system according to an embodiment of the present disclosure; and

FIGS. 7A-7C illustrate schematic diagrams of a display under different floor registration conditions.

List of reference numerals

[0023]

1,1'	Operation panel
2	Numeric keypad
3	First confirmation button
4	Second confirmation button
5	First display
6	Second display
7	First label
8	Second label
9	First group of door opening and closing buttons
10	Second group of door opening and closing buttons
11	Modification button
12	Card reader
13	Control box

Detailed description

[0024] In order to make objects, technical details and advantages of the embodiments of the present disclosure apparent, the technical solutions of the embodiment will be described in a clearly and fully understandable way in connection with the drawings related to the embodiments of the present disclosure. It should be noted that the described embodiments are just a part but not all of the embodiments of the present disclosure. Based on the described embodiments herein, those skilled in the art can obtain other embodiment(s), without any inventive work, which should be within the scope of the present disclosure.

[0025] Unless otherwise defined, all the technical and scientific terms used herein have the same meanings as commonly understood by one of ordinary skill in the art to which the present disclosure belongs. The terms "first," "second," etc., which are used in the description and the claims of the present application for disclosure, are not intended to indicate any sequence, amount or importance, but distinguish various components. Similarly, similar words such as "a", "an" or "the" do not indicate the limitation of quantity, but indicate the existence of at least one. The terms "comprise," "comprising," "include," "including," etc., are intended to specify that the elements or the objects stated before these terms encompass the elements or the objects and equivalents thereof listed after these terms, but do not preclude the other elements or objects. The phrases "connect", "connected", etc., are not intended to define a physical connection or mechanical connection, but may include an electrical connection, directly or indirectly. "Upper", "lower", "left", "right", etc. are only used to indicate the relative positional relationship, and when the absolute position of the object to be described is changed, the relative positional relationship may also change accordingly.

[0026] The operation panel according to the present disclosure will be described in detail with reference to the

accompanying drawings hereafter.

[0027] FIG. 1 illustrates a front view of an operation panel according to an embodiment of the present disclosure, FIG. 2 illustrates a plan view of an elevator car having at least two car doors according to an embodiment of the present disclosure. The operation panel 1 according to the embodiment of the present disclosure is used for an elevator car having at least two car doors, and the operation panel 1 includes:

a numeric keypad 2 for entering a destination floor number;

at least two confirmation buttons respectively corresponding to the at least two car doors, and the confirmation buttons are configured to confirm the entered destination floor number and the car door to be opened after being pressed, so that:

by only entering the destination floor number via the numeric keypad 2, the elevator car does not start;

after entering the destination floor number via the numeric keypad 2 and pressing one of the at least two confirmation buttons, the elevator car starts to reach the destination floor, and opens the car door corresponding to the confirmation button.

[0028] For example, as illustrated in FIG. 2, an elevator car includes two car doors, i.e., a left car door and a right car door, which are respectively arranged on side A and side C of the elevator car for passengers to enter and exit. The operation panel 1 according to an embodiment of the present disclosure can be arranged on the side B, the side D1 or the side D2. The present invention is not limited to this, and different numbers of car doors can be selected according to actual application, and adaptively, the operation panel 1 includes confirmation buttons with the same number as the car doors or corresponding to the number of car doors.

[0029] The operation panel 1 of the embodiment of the present disclosure will be described by taking an elevator car with two car doors as an example hereafter.

[0030] As illustrated in FIG. 1, the operation panel 1 includes a numeric keypad 2, a first confirmation button 3 and a second confirmation button 4. The first confirmation button 3 corresponds to the left car door, and the second confirmation button 4 corresponds to the right car door. Therefore, by only entering the destination floor number via the numeric keypad 2, the elevator car does not start. And after entering the destination floor number via the numeric keypad 2 and pressing one of the first confirmation button 3 and the second confirmation button 4, the elevator car starts and reaches the destination floor, and the car door corresponding to the confirmation button is opened. For example, after entering the destination floor number via the numeric keypad 2 and pressing the first confirmation button 3, the elevator car starts and reaches the destination floor, and then opens the left car door. Similarly, after entering the destination floor number via the numeric keypad 2 and pressing the second confirmation button 4, the elevator car starts and reaches the destination floor, and then open the right car door.

[0031] Optionally, the first confirmation button 3 and the second confirmation button 4 can both be patterned buttons, such as the "☆" button illustrated in FIG. 1.

[0032] Optionally, as illustrated in FIG. 1, the operation panel 1 can also include a first group of door opening and closing buttons 9 and a second group of door opening and closing buttons 10, each of which includes a door opening button and a door closing button for opening or closing the car door.

[0033] Optionally, the operation panel 1 is configured to store a plurality of confirmed destination floor numbers, so as to start the elevator car to reach a plurality of destination floors in turn, and open the car door corresponding to the confirmation button pressed each time.

[0034] For example, when passengers entering the elevator wish to reach a plurality of destination floors, they can input the confirmed destination floor numbers in the above manner, that is, input the destination floor numbers via the numeric keypad 2 and press one of the first confirmation button 3 and the second confirmation button 4. The operation panel 1 is configured to store a plurality of confirmed destination floor numbers, and sequentially arrive at a plurality of destination floors according to the order of destination floor numbers from small to large (when the elevator runs upward) or from large to small (when the elevator runs downward), and then open the car doors corresponding to the confirmation buttons pressed each time. For example, passengers enter the 2nd floor and press the first confirmation button 3, enter the 16th floor and press the second confirmation button 4, then the elevator starts and reaches the 2nd floor first, and then opens the left car door. After that, the elevator closes the left car door, continues to run up to the 16th floor, and then opens the right car door.

[0035] For example, the operation panel 1 can also include displays 5 and 6, the displays 5 and 6 display the input destination floor numbers and the confirmed destination floor numbers. Specifically, the operation panel 1 can include a first display 5 and a second display 6, which are respectively used to display information related to the left car door floor number and information related to the right car door floor number.

[0036] FIG. 3 illustrates a schematic diagram that a display displays operation tips when the confirmation button has not been pressed. Further, when the destination floor number has been input but the confirmation button has not been pressed, the display displays operation tips, and the operation tips prompt passengers to press one of the at least two confirmation buttons to confirm the destination floor.

[0037] For example, as illustrated in FIG. 3, the registered floor is displayed on the left side of the screen of

the display. The term "registration" means input or entry, and the registered floor can be understood as the input and confirmed floor. Operation tips are displayed on the right side of the screen of the display, prompting passengers to press OK after registering the floor, that is, enter the floor to be reached and press the "☆" button (i.e. confirmation button) to confirm.

[0038] FIG. 4 illustrates a schematic diagram that a display displays operation tips of another embodiment when the confirmation button has not been pressed. Optionally, as illustrated in FIG. 1, the operation panel 1 can further include a modification button 11, the modification button 11 is configured to cancel or re-enter the destination floor number after being pressed. Optionally, the modification button 11 can be a patterned button, such as the "-" button illustrated in FIG. 1.

[0039] As illustrated in FIG. 4, registered floors (for example, the 24th floor is registered) are displayed on the left side of the screen of the display, and operation tips are displayed on the right side of the screen of the display, prompting passengers to press the "☆" button (i.e. confirmation button) to confirm or press the "-" button (i.e. modification button) to cancel (minus sign) or re-enter (correct) the destination floor number.

[0040] Optionally, the operation panel 1 can also include at least two labels arranged around the at least two confirmation buttons to indicate each of the at least two confirmation buttons corresponding to which of the at least two car doors.

[0041] For example, as illustrated in FIG. 1, the operation panel 1 includes a first label 7 and a second label 8, the first label 7 is arranged below the first confirmation button 3 and marked with a prompt word of "left door confirmation", and the second label 8 is arranged below the second confirmation button 4 and marked with a prompt word of "right door confirmation". The present invention is not limited to this, and the person skilled in the art can also set labels at other nearby positions of the confirmation button, or the labels can have other prompt words, as long as they play the role of indicating the car door corresponding to the confirmation button.

[0042] For example, as illustrated in FIG. 1, the numeric keypad 2 can be a decimal numeric keypad. This kind of keypad usually includes at least ten keys or buttons, such as numeric buttons from 0 to 9. With this decimal keypad, any desired floor number can be input into the operation panel 1. In addition, in this embodiment, only one decimal numeric keypad can correspond to at least two confirmation buttons, because the confirmation buttons can not only confirm the input floor numbers, but also confirm which car door to open. Therefore, compared with the traditional operation panel with a set of numeric keypads corresponding to one confirmation button, the operation panel provided by the present invention can be relatively cheap and space saving.

[0043] FIG. 5 illustrates a front view of an operation panel according to another embodiment of the present disclosure. Hereinafter, only the differences between this embodiment and the previous embodiments will be described. For example, an operation panel 1' according to another embodiment of the present disclosure further includes a card reader 12, the card reader is used to read electronic cards stored with passenger identity information, floor access information and/or car door opening information. In some examples, passengers can swipe their cards directly on the card reader 12, and the card reader 12 reads corresponding information for subsequent operations. For example, passenger information, floor access information and/or car door opening information is confirmed. Further, the passenger's electronic card can carry the floor access information and car door opening information, and the elevator can run automatically only by swiping the card through the card reader 12 without inputting the floor number and pressing the confirmation button.

[0044] FIG. 6 illustrates a schematic diagram of an elevator control system according to an embodiment of the present disclosure. The embodiment of the present disclosure further provides an elevator control system, which includes a control box 13 and the operation panel 1 or 1' as described above, and the control box 13 is configured to receive instructions input from the operation panel 1 or 1' to control the elevator car. As illustrated in FIG. 6, the operation panel 1 or 1' is connected to the control box 13 by cables so as to send and/or receive instructions from the control box 13.

[0045] Embodiments of the present disclosure further provide an elevator, the elevator includes an elevator car having at least two car doors and the elevator control system as described above.

[0046] In addition, the embodiment of the disclosure further provides an operation method for an operation panel of an elevator car with at least two car doors, which includes the following steps:

entering a destination floor number via a numeric keypad;

pressing one of at least two confirmation buttons to start the elevator car to reach the destination floor, and open the car door corresponding to the confirmation button, wherein the at least two confirmation buttons respectively correspond to the at least two car doors.

[0047] For example, the method further includes:

entering a plurality of destination floor numbers via the numeric keypad;

after the destination floor number being entered each time, pressing one of the at least two confirmation buttons, in order to start the elevator car to reach the plurality of destination floors in sequence, and open the car doors corresponding to the pressed confirmation button each time.

[0048] For example, the method further includes:

showing the entered destination floor numbers and the confirmed destination floor numbers by a display.

[0049] For example, the method further includes: displaying on a screen of the display operation tips prompting the passenger to press one of the at least two confirmation buttons to confirm the destination floor when the destination floor number has been entered but the confirmation button has not been pressed.

[0050] For example, the method further includes: pressing a modification button to cancel or re-enter the destination floor number.

[0051] For example, the method further includes: reading an electronic card storing passenger identification information, access floor information, and/or car door opening information via a card reader.

[0052] FIGS. 7A-7C illustrate schematic diagrams of a display under different floor registration conditions. In a first case, FIG. 7A illustrates an example of the screen of the display when registration is successful. It can be seen from FIG. 7A that the registered floors are floors 1, 8, 12, 18, 20A, 24, 26, 36B and 40 at this time. When the passenger enters the destination floor number (excluding the above-mentioned registered floors) via the numeric keypad and presses one of the at least two confirmation buttons, the right side of the screen displays "registration is successful".

[0053] In a second case, FIG. 7B illustrates an example of the screen of the display when floors are registered. At this time, the registered floors are floors 1, 8, 12, 18, 20A, 24, 26, 36B and 40. When the destination floor number entered by passengers via the numeric keypad and confirmed by the confirmation button is included in the above registered floor numbers, "this floor has been registered" is displayed on the right side of the screen.

[0054] In a third case, FIG. 7C illustrates an example of the screen of the display when the floor is unavailable. When the destination floor number entered by the passenger via the numeric keypad and confirmed by the confirmation button is that the elevator cannot reach or exceed the elevator running floor range, "this floor is unavailable" is displayed on the right side of the screen, and the passenger cannot register the floor.

[0055] To sum up, the embodiments of the present invention provide an operation panel for an elevator car having at least two car doors. According to the operation panel, destination floor information and car door opening information are registered through at least two confirmation buttons respectively corresponding to the at least two car doors, thereby providing an operation panel which is cost-effective and simple to operate and prevents a plurality of car doors from opening at the same time for elevator car applications with at least two car doors. In addition, with only one decimal numeric keypad, passengers can input any desired floor number, and the operation panel can be relatively cheap and save panel space to expand other functions, for example, a card reader can be further installed. In addition, the embodiments of the invention further provide an operation method of the operation panel, an elevator control system including the operation panel and an elevator including the elevator control system.

[0056] What have been described above are only specific implementations of the present disclosure, the protection scope of the present disclosure is not limited thereto. Any changes, substitutions or combinations easily occur to those skilled in the art within the technical scope or the principle of the present disclosure should be covered in the protection scope of the present disclosure.

Claims

1. An operation panel for an elevator car having at least two car doors, the operation panel comprising:

   a numeric keypad for entering a destination floor number;
   at least two confirmation buttons respectively corresponding to the at least two car doors, and the confirmation buttons are configured to confirm the entered destination floor number and the car door to be opened after being pressed, so that:

   by only entering the destination floor number via the numeric keypad, the elevator car does not start;
   after entering the destination floor number via the numeric keypad and pressing one of the at least two confirmation buttons, the elevator car starts to reach the destination floor, and opens the car door corresponding to the confirmation button.

2. The operation panel according to claim 1, wherein the operation panel is configured to store a plurality of confirmed destination floor numbers, in order to start the elevator car to reach the plurality of destination floors in sequence, and then open the car doors corresponding to the pressed confirmation button each time.

3. The operation panel according to claim 2, further comprising: a display showing the entered destination floor numbers and the confirmed destination floor numbers.

4. The operation panel according to claim 3, wherein the display displays operation tips prompting the passenger to press one of the at least two confirmation buttons to confirm the destination floor when the destination floor number has been entered but the confirmation button has not been pressed.

5. The operation panel according to claim 1, further

comprising:
a modification button configured to cancel or re-enter the destination floor number after being pressed.

6. The operation panel according to claim 1, further comprising:
at least two labels provided around the at least two confirmation buttons to indicate which of the at least two car doors each of the at least two confirmation buttons corresponds to.

7. The operation panel according to claim 1, wherein the numeric keypad is a decimal numeric keypad.

8. The operation panel according to any of claims 1 to 7, further comprising:
a card reader for reading an electronic card storing passenger identification information, access floor information, and/or car door opening information.

9. An elevator control system, comprising a control box and the operation panel according to any one of claims 1 to 8, and the control box being configured to receive instructions input from the operation panel to control the elevator car.

10. An elevator, comprising an elevator car having at least two car doors and the elevator control system according to claim 9.

11. An operating method for an operation panel of an elevator car having at least two car doors, the method comprising:

entering a destination floor number via a numeric keypad;
pressing one of at least two confirmation buttons to start the elevator car to reach the destination floor, and open the car door corresponding to the confirmation button, wherein the at least two confirmation buttons respectively correspond to the at least two car doors.

12. The method according to claim 11, further comprising:

entering a plurality of destination floor numbers via the numeric keypad;
after the destination floor number being entered each time, pressing one of the at least two confirmation buttons, in order to start the elevator car to reach the plurality of destination floors in sequence, and then open the car doors corresponding to the pressed confirmation button each time.

13. The method according to claim 11 or 12, further comprising:
showing the entered destination floor numbers and the confirmed destination floor numbers by a display.

14. The method according to claim 13, further comprising:
displaying on a screen of the display operation tips prompting the passenger to press one of the at least two confirmation buttons to confirm the destination floor when the destination floor number has been entered but the confirmation button has not been pressed.

15. The method according to claim 11, further comprising:
pressing a modification button to cancel or re-enter the destination floor number.

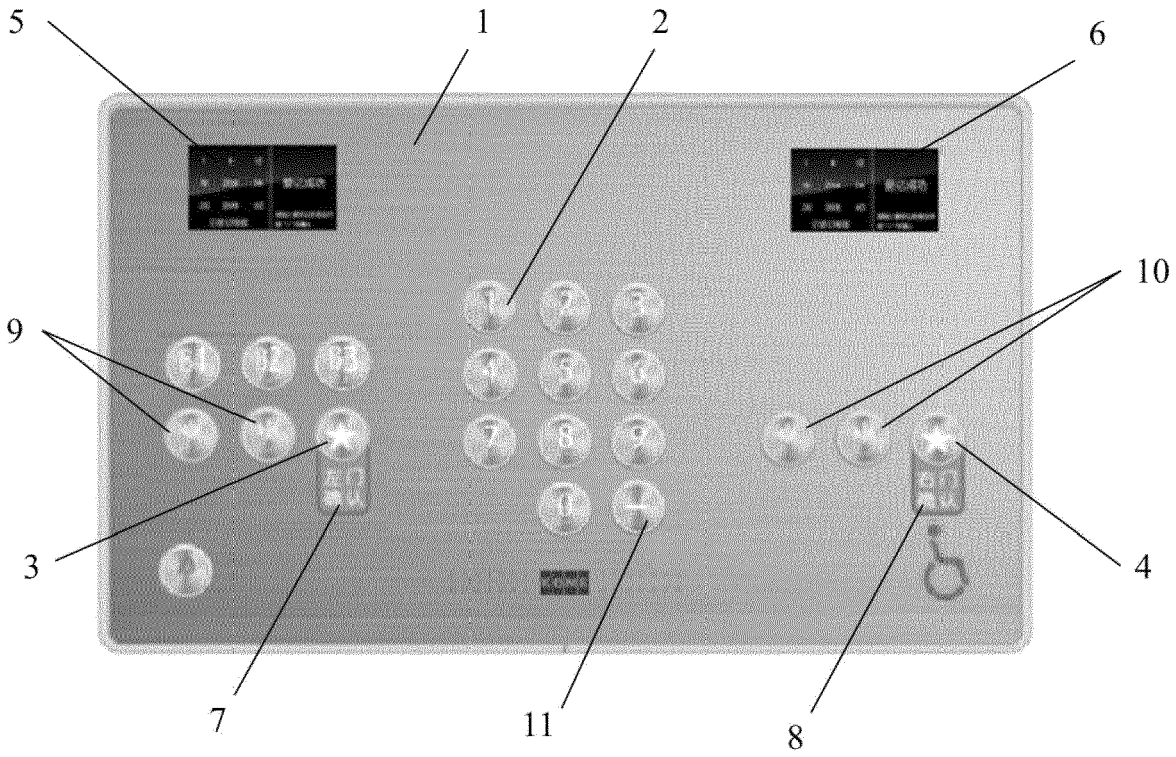

FIG. 1

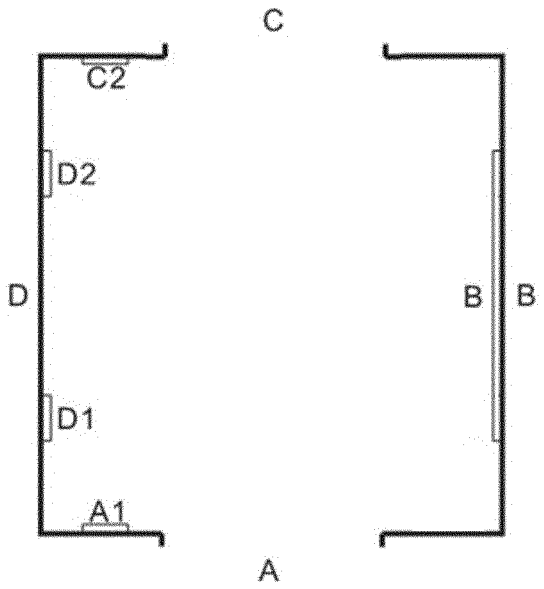

FIG. 2

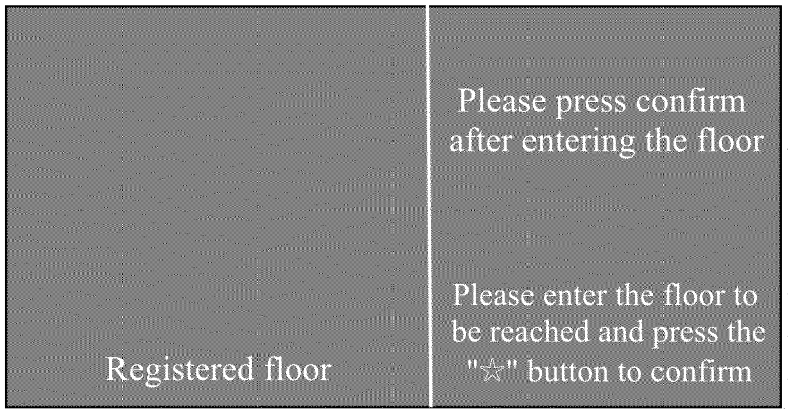
Please press confirm after entering the floor
Please enter the floor to be reached and press the "☆" button to confirm
Registered floor

FIG. 3

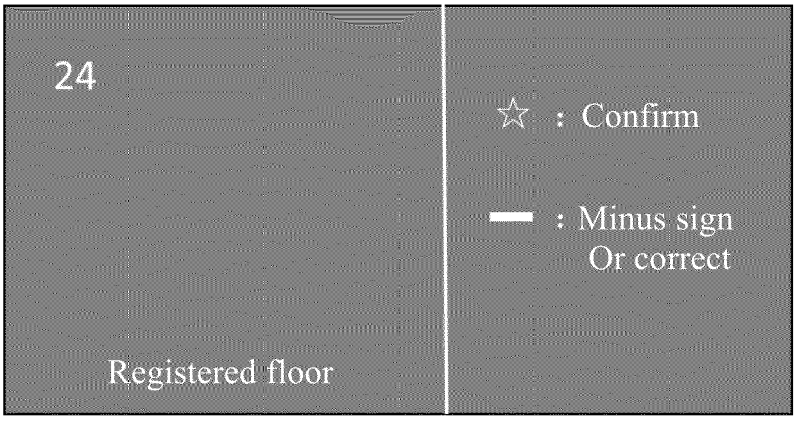
24
☆ : Confirm
: Minus sign
Or correct
Registered floor

FIG. 4

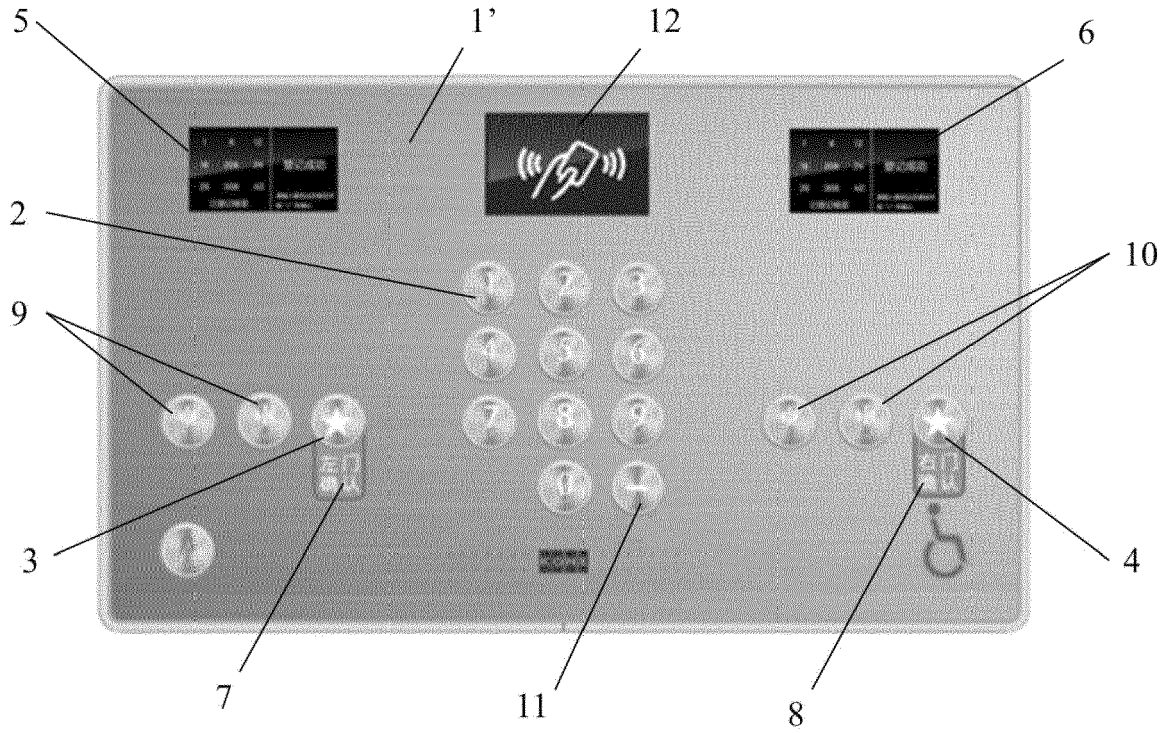

FIG. 5

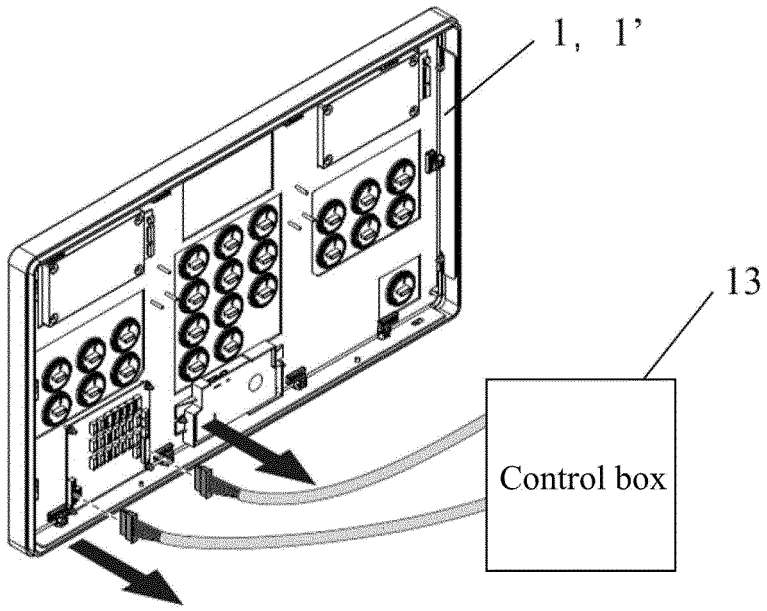

FIG. 6

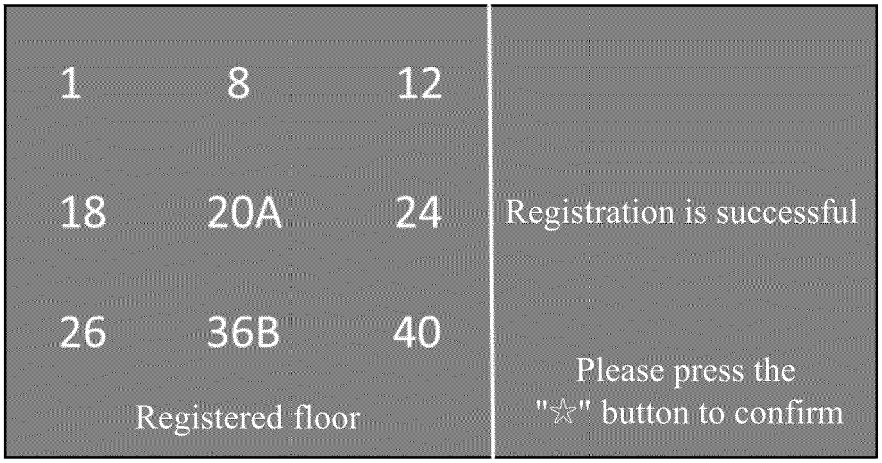
1
8
12
18
20A
24
26
36B
40
Registered floor
Registration is successful
Please press the
"☆" button to confirm

FIG. 7A

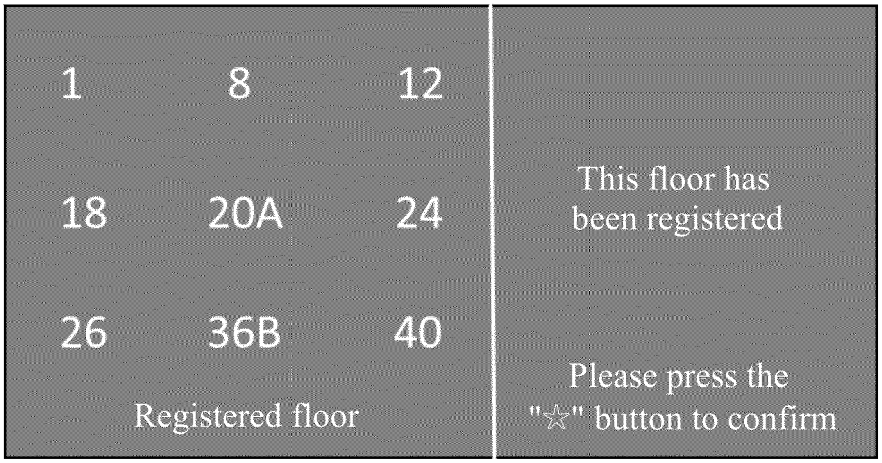
1
8
12
18
20A
24
26
36B
40
Registered floor
This floor has
been registered
Please press the
"☆" button to confirm

FIG. 7B

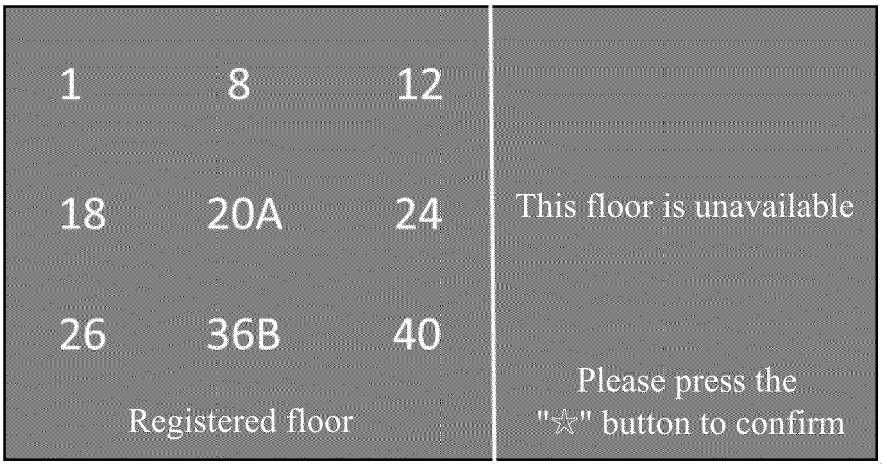
1
8
12
18
20A
24
26
36B
40
Registered floor
This floor is unavailable
Please press the
"☆" button to confirm

FIG. 7C

Europäisches Patentamt
European Patent Office
Office européen des brevets

EUROPEAN SEARCH REPORT

Application Number
EP 21 16 6209

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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Place of search	Date of completion of the search	Examiner
The Hague	3 August 2021	Dogantan, Umut H.

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X : particularly relevant if taken alone
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