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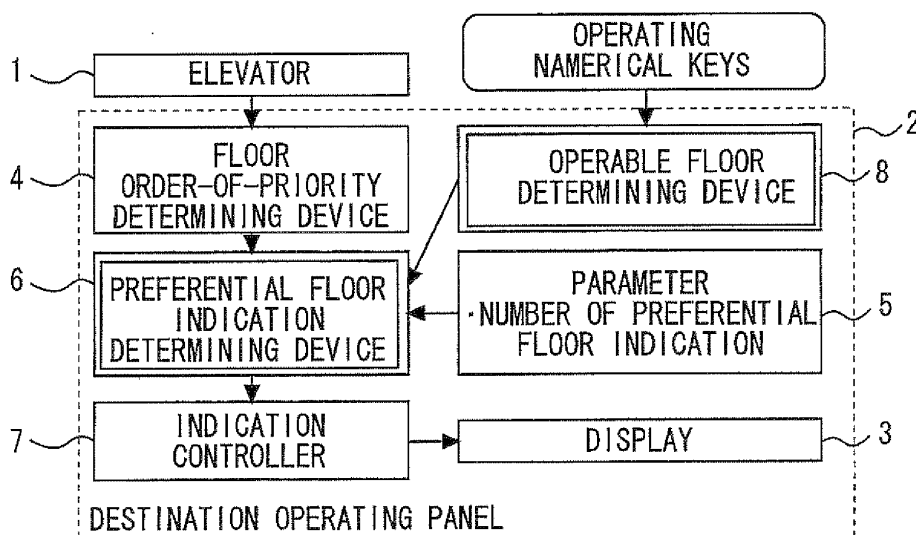
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(54) **CONSOLE PANEL OF ELEVATOR**

(57) Provided is an operating panel of an elevator which enables the operability during destination floor registration and the visibility during the operation for destination floor registration to be improved. For this purpose, the operating panel includes a first touch panel provided in at least either a car or a hall of the elevator, a second touch panel provided in proximity to the first touch panel, a determining device which determines the order of priority of service floors of the elevator, and an indication

controller which causes the first touch panel to indicate an input image showing numerical keys and causes, upon input of a numeral from the input image showing the numerical keys, the second touch panel to indicate images showing service floors which are determined by the determining device as being floors of high order of priority among service floors having the numeral as a leftmost digit as input images for registering destination floors of the elevator in the preset number of preferential floors indications.

Fig. 2



Description

Technical Field

[0001] The present invention relates to an operating panel of an elevator.

Background Art

[0002] There has been proposed an operating panel of an elevator in which a car call button group as well as a preferential car call button indication region is set, wherein frequently-used floors are determined from floors corresponding to the car call buttons (refer to Patent Document 1, for example).

Also, there has been proposed a destination operating panel of the numerical-key operation method in which buttons of 0 to 9 are arranged (refer to Patent Document 2, for example).

Furthermore, there has been proposed a hall-installed operating panel of the numerical-key operation method (refer to Patent Document 3, for example).

[0003]

Patent Document 1: Japanese Patent Laid-Open No. 2005-162465

Patent Document 2: Japanese Patent Laid-Open No. 8-175770

Patent Document 3: Japanese Patent Laid-Open No. 2001-287876

Disclosure of the Invention

Problems to be Solved by the Invention

[0004] However, the operating panel described in Patent Document 1 can indicate only several preferential floors among a numerous number of service floors of a high-rise building constructed thanks to a recent improvement in building technologies. For this reason, in registering service floors other than preferential floors as destination floors, it is necessary to switch buttons of a car call button group one after another, posing the problem that the operability of destination floor registration is poor. The operating panels described in Patent Documents 2 and 3 cannot indicate the floor information of each floor and for example, in the case of two-digit floors, it is impossible to register destination floors by operating buttons indicating destination floors themselves. For this reason, these operating panels had the problem that the visibility is poor during the operation for destination floor registration.

[0005] The present invention was made to solve the problems described above and the object of the present invention is to provide an operating panel of an elevator which enables the operability during destination floor registration and the visibility during the operation for destination floor registration to be improved.

Means for Solving the Problems

[0006] An operating panel of an elevator includes a first touch panel provided in at least either a car or a hall of an elevator; a second touch panel provided in proximity to the first touch panel, a determining device which determines the order of priority of service floors of the elevator, and an indication controller which causes the first touch panel to indicate an input image showing numerical keys and causes, upon input of a numeral from the input image showing the numerical keys, the second touch panel to indicate images showing service floors which are determined by the determining device as being floors of high order of priority among service floors having the numeral as a leftmost digit as input images for registering destination floors of the elevator in a preset number of preferential floor indications.

Advantages of the Invention

[0007] According to the present invention, it is possible to improve the operability during destination floor registration and the visibility during the operation for destination floor registration.

Brief Description of the Drawings

[0008]

Figure 1 is a block diagram to explain the basic configuration of an operating panel of an elevator in Embodiment 1 of the present invention.

Figure 2 is a block diagram to explain the general configuration of the operating panel of the elevator in Embodiment 1 of the present invention.

Figure 3 is a diagram showing a list for preferential floor determination to explain the initial condition of the operating panel of an elevator in Embodiment 1 of the present invention.

Figure 4 is a front view of a display to explain the initial condition of the operating panel of an elevator in Embodiment 1 of the present invention.

Figure 5 is a flowchart to explain the indication action in the initial condition of the operating panel of an elevator in Embodiment 1 of the present invention.

Figure 6 is a diagram showing a list for preferential floor determination to explain the switching of the preferential floor indication performed by the operating panel of an elevator in Embodiment 1 of the present invention.

Figure 7 is a front view of the display to explain the switching of the preferential floor indication performed by the operating panel of an elevator in Embodiment 1 of the present invention.

Figure 8 is a flowchart to explain the switching action of the preferential floor indication performed by the operating panel of an elevator in Embodiment 1 of the present invention.

Figure 9 is a block diagram to explain an operating panel of an elevator in Embodiment 2 of the present invention.

Figure 10 is a diagram showing a list for preferential floor determination to explain the switching of the preferential floor indication performed by the operating panel of the elevator in Embodiment 2 of the present invention.

Figure 11 is a front view of the display to explain the switching of the preferential floor indication performed by the operating panel of an elevator in Embodiment 2 of the present invention.

Figure 12 is a flowchart to explain the switching action of the preferential floor indication performed by the operating panel of an elevator in Embodiment 2 of the present invention.

Description of symbols

[0009]

1 elevator, 2 destination operating panel, 3 display, 4 floor order-of-priority determining device, 5 preferential floor indication number storage device, 6 preferential floor indication determining device, 7 indication controller, 8 operable floor determining device, 9 list for preferential floor determination, 10 first touch panel, 11 second touch panel, 12 list for preferential floor determination, 13 input image, 14 screen switching determining device, 15 list for preferential floor determination, 16 input image,

Best Mode for Carrying Out the Invention

[0010] The best mode for carrying out the present invention will be described with reference to the accompanying drawings. Incidentally, in each of the drawings, like numerals refer to like or corresponding parts and overlaps of description of these parts are appropriately simplified or omitted.

Embodiment 1

[0011] Figure 1 is a block diagram to explain the basic configuration of an operating panel of an elevator in Embodiment 1 of the present invention.

In Figure 1, reference numeral 1 denotes an elevator. This elevator 1 is installed in a building. The shaft of this elevator 1 pierces through each floor of the building. A car of the elevator 1 is arranged in this shaft. A hall of the elevator 1 is provided in the vicinity of the shaft of each floor. And the car ascends and descends in the shaft. As a result of this, passengers in the car can move between halls.

[0012] Reference numeral 2 denotes a destination operating panel. This destination operating panel 2 is provided in the car. This destination operating panel 2 is provided with a display 3, a floor order-of-priority determining device 4, a preferential floor indication number storage device 5, a preferential floor indication determining device 6, and an indication controller 7. The display 3 is provided with a first touch panel and a second touch panel which are close to each other. The floor order-of-priority determining device 4 has the function of determining the order of priority of all service floors of the elevator 1. For example, the order of priority of all service floors is determined on the basis of the operation results of the elevator 1 for the past one month. However, it is unnecessary to limit the method of determining the order of priority of service floors.

[0013] The preferential floor indication number storage device 5 has the function of storing the number of preferential floor indications which are simultaneously indicated on the second touch panel as an indication control parameter of the display 3. The preferential floor indication determining device 6 has the function of determining floors to be simultaneously indicated on the second touch panel on the basis of the order of priority of service floors and the number of preferential floor indications. The indication controller 7 has the function of causing the second touch panel to indicate images showing floors determined by the preferential floor indication determining device 6 as input images for registering destination floors of the elevator 1.

[0014] Figure 2 is a block diagram to explain the general configuration of the operating panel of the elevator 1 in Embodiment 1 of the present invention.

In this embodiment, the indication controller 7 has the function of causing an input image showing numerical keys to be indicated on the first touch panel.

Furthermore, the destination operating panel 2 is provided with an operable floor determining device 8. This operable floor determining device 8 has the function of determining floors having an inputted numeral as a leftmost digit as being floors operable in the future when the numeral is inputted from an input image showing the numerical keys of the first touch panel.

[0015] At this time, the preferential floor indication determining device 6 functions so as to determine floors to be indicated on the second touch panel on the basis of the order of priority of service floors and floors operable in the future. Concretely, floors of high order of priority among service floors having a numeral inputted from the input image showing the numerical keys of the first touch panel as a leftmost digit are determined as floors to be indicated. And the indication controller 7 functions so as to switch the indication of the second touch panel to the image showing the floors to be indicated, which were determined by the preferential floor indication determining device 6.

[0016] Next, with the aid of Figures 3 to 5, a description will be given of the indication of the display 3 before a

numeral is inputted from the input image showing the numerical keys.

Figure 3 is a diagram showing a list for preferential floor determination to explain the initial condition of the operating panel of an elevator in Embodiment 1 of the present invention.

In Figure 3, reference numeral 9 denotes a list for preferential floor determination. This list for preferential floor determination 9 is generated in the preferential floor indication determining device 6. Each service floor and the order of priority of the service floors are shown in this list for preferential floor determination 9. Concretely, the total number of the service floors is 30. In this embodiment, the preferential floor indication number storage device 5 stores "3" as the number of preferential floor indications. Therefore, the preferential floor indication determining device 6 determines that the 8th floor, the 2nd floor and the 20th floor, which are the first through third floors in the order of priority, are floors which the second touch panel is caused to simultaneously indicate.

[0017] Figure 4 is a front view of the display to explain the initial condition of the operating panel of an elevator in Embodiment 1 of the present invention.

In Figure 4, reference numeral 10 denotes the first touch panel. Reference numeral 11 denotes the second touch panel. In this embodiment, the first touch panel 10 and the second touch panel 11 are arranged by dividing the indication region of one display 3. Concretely, the first touch panel 10 forms a numerical key button region in the upper part of the display 3. An input image showing the numerical keys is indicated on this first touch panel 10.

[0018] On the other hand, the second touch panel 11 forms a preferential floor indication region in the lower part of the display 3. In this preferential floor indication region, images showing the 8th floor, 2nd floor and 20th floor of high order of priority are indicated as input images for registering the destination floors of the elevator 1. Concretely, these input images showing the floors of high order of priority are indicated in the order of increasing numeral of floor from above, i.e., in the order: the 2nd floor, the 8th floor and the 20th floor. In addition to the numerals showing the floors, also the names of facilities and the like provided on each floor are indicated in these input images. As a result of this, users of the elevator 1 can identify their desired destination floors not only from the numerals of floors, but also from the names of facilities and the like. For this reason, the input images showing the floors require horizontally long regions having a measure of indication area.

[0019] Figure 5 is a flowchart to explain the indication action in the initial condition of the operating panel of an elevator in Embodiment 1 of the present invention.

In Step S1, preferential floors are determined among service floors by the floor order-of-priority determining device 4. And the preferential floors are indicated on the second touch panel 11, i.e., in the preferential floor indication region, and the action is completed.

[0020] Next, with the aid of Figures 6 to 8, a description will be given of the indication of the display 3 after the input of a numeral from the input image showing the numerical keys.

5 Figure 6 is a diagram showing a list for preferential floor determination to explain the switching of the preferential floor indication performed by the operating panel of an elevator in Embodiment 1 of the present invention.

10 In Figure 6, reference numeral 12 denotes a list for preferential floor determination. This list for preferential floor determination 12 shows operable floors in case that "2" of the input image showing the numerical keys is depressed.

[0021] In this figure, the double strike-through lines indicate service-cut floors. Concretely, the 22nd floor and the 23rd floor are the service-cut floors. In this case, the service floors having "2" as a leftmost digit are determined by the operable floor determining device 8 as being floors operable in the future. That is, the filled-in portions of Figure 6 are excluded from the floors operable in the future. Furthermore, floors which have high order of priority in the floors operable in the future and are not the service-cut floors are determined by the preferential floor indication determining device 6 as floors to be indicated in a switching manner.

[0022] As described above, in this embodiment, the preferential floor indication number storage device 5 stores "3" as the number of preferential floors. That is, the number of floors to be indicated is 3. And among the floors operable in the future, floors which are not the service-cut floors and are ranked in first to third places among the service floors having high order of priority are the 2nd floor, the 20th floor and the 27th floor. For this reason, the floors to be indicated in a switching manner by the preferential floor indication determining device 6 are determined to be the 2nd floor, the 20th floor and the 27th floor.

[0023] Figure 7 is a front view of the display to explain the switching of the preferential floor indication performed by the operating panel or an elevator in Embodiment 1 of the present invention.

As described above, the floors to be indicated in a switching manner are the 2nd floor, the 20th floor and the 27th floor. For this reason, the indication of the input image showing the 2nd floor, the 8th floor and the 20th floor as preferential floors is switched to the input image showing the 2nd floor, the 20th floor and the 27th floor. At this time, the indication controller 7 causes the first touch panel 10 to indicate an input image 13 for nullifying inputs from the input image showing the numerical keys. Concretely, this input image 13 is indicated as "CANCEL."

[0024] Figure 8 is a flowchart to explain the switching action of the preferential floor indication performed by the operating panel of an elevator in Embodiment 1 of the present invention.

First, Step 11 is the same step as Step S1 of Figure 5. That is, in Step 11, preferential floors are determined among service floors. And the preferential floors are in-

licated in the preferential floor indication region of the display 3. After that, the flow of action proceeds to Step S12. In Step S12, a determination is made as to whether or not there is a corresponding floor in the preferential floor indication region, i.e., a service floor. And when there is a corresponding service floor corresponding in the preferential floor indication region, in Step S13 a user of the elevator 1 depresses the input image showing the corresponding service floor in the second touch panel 11, i.e., in the preferential floor indication region. A desired destination floor is registered by this depressing.

[0025] On the other hand, when in Step S12 there is no corresponding service floor in the preferential floor indication region of the second touch panel 11, in Step S14 the user of the elevator 1 depresses the input image showing a leftmost digit of the desired destination floor in the input image showing the numerical keys in the numerical key button region. After that, in Step S15 the operable floor determining device 8 determines that floors having the depressed numeral as a leftmost digit are floors operable in the future, and the flow of action returns to Step S11. And in Step S11, the preferential floor indication determining device 6 determines floors to be indicated on the second touch panel 11 on the basis of the order of priority of the service floors and the floors operable in the future. The indication controller 7 switches the indication of the preferential floor indication region to the input image showing the floors to be indicated, which were determined by the preferential floor indication determining device 6. After that, the action described above is repeated.

[0026] According to Embodiment 1 described above, the indication controller 7 causes the first touch panel 10 to indicate the input image showing the numerical keys. Also, the indication controller 7 causes, upon input of a numeral from the input image showing the numerical keys, the second touch panel 11 to indicate images showing service floors of high order of priority among service floors having the inputted numeral as a leftmost digit as input images for registering destination floors of the elevator 1 in the preset number of preferential floors indications. For this reason, it is possible to improve the operability during destination floor registration and the visibility during the operation for destination floor registration.

[0027] Also, the indication controller 7 causes the first touch panel 10 to indicate an input image showing numerical keys and an input image for nullifying inputs from the input image showing the numerical keys. For this reason, it is possible to eliminate wrong inputs from the input image showing the numerical keys.

Embodiment 2

[0028] Figure 9 is a block diagram to explain an operating panel of an elevator in Embodiment 2 of the present invention. Incidentally, as with Embodiment 1, like numerals refer to like or corresponding parts and descriptions of these parts are omitted.

The preferential floor indication number storage device 5 in Embodiment 1 stores the number of preferential floor indications as a parameter. On the other hand, a preferential floor indication number storage device 5 in Embodiment 2 stores the number of switched screens in addition to the number of preferential floor indications as parameters. This number of switched screens is preset at a number larger than the number of preferential floor indications.

[0029] Also, in this embodiment, a screen switching determining device 14 is newly added to a destination operating panel 2. This screen switching determining device 14 has the functions of giving prescribed instructions to an indication controller 7 when the number of service floors having a numeral inputted from an input image showing the numerical keys as a leftmost digit, which are not service-cut floors, is not more than the number of switched screens. Concretely, the screen switching determining device 14 gives instructions to the indication controller 7 to cause an input image showing each of all service floors which are not service-cut floors among the service floors having the numeral inputted from the input image showing the numerical keys as a leftmost digit to be indicated by using both a first touch panel and a second touch panel 10, 11.

[0030] And the indication controller 7 which has received the above-described instructions causes the second touch panel 11 to indicate a part of all service floors having the numerals inputted from the input image showing the numerical keys as a leftmost digit as input images for registering destination floors of an elevator 1. At the same time with this, the indication controller 7 causes the first touch panel 10 to erase the input image showing the numerical keys and to indicate the floors other than the part of the floors which the second touch panel 11 was caused to indicate among all service floors having the numerals inputted from the input image showing the numerical keys as a leftmost digit as input images for registering the destination floors of the elevator 1.

[0031] Next, the switching of the indication of the display 3 will be described with the aid of Figures 10 and 11. Figure 10 is a diagram showing a list for preferential floor determination to explain the switching of the preferential floor indication performed by the operating panel of the elevator in Embodiment 2 of the present invention.

In Figure 10, reference numeral 15 denotes a list for preferential floor determination. This list for preferential floor determination 15 shows operable floors in case that "2" of the input image showing the numerical keys is depressed. In this figure, the double strike-through lines indicate service-cut floors. Concretely, the 22nd to the 26th floor are the service-cut floors. In this case, service floors having "2" as a leftmost digit which are not service-cut floors are the 2nd floor, the 20th floor, the 21st floor, the 27th floor and the 29th floor.

[0032] Figure 11 is a front view of the display to explain the switching of the preferential floor indication performed by the operating panel of an elevator in Embodiment 2

of the present invention.

Figure 11 shows the display 3 in which the number of switched screens is set at "5." As described above, service floors having "2" as a leftmost digit which are not service-cut floors are the 2nd floor, the 20th floor, the 21st floor, the 27th floor and the 29th floor. That is, the number of floors to be indicated is 5. The number of switched screens is set at "5." That is, the number of service floors having the numeral inputted from the input image showing the numerical keys as a leftmost digit which are not service-cut floors, is not more than the number of switched screens.

[0033] Therefore, the screen switching determining device 14 gives prescribed instructions to the indication controller 7. The indication controller 7 which has received the above-described instructions causes the first touch panel 10 to indicate images showing the 2nd floor, the 20th floor, and the 21st floor as input images for registering the destination floors of the elevator 1. At the same time with this, the indication controller 7 causes the second touch panel 11 to indicate the 27th floor and the 29th floor as input images for registering the destination floors of the elevator 1. At this time, the indication controller 7 causes the second touch panel 11 to indicate in the lower part thereof an input image for returning the indication of the first touch panel 10 from the input images for registering the destination floors of the elevator 1 to an input image 16 showing the numerical keys. Concretely, this input image 16 is indicated as "RETURN." This input indication 16 may be appropriately indicated on the first touch panel 10.

[0034] Next, the indication action of the operating panel of the elevator 1 will be described with the aid of Figure 12.

Figure 12 is a flowchart to explain the switching action of the preferential floor indication performed by the operating panel of an elevator in Embodiment 2 of the present invention.

First, in Step S21, the number of service floors is determined. When the number of service floors is not less than the number of switched screens N, the flow of action proceeds to Step S22. In Step S22, a numerical key button region is indicated on the first touch panel 10. At the same time with this, a preferential floor indication region is indicated, and the flow of action proceeds to Step S23.

[0035] In Step S23, preferential floors are determined among the service floors. And the preferential floors are indicated in the preferential floor indication region of the display 3, and the flow of action proceeds to Step S24. In Step S24, a determination is made as to whether or not there is a corresponding floor in the preferential floor indication region. And when there is a corresponding service floor in the preferential floor indication region, in Step S25 a user of the elevator 1 depresses the input image showing the corresponding service floor in the preferential floor indication region.

[0036] On the other hand, when in Step S24 there is no corresponding service floor to the preferential floor

indication region, in Step S26 the user of the elevator 1 depresses the input image showing the numerical keys in the numerical key button region. After that, in Step S27 an operable floor determining device 8 determines that floors having the depressed numeral as a leftmost digit are floors operable in the future, and the flow of action returns to Step S21, where the above-described action is repeated.

[0037] When in Step S21 the number of service floors is less than the number of switched screens N, the flow of action proceeds to Step S28. In Step S28, the numerical key button region becomes hidden. And on the second touch panel 11, there are indicated images showing a part of all service floors having the numeral inputted from the input image showing the numerical keys as a leftmost digit as input images for registering the destination floors of the elevator 1. At the same time with this, on the first touch panel 10, there are indicated the floors other than the part of the floors which the second touch panel 11 was caused to indicate among all service floors having the numeral inputted from the input image showing the numerical keys as a leftmost digit as input images for registering the destination floors of the elevator 1.

[0038] And in Step S29, a determination is made as to whether or not there is an input image of a corresponding service floor on the first touch panel 10 or the second touch panel 11. When there is an input image of a corresponding service floor on the first touch panel 10 or the second touch panel 11, in Step S25 a user of the elevator 1 depresses an input image showing the corresponding service floor in the preferential floor indication region. A desired destination floor is registered by this depressing. On the other hand, when there is no input image of a corresponding service floor on the first touch panel 10 or the second touch panel 11, in Step S30 the user of the elevator 1 depresses "RETURN" and the flow of action returns to START, where the above-described action is repeated.

[0039] According to Embodiment 2 described above, when the number of service floors having the numeral inputted from the input image showing the numerical keys as a leftmost digit is not more than the number which is preset as a number larger than the number of preferential floor indications, the indication controller 7 causes the second touch panel 11 to indicate a part of all service floors having the numeral inputted from the input image showing the numerical keys as a leftmost digit as input images for registering the destination floors of the elevator 1. At the same time with this, the indication controller 7 causes the first touch panel 10 to erase the input image showing the numerical keys and to indicate the floors other than the part of the floors which the second touch panel 11 was caused to indicate among all service floors having the numeral inputted from the input image showing the numerical keys as a leftmost digit as input images for registering the destination floors of the elevator 1. For this reason, it is possible to further improve the operability during destination floor registration and the visibility dur-

ing the operation for destination floor registration.

[0040] Also, the indication controller 7 causes at least either the first touch panel 10 and the second touch panel 11 to indicate an input image for returning the indication of the first touch panel 10 to the indication of the input image showing the numerical keys. For this reason, it is possible to eliminate wrong inputs from the input image showing the numerical keys.

[0041] Incidentally, in Embodiments 1 and 2, the description was given of the destination operating panel 2 provided in the car. However, the same effect as from the destination operating panels 2 of Embodiments 1 and 2 can be obtained by configuring a hall-installed operating panel provided in a hall in the same manner.

[0042] In Embodiments 1 and 2, the configurations are such that inputting numerals from the numerical keys and registering destination floors are performed on the display 3 of the destination operating panel 2. However, by using mechanical numerical key buttons, mechanical preferential floor buttons and an indication device, it is also possible to construct a configuration from which the same effect can be obtained. In this case, the indication device is arranged adjacent to the preferential floor buttons, and this indication device is caused to indicate images showing service floors of high order of priority among service floors having a numeral inputted from the mechanical numerical key buttons as a leftmost digit.

Industrial Availability

[0043] As described above, the operating panel of an elevator of the present invention can be applied to a hall of an elevator or an elevator provided with a car.

Claims

1. An operating panel of an elevator, comprising:

- a first touch panel provided in at least either a car or a hall of an elevator;
- a second touch panel provided in proximity to the first touch panel;
- a determining device which determines the order of priority of service floors of the elevator;
- and
- an indication controller which causes the first touch panel to indicate an input image showing numerical keys and causes, upon input of a numeral from the input image showing the numerical keys, the second touch panel to indicate images showing service floors which are determined by the determining device as being floors of high order of priority among service floors having the numeral as a leftmost digit as input images for registering destination floors of the elevator in a preset number of preferential floor indications.

2. The operating panel of an elevator according to claim 1, wherein the indication controller, in a case where the number of service floors having a numeral inputted from the input image showing the numerical keys as a leftmost digit is larger than the number of preferential floor indications but not more than a preset number, causes the second touch panel to indicate a part of all service floors having the numeral inputted from the input image showing the numerical keys as a leftmost digit as input images for registering the destination floors of the elevator, and the indication controller causes the first touch panel to erase the input image showing the numerical keys and to indicate the floors other than the part of the floors which the second touch panel was caused to indicate among all service floors having the numeral inputted from the input image showing the numerical keys as a leftmost digit as input images for registering the destination floors of the elevator.
3. The operating panel of an elevator according to claim 1, wherein the indication controller causes the first touch panel to indicate the input image showing the numerical keys and to indicate an input image for nullifying inputs from the input image showing the numerical keys.
4. The operating panel of an elevator according to claim 2, wherein the indication controller causes at least either the first touch panel or the second touch panel to indicate an input image for returning the indication of the first touch panel from the indication of the input image for registering the destination floors of the elevator to the indication of the input image showing the numerical keys.

Fig. 1

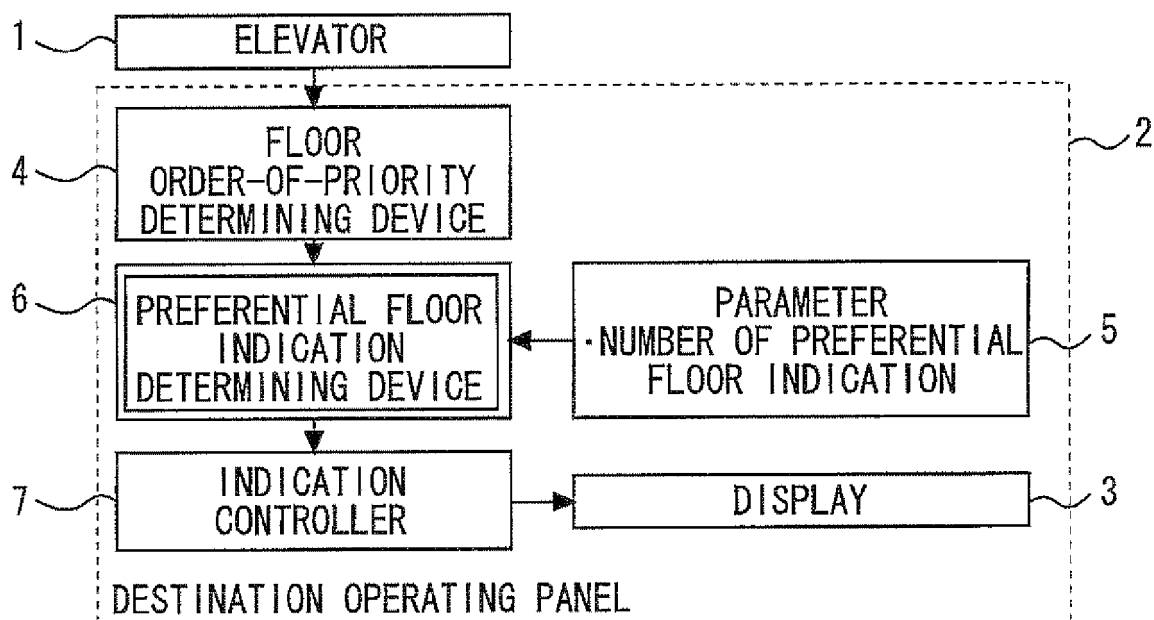


Fig. 2

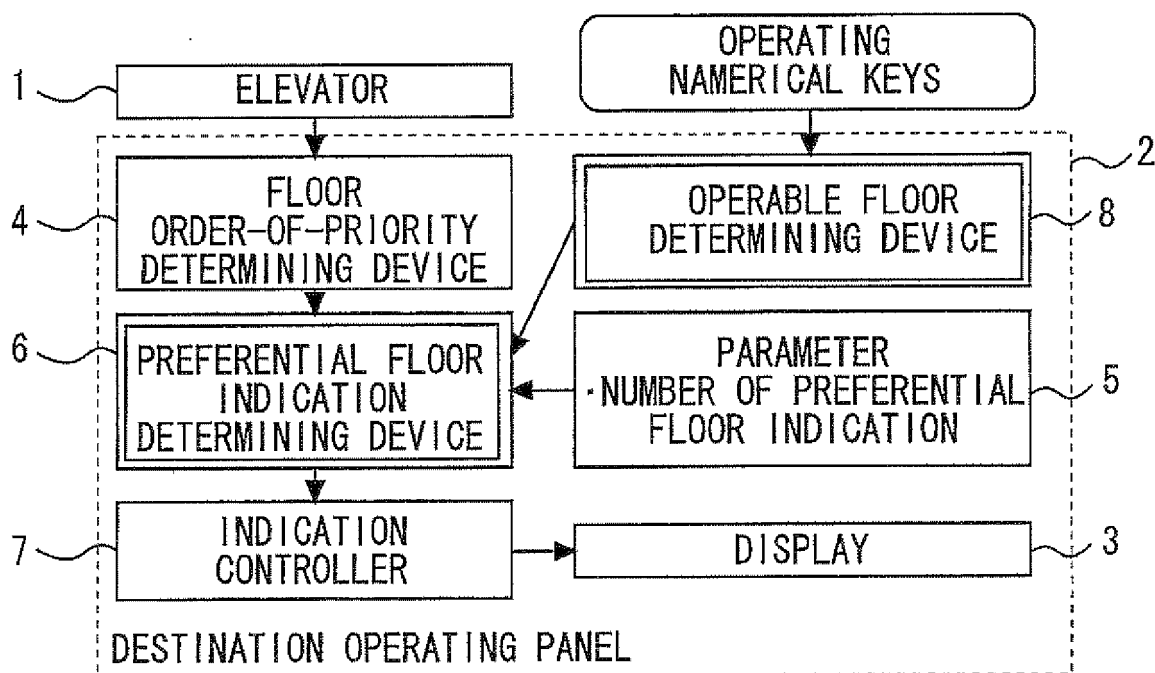


Fig. 3

9

FLOOR	PRIORITY	FLOOR	PRIORITY
1	4	16	16
2	2	17	17
3	21	18	18
4	29	19	19
5	5	20	3
6	6	21	12
7	7	22	11
8	1	23	23
9	9	24	24
10	10	25	25
11	30	26	26
12	22	27	15
13	13	28	28
14	14	29	20
15	8	30	27

Fig. 4

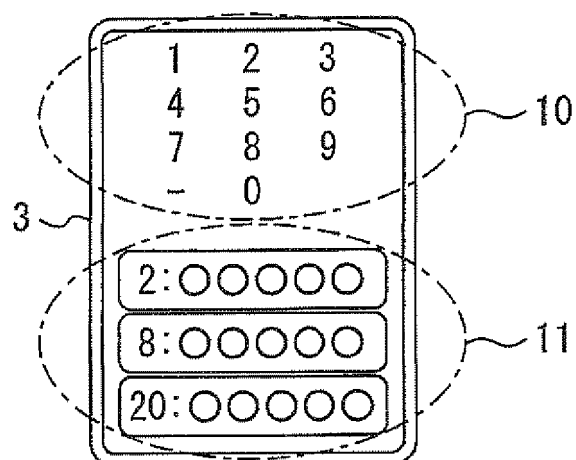


Fig. 5

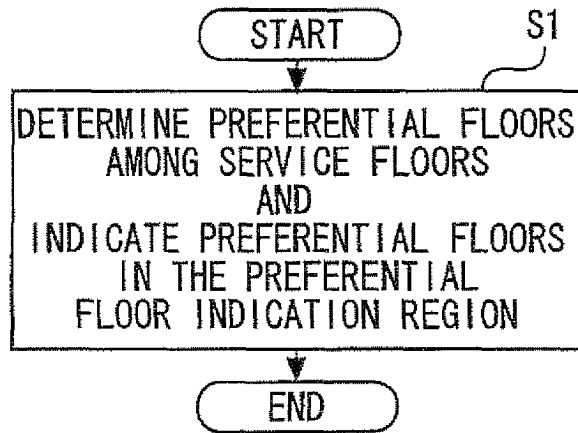


Fig. 6

FLOOR	PRIORITY	FLOOR	PRIORITY
1	4	16	16
2	2	17	17
3	21	18	18
4	29	19	19
5	5	20	3
6	6	21	12
7	7	22	11
8	1	23	23
9	9	24	24
10	10	25	25
11	30	26	26
12	22	27	15
13	13	28	28
14	14	29	20
15	8	30	27

* THE DOUBLE STRIKE-THROUGH LINES INDICATE SERVICE-CUT FLOORS.

Fig. 7

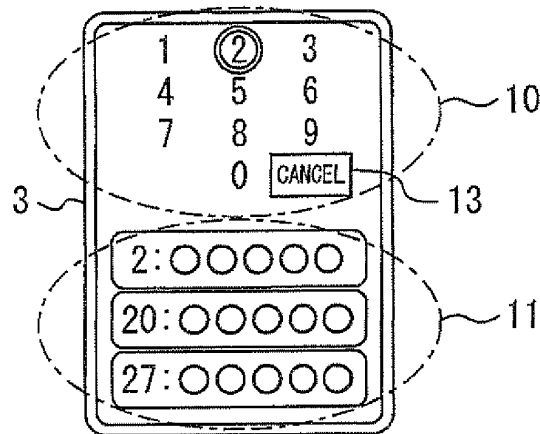


Fig. 8

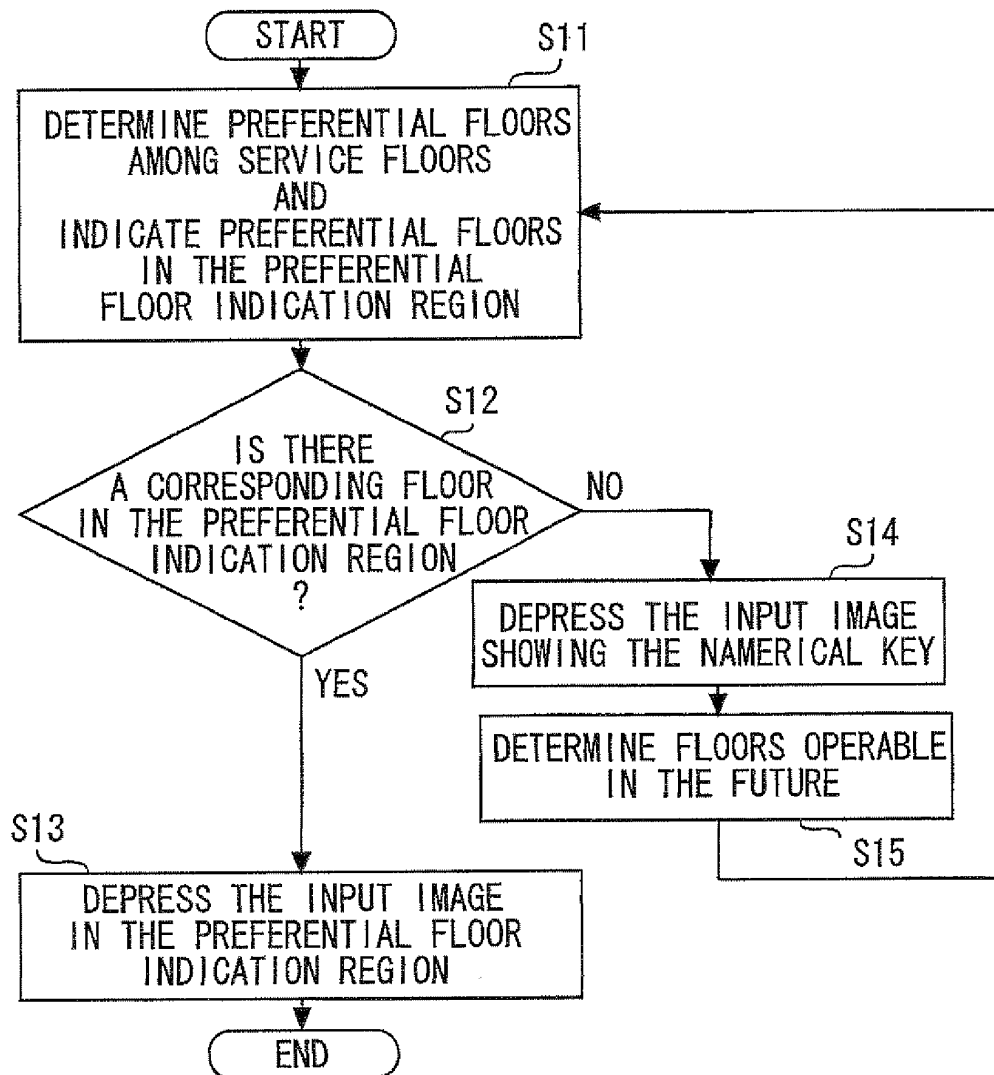


Fig. 9

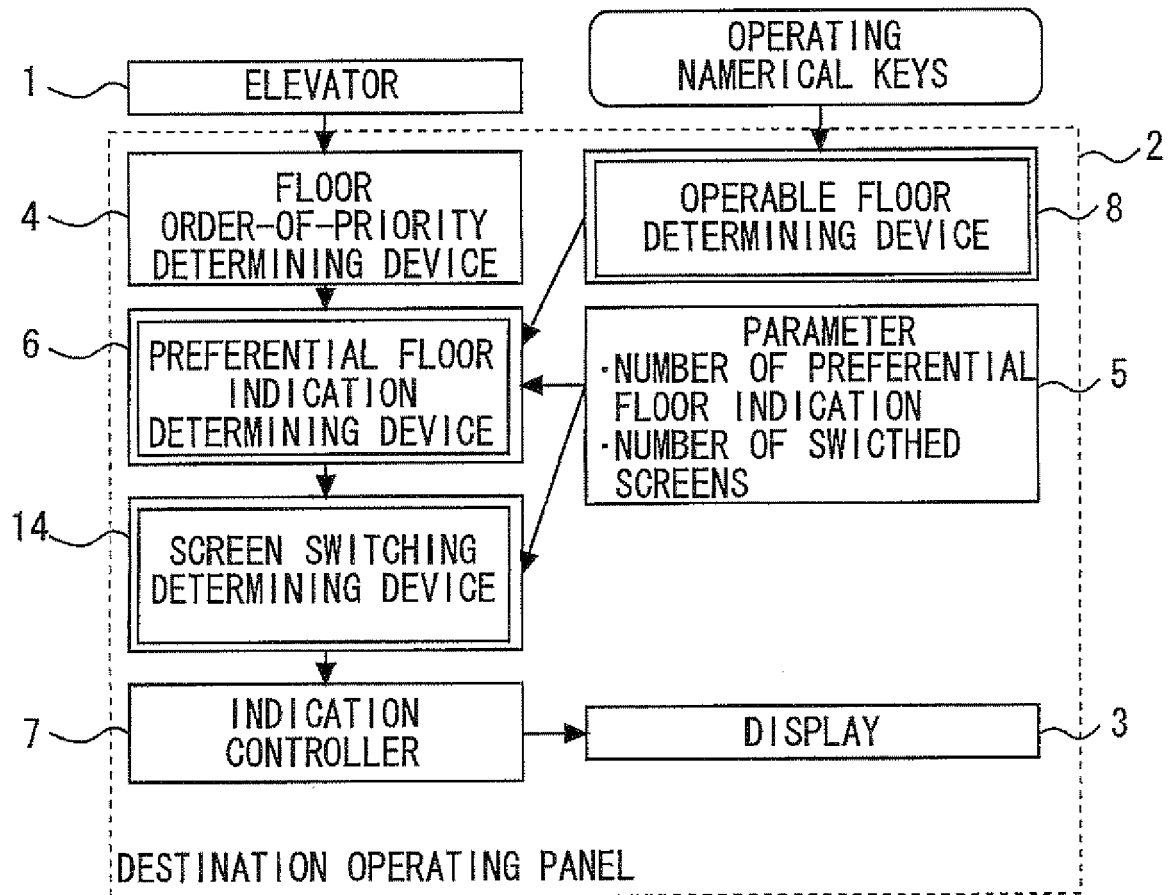


Fig. 10

15

FLOOR	PRIORITY	FLOOR	PRIORITY
1	4	16	16
2	2	17	17
3	21	18	18
4	29	19	19
5	5	20	3
6	6	21	12
7	7	22	11
8	1	23	23
9	9	24	24
10	10	25	25
11	30	26	26
12	22	27	15
13	13	28	28
14	14	29	20
15	8	30	27

* THE DOUBLE STRIKE-THROUGH LINES INDICATE SERVICE-CUT FLOORS.

Fig. 11

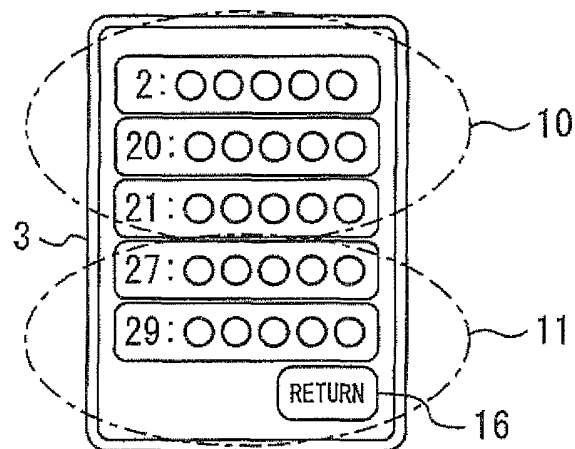
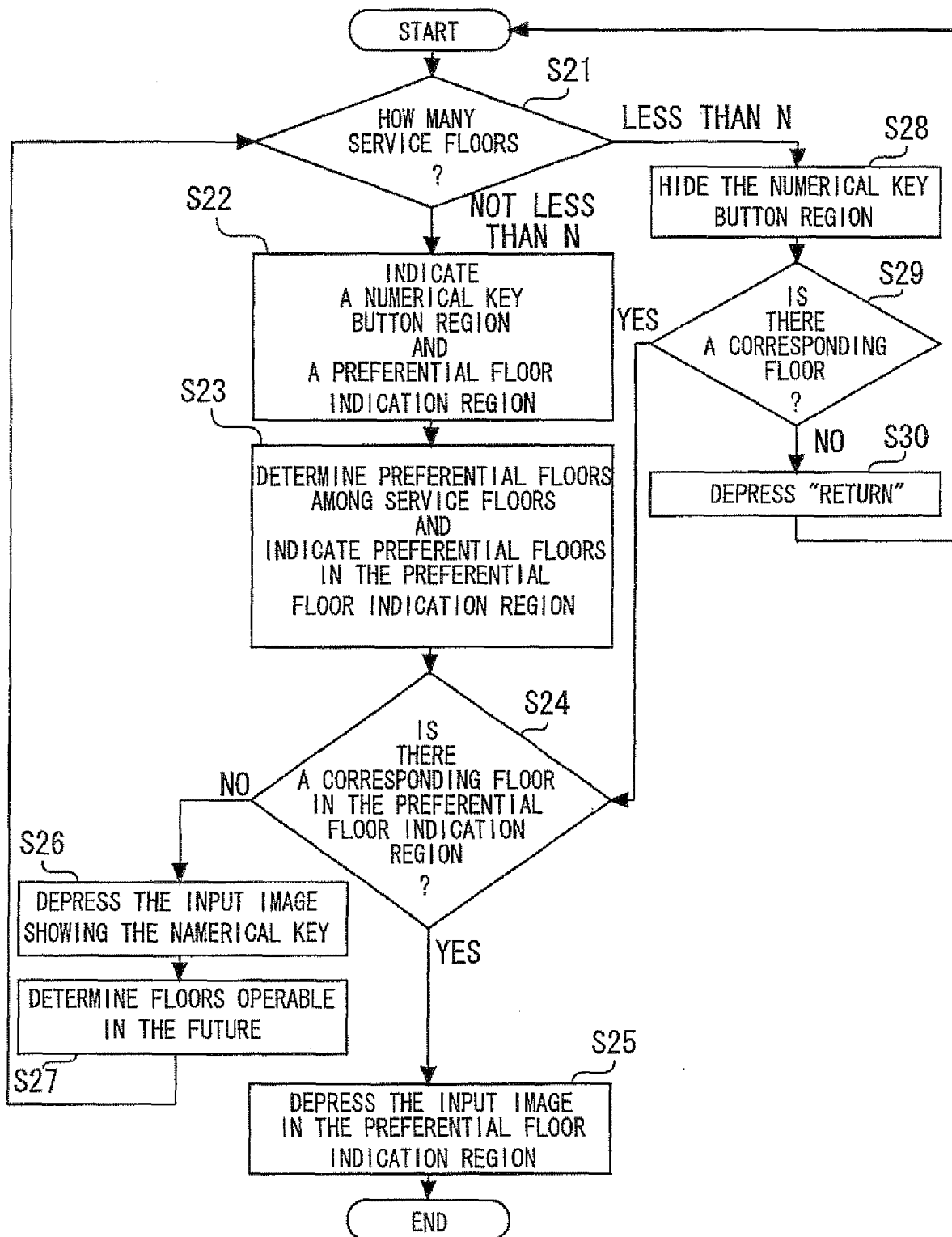


Fig. 12



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2009/051961

A. CLASSIFICATION OF SUBJECT MATTER

B66B1/46 (2006.01) i, B66B3/00 (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)

B66B1/46, B66B3/00

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 1996-2009

Kokai Jitsuyo Shinan Koho 1971-2009 Toroku Jitsuyo Shinan Koho 1994-2009

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 8-119543 A (Hitachi, Ltd.), 14 May 1996 (14.05.1996), entire text; all drawings (Family: none)	1-4
A	JP 8-181763 A (Casio Computer Co., Ltd.), 12 July 1996 (12.07.1996), claims 1 to 3; all drawings (Family: none)	1
A	JP 2005-162465 A (Mitsubishi Electric Corp.), 23 June 2005 (23.06.2005), entire text; all drawings (Family: none)	1-2

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

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Date of the actual completion of the international search
14 October, 2009 (14.10.09)Date of mailing of the international search report
27 October, 2009 (27.10.09)Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2009/051961

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 2004-292155 A (Mitsubishi Electric Corp.), 21 October 2004 (21.10.2004), entire text; all drawings (Family: none)	2
A	JP 2006-282308 A (Mitsubishi Electric Corp.), 19 October 2006 (19.10.2006), entire text; all drawings & EP 1864933 A1 & WO 2006/112115 A1 & CN 1956906 A	4

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REFERENCES CITED IN THE DESCRIPTION

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- JP 2001287876 A [0003]