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(71) Applicant: **Mitsubishi Electric Corporation**
Tokyo 100-8310 (JP)

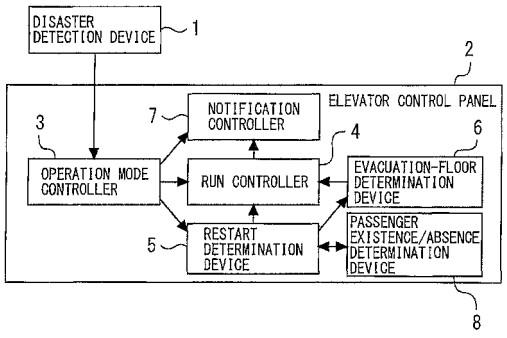
(72) Inventor: **KODERA, Yuichi**
Nagoya-shi
Aichi 461-8670 (JP)

(74) Representative: **HOFFMANN EITLE**
Patent- und Rechtsanwälte
Arabellastrasse 4
81925 München (DE)

(54) CONTROL DEVICE FOR ELEVATOR

(57) Provided is an elevator controller which, after an emergency stop of an elevator car in the event of the occurrence of a predefined disaster, can enable passengers to get off onto an appropriate floor in such a manner as to facilitate evacuation to outdoors as far as possible. This elevator controller includes: a disaster detection device which detects a predefined disaster which occur in a building; a run controller which, in the case where a disaster has been detected by the disaster detection device, brings an elevator car into an emergency stop on the basis of predefined stop conditions; and an evacuation-floor determination device which, in the case where the car has been brought into an emergency stop by the run controller, sets the degree of priority for each floor to which the car is permitted to run from the standpoint of laws and regulations and physically and determines an evacuation floor on the basis of the set degree of priority. Incidentally, the degree of priority indicates the easiness of evacuation of passengers after getting off the car. The run controller causes the car to run to the evacuation floor determined by the evacuation-floor determination device after bringing the car into an emergency stop on the basis of the stop conditions.

Fig. 1



EP 2 557 062 A1

Description

Technical Field

[0001] The present invention relates to an elevator controller which carries out a control operation when a predefined disaster, such as shaking due to an earthquake or a fire, occurs in a building.

Background Art

[0002] Some elevators carry out a control operation in order to rescue passengers in a car upon detection of the occurrence of a predefined disaster, such as shaking due to an earthquake, a fire or a flood.

[0003] As a conventional technique for an elevator provided with this function, there has been proposed, for example, an elevator which performs an earthquake emergency return operation after the occurrence of an earthquake (refer to Patent Literature 1).

Specifically, in the elevator described in Patent Literature 1, as soon as an earthquake S wave of not less than a predefined value is detected, first, a car is forcibly stopped in the shaft. When the shaking of the building subsides to some extent, the run of the car is started to rescue the passengers in the car and the door is opened after the car is stopped at the nearest floor.

Citation List

Patent Literature

[0004] Patent Literature 1: Japanese Patent Laid-Open No. 2007-254036

Summary of Invention

Technical Problem

[0005] In an elevator provided with the control operation function, when the occurrence of a disaster is detected, a car may sometimes be brought into an emergency stop in the shaft in order to prevent the expansion of damage. At this time, at some timing of an emergency stop, the car stops between floors.

[0006] In the elevator described in Patent Literature 1, when the elevator car comes to a condition permitting a run after an emergency stop of the car is made, the passengers are allowed to get off the car at the nearest floor in order to allow the passengers to escape from the car as soon as possible. However, in some disasters which occur, the passengers have to move to outdoors after getting off the car and the nearest floor at which the car made an emergency stop is not always a floor suitable for evacuation.

[0007] For example, for a floor which is not served in normal operations, there are some cases where an evacuation route is not secured or no power source is supplied. If a passenger gets off onto such a floor, it takes much time for the passenger to move from the floor to outdoors. Furthermore, in the case where an evacuation route is secured on the nearest floor, it is sometimes necessary to use long stairs and the like in moving from the floor to outdoors. In such a case, the burden is great for certain passengers (for example, elderly or injured people, wheelchair users and the like), and in the worst case, passengers are sometimes unable to move from the floor onto which they got off.

[0008] The present invention was made to solve the problems described above, and it is an object of the invention to provide an elevator controller which, after an emergency stop of an elevator car is made in the event of the occurrence of a predefined disaster, can allow passengers to get off onto an appropriate floor in such a manner as to facilitate evacuation to outdoors as far as possible.

Solution to Problem

[0009] An elevator controller of the invention is an elevator controller which comprises a disaster detection device which detects a predefined disaster which occurs in a building, a run controller which, in the case where a disaster has been detected by the disaster detection device, brings an elevator car into an emergency stop on the basis of predefined stop conditions, and an evacuation-floor determination device which, in the case where the car has been brought into an emergency stop by the run controller, sets the degree of priority which indicates the easiness of evacuation of passengers after getting off the car for each floor to which the car is permitted to run from the standpoint of laws and regulations and physically, and determines an evacuation floor on the basis of the set degree of priority. The run controller causes the car to run to the evacuation floor determined by the evacuation-floor determination device after bringing the

car into an emergency stop on the basis of the stop conditions.

Advantageous Effect of Invention

[0010] According to the elevator controller of the present invention, it becomes possible to allow passengers to get off onto an appropriate floor in such a manner as to facilitate evacuation to outdoors as far as possible after an emergency stop of an elevator is made in the event of the occurrence of a predefined disaster.

Brief Description of Drawings

[0011]

Figure 1 is a block diagram showing an elevator controller in a first embodiment according to the present invention.
Figure 2 is a flowchart showing the actions of an elevator controller in the first embodiment according to the present invention.

Description of Embodiments

[0012] The present invention will be described in more detail with reference to the accompanying drawings. In each of the drawings, like numerals refer to like or corresponding parts and redundant descriptions of these parts are appropriately simplified or omitted.

First embodiment

[0013] Figure 1 is a block diagram showing an elevator controller in a first embodiment according to the present invention. This controller has the function of performing a control operation in the event of the occurrence of a predefined disaster in a building.

[0014] In Figure 1, reference numeral 1 denotes a disaster detection device which detects a predefined disaster which occurs in a building, such as a fire, a flood or shaking due to an earthquake, and reference numeral 2 denotes a control panel of an elevator provided in the building.

[0015] Upon detection of the occurrence of a predefined disaster in the building, the disaster detection device 1 outputs disaster detection information to the control panel 2. For example, in the case where a seismic sensor which senses the occurrence of an earthquake is provided in the building as the disaster detection device 1, the disaster detection device 1 outputs the information on the scale and the like of the earthquake which occurred as disaster detection information. In the case where a smoke detector or a fire detector is provided as the disaster detection device 1, the disaster detection device 1 outputs, for example, information on the floor where a fire occurred or on the specific place of occurrence of a fire and the like as disaster detection information.

[0016] The control panel 2 has the function of controlling the operation of an elevator, such as a normal operation of the elevator and a control operation during the occurrence of a disaster (hereinafter referred to as an "emergency operation"). Specifically, the control panel 2 is provided with an operation mode controller 3, a run controller 4, a restart determination device 5, an evacuation-floor determination device 6, a notification controller 7, and a passenger existence/absence determination device 8.

[0017] The operation mode controller 3 has the function of selecting an operation mode of the elevator on the basis of input information and the like and appropriately controlling the selected operation mode. For example, in the case where the occurrence of a disaster has not been detected by the disaster detection device 1, the operation mode controller 3 selects a normal operation as the operation mode of the elevator. Incidentally, when a normal operation has been selected by the operation mode controller 3, the control panel 2 carries out the control for causing (the car of) the elevator to sequentially respond to calls registered from halls and the car.

[0018] When the occurrence of a disaster has been detected by the disaster detection device 1, the operation mode controller 3 selects an emergency operation (an earthquake emergency return operation, a fire emergency return operation, a flood control operation or the like) as the operation mode of the elevator. That is, upon input of disaster detection information from the disaster detection device 1, the operation mode controller 3 selects an appropriate emergency operation on the basis of the inputted disaster detection information. When an emergency operation is selected by the operation mode controller 3, the control panel 2 performs a shift from a normal operation to the emergency operation and carries out an optimum control for the disaster which occurred.

[0019] The run controller 4 has the function of appropriately controlling a run and stop of the car of the elevator so as to suit the selected operation mode. For example, when a disaster has been detected by the disaster detection device 1, the run controller 4 brings the car of the elevator into an emergency stop on the basis of predefined stop conditions.

That is, when an emergency operation has been selected by the operation mode controller 3, the run controller 4 makes a determination as to whether or not the stop conditions hold on the basis of the kind and scale of the disaster, the condition of the car (whether or not the car is running, car position and the like), and the condition of the safety device and the like. When the stop conditions hold, the run controller 4 brings the car which is running into an emergency stop.

[0020] Incidentally, when the car has been brought into an emergency stop, at some stop timing, the car may stop between floors (for example, the zone in which the hall door does not move in response to the opening and closing actions of the car door).

[0021] In the case where the car has stopped between floors due to the control of the run controller 4 after the occurrence of a disaster, on the basis of predefined restart conditions, the restart determination device 5 makes a determination as to whether or not it is possible to cause the car to run again. For example, on the basis of the kind and scale of the disaster, and the condition of the safety device and the like, the restart determination device 5 makes a determination as to whether or not the restart conditions hold. When the restart conditions hold, the restart determination device 5 determines that the condition is such that the car can run again.

[0022] The evacuation-floor determination device 6 has the function of determining an evacuation floor for allowing the passengers in the car to get off in the case where an emergency stop of the car has been performed by the run controller 4. Specifically, when it is determined by the restart determination device 5 that the car can run again, the evacuation-floor determination device 6 specifies the zone in which a run of the car is possible at that point of time from the standpoint of laws and regulations and physically, and sets a predefined degree of priority for each floor in the specified zone. Incidentally, the zone in which a run of the car is possible from the standpoint of laws and regulations and physically is fixed by a range of time presetting according to the disaster and the like (in which it is necessary to cause the car to land within a predefined period of time), limits to the running distance due to the remaining capacity of a battery during a power failure, and the like. The degree of priority indicates the easiness of the evacuation of passengers after getting off the car, and for example, small (or large) values are set in the order of easiness after getting off. When the degree of priority of each floor is set, the evacuation-floor determination device 6 determines the evacuation floor on the basis of the set degree of priority. For example, the evacuation-floor determination device 6 selects a floor which has obtained the smallest value (a high degree of priority) as an evacuation floor.

[0023] Incidentally, when an evacuation floor is determined by the evacuation-floor determination device 6 after the car is brought into an emergency stop on the basis of the above-described stop conditions, the run controller 4 causes the car to run toward the determined evacuation floor. The run controller 4 performs a door opening action when the car arrives at the evacuation floor, and allows the passengers to get off.

[0024] The notification controller 7 has the function of controlling a notification device (not shown) which is provided in the car.

For example, when an evacuation floor is determined by the evacuation-floor determination device 6 after an emergency stop of the car due to the detection of a disaster by the disaster detection device 1 (including the time during which the car is running to the above-described evacuation floor), the notification controller 7 causes the notification device to provide information to the effect that the car will run (is running) toward the evacuation floor and that the evacuation floor is a floor from which the passengers can easily evacuate after getting off. Furthermore, when an evacuation floor has been determined by the evacuation-floor determination device 6, the notification controller 7 causes the notification device to provide information useful for evacuation after getting off at the evacuation floor, such as how to evacuate from the elevator hall of the evacuation floor, and the evacuation route to get out of the hall to outdoors.

[0025] Incidentally, the notification device is intended for notifying the passengers in the car of predefined information, and is composed of an indication device, such as a liquid crystal display.

[0026] The passenger existence/absence determination device 8 has the function of determining the existence and absence of passengers in the car. Even in the case where a disaster is detected by the disaster detection device 1 and an emergency stop of the car has been made, if there is no passenger in the car, it is unnecessary to cause the car to run to a floor which is away from the stop position. For this reason, for example, when the absence of passengers in the car is detected by the passenger existence/absence determination device 8 upon an emergency stop of the car on the basis of the stop conditions, the run controller 4 causes the car to run to the floor which is the nearest from the stop position (the nearest floor). In such a case, it is not necessary for the evacuation-floor determination device 6 to carry out the setting of the degree of priority for each floor, or predefined control may be carried out in such a manner that the degree of priority of the nearest floor becomes highest.

[0027] On the other hand, when the presence of passengers in the car is detected by the passenger existence/absence determination device 8 upon an emergency stop of the car by the run controller 4, the evacuation-floor determination device 6 makes a determination of an evacuation floor on the basis of the degree of priority and causes the car to run to the evacuation floor.

[0028] Next, referring also to Figure 2, a concrete description will be given of the actions of the controller having the above-described configuration. Figure 2 is a flowchart showing the actions of an elevator controller in the first embodiment according to the present invention.

[0029] The control panel 2 makes a determination on a constant basis as to whether or not the disaster detection device 1 has detected a disaster (S 101). If disaster detection information has not been inputted from the disaster detection device 1, the operation mode controller 3 selects a normal operation as the operation mode of the elevator (S102).

[0030] On the other hand, when a disaster has been detected by the disaster detection device 1, the operation mode controller 3 selects an emergency operation as the operation mode of the elevator. As a result of this, the control panel 2 starts the control for bringing the elevator into a pause.

[0031] For example, in the case where it is unnecessary to bring the car during a run into an emergency stop (that is, the above-described stop conditions do not hold) as when the scale of a disaster which occurred is small, the run controller 4 continues the run of the car as it is even after the input of the disaster detection information, and causes the car to stop at the nearest floor at the time of the occurrence of the disaster. After carrying out the control for allowing the passengers to get off at the nearest floor, the control panel 2 performs an elevator pause action for prohibiting the use of the elevator after that (from NO in S103 to S104).

[0032] On the other hand, in the case where it is necessary to bring the car during a run into an emergency stop (that is, the stop conditions hold) as when the scale of a disaster which occurred is large or when a prescribed safety device goes into action, the run controller 4 brings the car into an immediate stop in order to prevent the occurrence and expansion of damage. As described above, when the car is brought into an emergency stop, at some timing of the stop, the car may stop between floors. For this reason, when an emergency stop has been performed by the run controller 4, the control panel 2 makes a determination as to whether or not the car has stopped between floors (S 103).

[0033] In the case where at an emergency stop by the run controller 4, the car happened not to stop between floors, that is, the car stopped in the zone in which the hall door moves in response to the opening and closing actions of the car door (NO in S 103), the control panel 2 carries out the control for allowing the passengers to get off at the floor, and performs an elevator pause action in order to prohibit the use of the elevator after that (S104).

[0034] On the other hand, in the case where the car stops between floors due to an emergency stop by the run controller 4 (YES in S103), the control panel 2 makes a determination by use of the restart determination device 5 as to whether or not the restart conditions hold (S 105). When the restart conditions hold and the car comes into a condition where the car can run again (YES in S 105), the control panel 2 makes a determination by use of the passenger existence/absence determination device 8 as to whether or not there are passengers in the car (S 106).

[0035] When the presence of passengers is detected in S106, the control panel 2 performs the control for stopping the car at an appropriate floor in consideration of the evacuation of the passengers to outdoors. For this purpose, when the presence of passengers is detected in S106, the evacuation-floor determination device 6 selects a floor which provides easiest evacuation to outdoors and sets the selected floor as the evacuation floor (S107).
A concrete description will be given below of a method of setting an evacuation floor in S107.

[0036] When in S 106 the presence of passengers is detected, first, the evacuation-floor determination device 6 specifies the zone in which a run of the car is possible at that point of time from the standpoint of laws and regulations and physically. The evacuation-floor determination device 6 sets the degree of priority which indicates the easiness of evacuation after getting off for each floor present in the specified zone.
Table 1 below shows an example of a method of setting the degree of priority.

[0037]

[Table 1]

<table>
<tr><th>Degree of priority</th><th colspan="2">Floor name</th><th>Remarks</th></tr>
<tr><td rowspan="4">High
↑
↓
Low</td><td colspan="2">Main floor (entrance floor)</td><td>Provides direct movement to and from outdoors</td></tr>
<tr><td rowspan="3">Other floors</td><td>Service floor</td><td>The nearer to the main floor, the higher the degree of priority</td></tr>
<tr><td>Service-cut floor</td><td>An evacuation route may not be secured</td></tr>
<tr><td>Floor with emergency landing exit in express zone</td><td>An evacuation route may not be secured</td></tr>
</table>

[0038] As shown in Table 1, the degree of priority is set in such a manner that, for example, the easier the movement from the elevator hall to outdoors, the higher the degree of priority. That is, a low degree of priority is set in the case where it is difficult to move from the elevator hall of the floor in question to outdoors without using an elevator.

[0039] A floor which is most suitable as an evacuation floor is a floor which enables any passenger to evacuate to

outdoors after getting off, and the prime example is a main floor (an entrance floor). For this reason, the evacuation-floor determination device 6, for example, sets the degree of priority of the main floor of a building at the highest level. Furthermore, for floors other than the main floor, the evacuation-floor determination device 6 sets the degree of priority of each floor in such a manner that the nearer to the main floor, the higher the degree of priority.

[0040] Incidentally, floors determined by the evacuation-floor determination device 6 to permit a run of the car from the standpoint of laws and regulations and physically include non-service floors at which the elevator does not stop in normal operations (for example, service-cut floors at which the car is prohibited from stopping in normal operations and floors with emergency landing exit installed at some midpoint of a express zone for the emergency escape of passengers). For such non-service floors, an evacuation route to outdoors is not sometimes secured and power is not sometimes supplied. Therefore non-service floors are not very much suitable for evacuation floors. For this reason, the evacuation-floor determination device 6 sets the degree of priority of each floor in such a manner that for non-service floors, the degree of priority is lower than the degree of priority of service floors at which the car stops in normal operations.

[0041] For the setting of the degree of priority, the evacuation-floor determination device 6 considers also the damage condition of each floor due to the disaster which occurred and the like.

For example, in the case where a fire occurs in a building, even when the passengers get off onto the floor where the fire has occurred, the passengers cannot evacuate from the hall where they got off to outdoors. For this reason, when the occurrence of a fire is detected by the disaster detection device 1, the evacuation-floor determination device 6 sets the degree of priority of each floor in consideration of the spread of the fire in the building so that the degree of priority of the floors which are far away from the floor where the fire occurred and are lower than the floor where the fire occurred, becomes high.

[0042] Furthermore, in the case where the building is flooded, even when the passengers get off onto the lowest floor, the passengers cannot evacuate from the hall where they got off to outdoors. For this reason, when the occurrence of a flood is detected by the disaster detection device 1, the evacuation-floor determination device 6 sets the degree of priority of each floor so that the degree of priority becomes high for the upper floors where the effect of the damage by the flood is less great.

[0043] Incidentally, in the case where the simultaneous occurrence of a plurality of disasters is detected by the disaster detection device 1, the evacuation-floor determination device 6 may set the degree of priority also in consideration of the damage condition and degree of danger for each floor which occur due to each disaster. For example, in the case where a fire and another disaster occur simultaneously, for example, the evacuation-floor determination device 6 sets the degree of priority so that for the floor where the fire occurred the degree of priority is lower than the degree of priority of non-service floors.

[0044] On the other hand, in the case where in S 106 the absence of passengers was detected, it is unnecessary to cause the car to run to a floor away from the stop position in order to enable passengers to evacuate. For this reason, when in S 106 the absence of passengers is detected, the evacuation-floor determination device 6 sets a floor the nearest to the position where the car is at a standstill as an evacuation floor (S 1 08).

[0045] When in S 107 or S 108 the setting of an evacuation floor is performed, the run controller 4 causes the car to start running toward the evacuation floor (S109). At this time, for example, the run controller 4 causes the car to run at a speed lower than the run speed during a normal operation, thereby preventing damage to the elevator equipment and secondary disasters from occurring.

[0046] Incidentally, the configuration may be such that also after the run of the car has been started in S109, the resetting of an evacuation floor is made possible by making the setting function of the degree of priority by the evacuation-floor determination device 6 effective. In this case, until the car arrives at the evacuation floor or until the elevator is brought into a pause at the evacuation floor, the update processing of the degree of priority of each floor is performed by the evacuation-floor determination device 6 on the basis of each piece of input information. In the case where a change occurred in the degree of priority after the start of the run to the evacuation floor, the evacuation-floor determination device 6 determines a new evacuation floor on the basis of the newest degree of priority. Incidentally, when a change in the evacuation floor is made by the evacuation-floor determination device 6, the run controller 4 causes the car to run toward the newly determined evacuation floor.

[0047] When in S 107 or S 108 the setting of an evacuation floor is performed, the notification controller 7 outputs a control instruction to the notification device in the car and provides various kinds of information useful for evacuation to the passengers in the car (S110).

[0048] When the car arrives at the evacuation floor set by the evacuation-floor determination device 6 (Yes in S111), the control panel 2 brings the elevator into a pause at that floor after performing a door opening action in order to cause the passengers in the car to get off onto the hall of the evacuation floor (S112).

[0049] According to the first embodiment of the present invention, even in the case where an elevator is brought into an emergency stop in an emergency operation and the car stops between floors, if there are passengers in the car, a floor most suitable for evacuation to outdoors is selected as an evacuation floor and a run to the selected evacuation floor is started. For this reason, the passengers can escape to outdoors in a short time after getting off at the evacuation

floor and it is possible to minimize damage due to disasters.

[0050] Furthermore, when a determination of an evacuation floor is made by the evacuation-floor determination device 6, various kinds of information useful for evacuation are provided by the notification device in the car. For this reason, the passengers are not thrown into a panic even after getting off at the evacuation floor and can swiftly perform evacuation thereafter.

Furthermore, even in the case where the car is brought into an emergency stop between floors due to the occurrence of a disaster, the car starts running toward the nearest floor if there is no passenger in the car. For this reason, it is possible to cause the car to stop in an appropriate position early after the occurrence of a disaster and it is possible to substantially reduce the number of secondary disasters due to a re-run of the car (for example, damage to the elevator equipment and the like) by preventing useless runs.

[0051] In some buildings, there may be cases where a special evacuation route to outdoors is secured on floors other than the main floor and a floor where general passengers are never allowed to get off is provided from the standpoint of security. In this embodiment, the concrete description was given of the case where the main floor is a floor to which the highest priority is given and the nearer to the main floor, the higher the degree of priority. However, this is a mere example. For the evacuation-floor determination device 6, it is necessary only that the degree of priority which is most suited to the building be set in consideration of various factors, such as the construction and evacuation system of the building and the condition and role of each floor.

In some buildings, an optimum evacuation floor may differ from time period to time period. In this case, all that is needed is that the evacuation-floor determination device 6 performs the setting of the degree of priority for each floor also in consideration of the time at which the disaster occurred (the car stopped between floors) and selects an evacuation floor most suitable for the time period.

Industrial Applicability

[0052] The elevator controller of the present invention can be applied to an elevator controller which performs a control operation when a predefined disaster, such as shaking due to an earthquake or a fire, occurs in a building.

Reference Signs List

[0053]

1 disaster detection device

2 control panel

3 operation mode controller

4 run controller

5 restart determination device

6 evacuation-floor determination device

7 notification controller

8 passenger existence/absence determination device

Claims

1. An elevator controller, comprising:

a disaster detection device which detects a predefined disaster which occurs in a building;
a run controller which, in the case where a disaster has been detected by the disaster detection device, brings an elevator car into an emergency stop on the basis of predefined stop conditions; and
an evacuation-floor determination device which, in the case where the car has been brought into an emergency stop by the run controller, sets the degree of priority which indicates the easiness of evacuation of passengers after getting off the car for each floor to which the car is permitted to run from the standpoint of laws and

regulations and physically, and determines an evacuation floor on the basis of the set degree of priority, wherein the run controller causes the car to run to the evacuation floor determined by the evacuation-floor determination device after bringing the car into an emergency stop on the basis of the stop conditions.

2. The elevator controller according to claim 1, wherein the evacuation-floor determination device sets the degree of priority of a main floor of the building to be highest, sets the degree of priority of service floors at which the car stops in normal operations in such a manner that the nearer to the main floor, the higher the degree of priority, and sets the degree of priority of non-service floors at which the car does not stop in normal operations to be lower than the degree of priority of the service floors.

3. The elevator controller according to claim 1, wherein in the case where the simultaneous occurrence of a plurality of disasters has been detected by the disaster detection device, the evacuation-floor determination device performs the setting of the degree of priority also in consideration of the condition of damage for each floor occurring due to each disaster.

4. The elevator controller according to claim 1, wherein
the evacuation-floor determination device makes the setting function of the degree of priority effective also after a run to an evacuation floor has been started by the run controller; and
in the case where a new evacuation floor has been determined by the evacuation-floor determination device, after the start of a run to an evacuation floor, the run controller causes the car to run to the newly determined evacuation floor.

5. The elevator controller according to any of claims 1 to 4, further comprising:

a restart determination device which, in the case where the car has stopped between floors by an emergency stop on the basis of the stop conditions, determines on the basis of predefined restart conditions as to whether or not the car can run again, wherein
in the case where it is determined by the restart determination device that the car can run again, the evacuation-floor determination device makes a determination of an evacuation floor on the basis of the degree of priority.

6. The elevator controller according to any of claims 1 to 4, further comprising:

a notification device which is provided in the car; and
a notification controller which causes the notification device to provide information to the effect that the car is running to an evacuation floor permitting easy evacuation and predefined information useful in evacuation after getting off the car while the car is running toward an evacuation floor.

7. The elevator controller according to any of claims 1 to 4, further comprising:

a passenger existence/absence determination device which makes a determination as to the existence or absence of passengers in the car, wherein
the evacuation-floor determination device makes a determination of an evacuation floor on the basis of the degree of priority if the existence of passengers is detected by the passenger existence/absence determination device when the car is brought into an emergency stop on the basis of the stop conditions; and
the run controller causes the car to run to the nearest floor if the absence of passengers is detected by the passenger existence/absence determination device when the car is brought into an emergency stop on the basis of the stop conditions.

Fig. 1

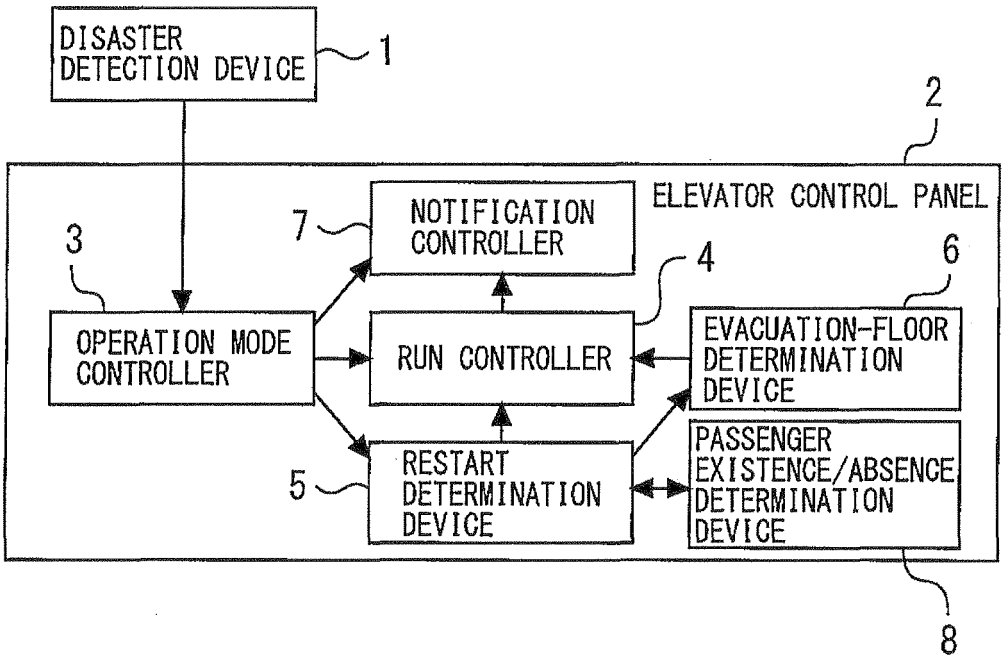
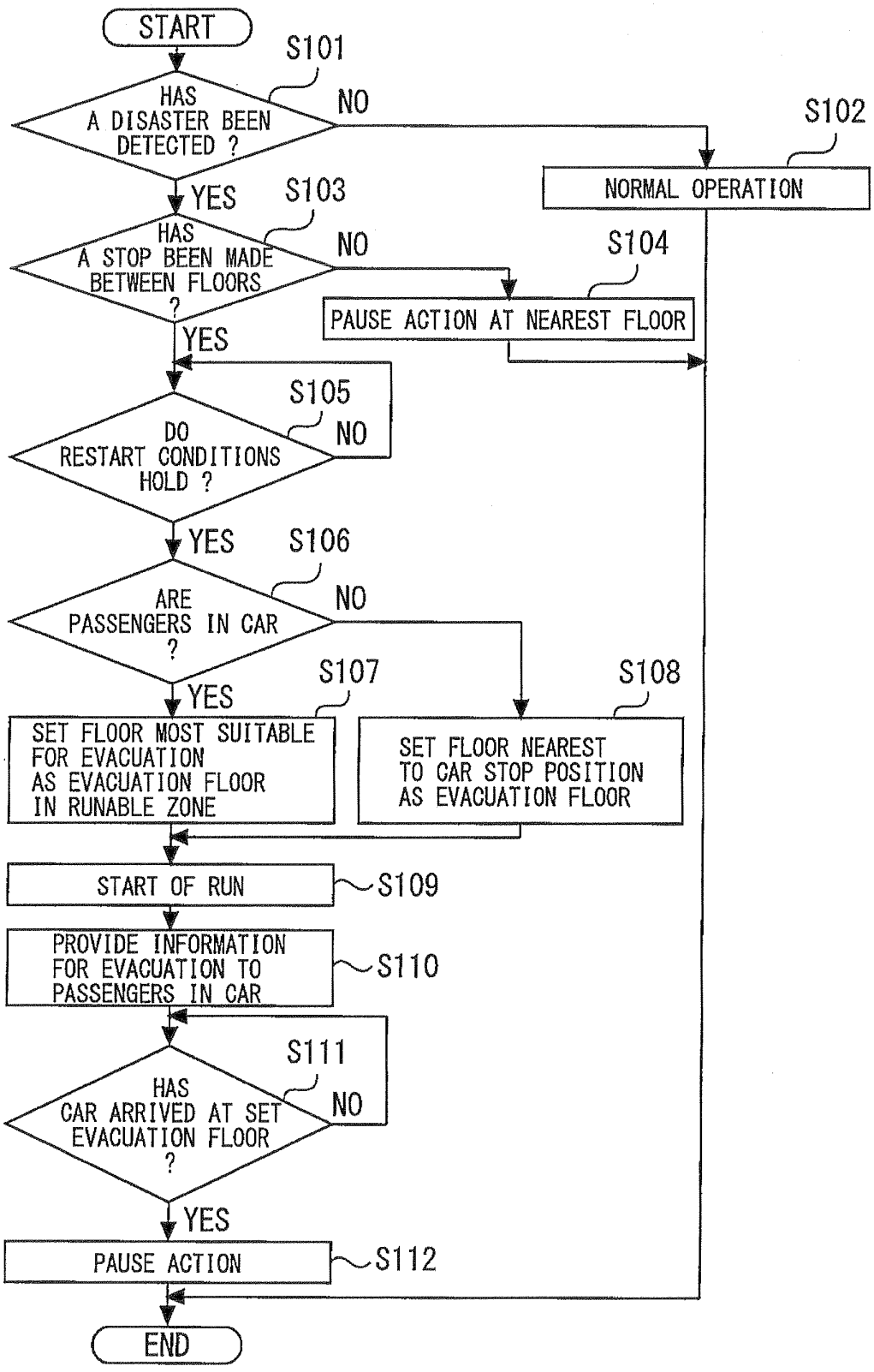

DISASTER DETECTION DEVICE
1
2
ELEVATOR CONTROL PANEL
3
7
NOTIFICATION CONTROLLER
4
6
OPERATION MODE CONTROLLER
RUN CONTROLLER
EVACUATION-FLOOR DETERMINATION DEVICE
5
RESTART DETERMINATION DEVICE
PASSENGER EXISTENCE/ABSENCE DETERMINATION DEVICE
8

Fig. 2


START
S101
HAS A DISASTER BEEN DETECTED ?
NO
S102
NORMAL OPERATION
YES
S103
HAS A STOP BEEN MADE BETWEEN FLOORS ?
NO
S104
PAUSE ACTION AT NEAREST FLOOR
YES
S105
DO RESTART CONDITIONS HOLD ?
NO
YES
S106
ARE PASSENGERS IN CAR ?
NO
YES
S107
SET FLOOR MOST SUITABLE FOR EVACUATION AS EVACUATION FLOOR IN RUNABLE ZONE
S108
SET FLOOR NEAREST TO CAR STOP POSITION AS EVACUATION FLOOR
START OF RUN
S109
PROVIDE INFORMATION FOR EVACUATION TO PASSENGERS IN CAR
S110
S111
HAS CAR ARRIVED AT SET EVACUATION FLOOR ?
NO
YES
PAUSE ACTION
S112
END

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2010/056170

A. CLASSIFICATION OF SUBJECT MATTER
B66B5/02(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B66B5/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2010
Kokai Jitsuyo Shinan Koho 1971-2010 Toroku Jitsuyo Shinan Koho 1994-2010

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2007-254036 A (Toshiba Elevator and Building Systems Corp.), 04 October 2007 (04.10.2007), paragraphs [0023] to [0027] (Family: none)	1-7
Y	JP 2008-230778 A (Toshiba Elevator and Building Systems Corp.), 02 October 2008 (02.10.2008), paragraphs [0035] to [0040] (Family: none)	1-5,7
Y	JP 10-182029 A (Toshiba Elevator and Building Systems Corp.), 07 July 1998 (07.07.1998), paragraphs [0013] to [0014], [0034] to [0035] (Family: none)	1-2,4-7

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

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
02 November, 2010 (02.11.10)	16 November, 2010 (16.11.10)
Name and mailing address of the ISA/ Japanese Patent Office Facsimile No.	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2010/056170

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	JP 2007-91379 A (Mitsubishi Electric Corp.), 12 April 2007 (12.04.2007), paragraphs [0020] to [0021] & EP 1930279 A1 & WO 2007/037031 A1 & KR 10-2007-0067166 A & CN 101061052 A	1-2,4-5,7
Y	JP 4-365768 A (Toshiba Corp.), 17 December 1992 (17.12.1992), paragraph [0005] (Family: none)	2
Y	JP 3-13502 Y2 (Fujitec Co., Ltd.), 27 March 1991 (27.03.1991), column 3, line 30 to column 4, line 7 (Family: none)	7
A	JP 2005-187162 A (Mitsubishi Electric Corp.), 14 July 2005 (14.07.2005), entire text; fig. 1 to 16 (Family: none)	1-7

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2007254036 A **[0004]**