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(54) **ELEVATOR CONTROL DEVICE**

(57) In an elevator control device in which there is provided at an elevator car an air conditioner and a drain tank, as well as there is provided at the lowermost floor a drain equipment; and in which the lowermost floor is set to be a non-service floor in normal operation, as well as the lowermost floor is set to be a floor at which the elevator car can be stopped at the time of a tank drain operation for making a drain operation of the drain tank with the drain equipment, to prevent passenger having been late for getting off from being confined at the time of making a drain operation from a drain tank, there is provided control means for causing the elevator car to travel from the lowermost floor to a floor at which the elevator car can be stopped in the case any button of a control panel is operated before the drain operation is started.

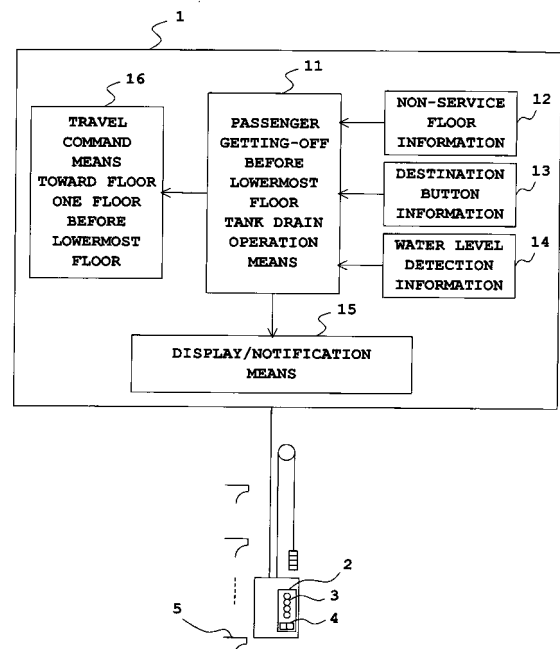


FIG. 1

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Description

Technical Field

[0001] The present invention relates to an elevator control device equipped with an air conditioner.

Background Art

[0002] In an elevator in which there are provided at an elevator car (hereinafter, merely referred to as "car" as well) an air conditioner and a drain tank, and there is provided at the lowermost floor, being a tank drain floor, a drain equipment; and when water in the above-mentioned drain tank exceeds a predetermined amount, operation of the above-mentioned air conditioner is stopped, as well as the above-mentioned car is returned to the lowermost floor, and a drain valve of the above-mentioned drain tank is made open with a door of the above-mentioned car closed to make the operation of draining water from this drain tank at this lowermost floor set to be a non-service floor, the following elevator control device is proposed. In this elevator control device, there is provided means, at the time of tank drain operation of causing the above-mentioned car to travel toward the above-mentioned lowermost floor for water drain, for once forcibly stopping the above-mentioned car at a floor one floor before the above-mentioned lowermost floor to open a door of this car, as well as for notifying passengers in the above-mentioned car to get off at this floor (for example, refer to Patent Document 1).

[0003] Patent Document 1: the Japanese Patent Publication (unexamined) No. 229748/1993

Disclosure of Invention

Problems to be solved by the Invention

[0004] In the case of the elevators in which the lowermost floor, being a tank drain floor, is set to be a non-service floor, conventionally as in the above-mentioned Patent Document 1, an elevator car is forcibly stopped at a service floor one floor before the lowermost floor to open the door of the elevator car, and notification or display of urging getting off is made.

However, supposing that passengers are not aware of these notification and display, or users of passengers-by get on the elevator of which door is open as is in normal operation, an elevator car is traveled to the lowermost floor upon the door is closed, the door of the elevator car is not open during several minutes while water drain operation of a drain tank is conducted, and the passengers in the elevator car are in the state of being confined at the lowermost floor. As a result, a problem exists in that anxiety and discomfort are given to the passengers in the elevator car.

The present invention has been made to solve such problems, and has an object of providing an elevator control

device by which, in an elevator in which the lowermost floor is set to be a non-service floor, passengers are prevented from being confined at the lowermost floor even if no passengers get off, or erroneously users get on this elevator car, when the elevator car is once stopped at a floor one floor before the lowermost floor in mode of draining water from a drain tank at the lowermost floor.

Means of Solution to the Problems

[0005] The elevator control device according to the invention is an elevator control device in which there is provided at an elevator car an air conditioner and a drain tank, as well as there is provided at the lowermost floor a drain equipment; and in which the mentioned lowermost floor is set to be a non-service floor in normal operation, as well as the mentioned lowermost floor is set to be a floor at which the elevator car can be stopped at the time of a tank drain operation for making a drain operation of the mentioned drain tank with the mentioned drain equipment, the elevator control device comprising:

first control means that causes the mentioned elevator car to be once stopped at the nearest service floor at which passengers can get off before the lowermost floor, and makes door opening/closing operation for allowing passengers to get off when the mentioned elevator car is traveled to the mentioned lowermost floor for the mentioned drain operation; second control means that causes the mentioned elevator car to travel again from the mentioned lowermost floor to the mentioned floor at which passengers can get off to be stopped, to make a door opening/closing operation for allowing passengers to get off in the case where any button of a car control part is operated within a time period after the mentioned door opening/closing operation is done but before the mentioned elevator car is made to travel to and stop at the mentioned lowermost floor while performing notification and display of getting-on rejection, and the mentioned water drain operation is started; and

third control means that causes the mentioned elevator car to travel to and stop at the mentioned lowermost floor again, and makes the mentioned drain operation in the state that the door is closed after the passengers are allowed to get off.

Effect of the Invention

[0006] According to the elevator control device of this invention, in the case where there are passengers late for getting off after the elevator car has stopped at a floor at which passengers can get off before the lowermost floor, being a tank drain floor, but before the tank drain operation is started, supposing that any button of the car control part is operated, the elevator car is once traveled to a service floor at which passengers can get off, thereby

allowing the passengers to get off.

Consequently, it is possible to provide a highly reliable elevator in which there is no state of being confined even if an elevator car is arrived at the lowermost floor, thus making it possible to improve convenience and to reduce anxiety and discomfort of passengers in the elevator car.

Best Mode for Carrying Out the Invention

[0007] Hereinafter, referring to the drawings, a first preferred embodiment according to the present invention is described.

Additionally, in the drawings, the same reference numerals indicate the same or like parts.

Embodiment 1.

[0008] An elevator control device according to the first embodiment is the one in which there is provided at a elevator car an air conditioner (cooler) and a drain tank, and there is provided at the lowermost floor a drain equipment; and in which the above-mentioned lowermost floor is set to be a non-service floor in normal operation, and the above-mentioned lowermost floor is set to be a floor at which the elevator car can be stopped at the time of draining water from the above-mentioned drain tank.

Further, in the elevator control device according to this first embodiment, when water in the above-mentioned drain tank exceeds a predetermined amount, hall calls are cancelled to accept, and the operation of air conditioner is stopped; as well as the elevator car is returned to the above-mentioned lowermost floor, being a non-service floor, and the water in the drain tank is drained in the state that the door is closed at this lowermost floor. Furthermore, the elevator control device according to this first embodiment is provided with getting-off before lowermost floor tank drain operation means by which no passengers are confined at the lowermost floor, being a non-service floor even in the case where no passengers get off, or on the contrary, erroneously users get on this elevator car although the elevator car is once stopped at the nearest service floor (normally at a floor one floor before the above-mentioned lowermost floor) in order to allow the passengers in the elevator car to get off before this drain operation.

More specifically, this getting-off before the lowermost floor tank drain operation means consists of: first control means that, at the time of making a drain operation in the drain tank, causes the elevator car to be once stopped at the above-mentioned nearest service floor, and makes door opening/closing operation for allowing passengers to get off; second control means that causes the elevator car to travel again from the above-mentioned lowermost floor to a floor at which the elevator car can stop to be stopped, to allow passengers to get off in the case where any button of a car control part is operated by passengers late for getting off within a time period after the door opening/closing operation is done but before the elevator car

is made to travel to and stop at the above-mentioned lowermost floor while performing notification and display of getting-on rejection, and the above-mentioned water drain operation is started, that is, during this time period; and third control means that causes the elevator car to travel to and stop at the above-mentioned lowermost floor again, and makes tank drain operation in the state that the door is closed after the passengers are allowed to get off.

[0009] Fig. 1 is a system block diagram of an elevator according to this first embodiment of the invention. Fig. 2 is an explanatory flowchart of operations of the elevator control device according to this first embodiment of the invention.

With reference to Fig. 1, reference numeral 1 designates an elevator control panel. This elevator control panel 1 makes an operation control, speed control and the like of an elevator as a whole.

According to this first embodiment, the elevator control panel 1 is provided with getting-off before tank drain operation means 11, non-service floor information 12, car call button information 13, water-level detection information, display and notification means 15, and travel command means 16 to a floor before the lowermost floor 5.

Further, numeral 2 designates a car control part (control panel), numeral 3 designates car call buttons, and numeral 4 designates door opening/closing buttons.

In the case where the lowermost floor 5 is a non-service floor as mentioned above, to prevent passengers from being confined at the time of tank drain operation, the getting-off before tank drain operation means 11 obtains information of non-service floor information 12 and water-level detection information 14 to command up-travel as follows.

That is, when water in a drain tank (not shown) comes to be at a predetermined water level and drain operation from the drain tank is made, an elevator car is made to stop at a floor one floor before the lowermost floor 5 to allow passengers to get off.

Thereafter, although the elevator car will travel to the lowermost floor 5 to start the tank drain operation, it may be thought that some passengers are late for getting off. Accordingly, only in the case where any button of the car control part 2 is operated by passengers having been late for getting off during the time period until the tank drain operation is started, the elevator car having been stopped at the lowermost floor 5 is commanded to travel up again toward the nearest service floor.

[0010] After the up-travel has started, non-service floor information 12 and car call button information 13 are obtained. Further, in the case where a car call button operated floor is not a non-service floor, a normal car call registration is executed; and in the case where a car call button operated floor is a non-service floor, display and notification means 15 is commanded to output "No call registration of the operated floor", and car call registration is executed to the nearest floor that is not a non-service floor.

During this time period, the elevator car is traveled while performing notification and display of getting-on rejection. In the case where a car call button 3 is newly operated, the elevator car responds to this operation of the car call button 3. Further, when the response to a final car call is completed, a door is closed at this floor, a travel command to the lowermost floor 5 is outputted, and the elevator car is stopped at the lowermost floor 5 to drain water from the drain tank.

In addition, in the case where no car call button 3 is operated in a predetermined time period after the up-travel has started, the elevator car is stopped at the nearest service floor (normally at the floor one floor before the lowermost floor). After a predetermined time period of the door being open has elapsed, the door is closed to command travel to the lowermost floor 5, and the elevator car is stopped at the lowermost floor 5 to drain water from the drain tank.

[0011] Now, operations of draining water from a drain tank are described with reference to the flowchart of Fig. 2.

With reference to Fig. 2, when a car control part (control panel) is operated before water in the drain tank is drained at the lowermost floor, being a tank drain floor, the following operations are made to allow passengers to get off.

Step S1: In cooler operation, the operation is made with a tank drain floor (the lowermost floor) being a non-service floor. (normal operation mode)

Step S2: When a water level in the tank is detected to be a predetermined water level, for example, 80%, the operation goes to Step S3. Otherwise, the normal operation continues (Step S1).

Step S3: The operation of a cooler is stopped, and response to hall calls is inhibited. (tank drain operation mode)

Step S4: When it is responded to the final car call and a door is fully closed, operation goes to Step S5. In the case where there is any car call to be responded, operation goes to Step S3.

Step S5: The elevator car is traveled toward a floor one floor before the lowermost floor, and then stopped there.

Step S6: It is determined whether or not any button of the car control part (control panel) 2 is operated before the elevator car starts traveling from the floor one floor before the lowermost floor toward the lowermost floor. In the case of any button not being operated, operation goes to Step S7. Further, in the case where any button of the car control part (control panel) 2 is operated, operation goes to Step S10.

Step S7: The elevator car is traveled toward the lowermost floor, being a tank drain floor. During a time period until tank drain operation is started, the determination is made in Step S8.

Step S8: It is determined whether or not any button of the car control part (control panel) 2 is operated

until the tank drain operation of the elevator car is made. In the case of not being operated, operation goes to Step S9. In the case where any button of the control panel is operated, operation goes to step S14.

Step S9: Water in the tank is drained.

Step S10: In the case where any car call button is operated, operation goes to Step S11. In the case of not being operated, operation returns to Step S6.

Step S14: In the case where any car call button is operated, operation goes to Step S11. In the case of not being operated, operation goes to Step S5.

Step S11: It is determined whether or not any car call button is operated to be at a non-service floor. In the case where it is not a non-service floor, operation goes to Step S12. In the case where it is a non-service floor, operation goes to Step S13.

Step S12: Car call registration of an operated floor is executed as is in the normal operation.

Step S13: Car call registration cannot be executed at a non-service floor, so that the car call registration to the nearest floor that is not a non-service floor (service floor) is executed, and it is notified that car call registration of an operated floor cannot be executed.

Step S15: Operations are responded only to car calls having been registered. After these responses have completed, operation goes to Step S7.

[0012] Now, a modification of this first embodiment is hereinafter described.

In the above-mentioned case, to allow passengers having been left in an elevator car to get off, the elevator car is traveled to the nearest floor or a floor to be operated with a car call button 3. This modification, however, may be arranged such that the elevator car is once traveled to the uppermost floor while performing notification and display of getting-on rejection, then the elevator car is stopped at a floor one floor before the lowermost floor, and thereafter the elevator cars is traveled to the lowermost floor 5.

In this manner, the passengers having been left in the elevator car during going up and down make the operations of any car call button 3 of floors to be intended, and all passengers can get off at intended floors, so that it is possible to more reliably prevent passengers from being confined.

Industrial Applicability

[0013] The present invention is preferred to implement a highly reliable elevator in which even if an elevator car is arrived at the lower most floor, there is no occurrence of the state that passengers are confined during drain operation of a drain tank of an air conditioner, thus enabling to improve convenience and to reduce anxiety and discomfort of passengers in the elevator car.

[0014]

[Fig. 1] is a system block diagram of an elevator control device according to a first embodiment of the present invention.

[Fig. 2] is a flowchart showing operations in the first embodiment of the invention.

[0015]

1: elevator control panel, 2: car control part

3: car call buttons, 4: door opening/closing buttons

5: lowermost floor

11: getting-off before lowermost floor tank drain operation means

12: non-service floor information, 13: car call button information

14: water level detection information, 15: display and notification means

16: travel command means toward a floor one floor before the lowermost floor

Claims

1. An elevator control device in which there is provided at an elevator car an air conditioner and a drain tank, as well as there is provided at the lowermost floor a drain equipment; and in which said lowermost floor is set to be a non-service floor in normal operation, as well as said lowermost floor is set to be a floor at which the elevator car can be stopped at the time of a tank drain operation for making a drain operation of said drain tank with said drain equipment, the elevator control device comprising:

first control means that causes the elevator car to be once stopped at the nearest service floor at which passengers can get off before said lowermost floor, and makes door opening/closing operation for allowing passengers to get off when said elevator car is traveled to said lowermost floor for said drain operation;

second control means that causes said elevator car to travel again from said lowermost floor to said floor at which passengers can get off to be stopped, to make a door opening/closing operation for allowing passengers to get off in the case in which any button of a car control part is operated in a time period after said door opening/closing operation is done but before said elevator car is made to travel to and stop at said lowermost floor while performing notification and display of getting-on rejection, and said water drain operation is started; and

third control means that causes the elevator car to travel to and stop at said lowermost floor again, and makes said drain operation in the state in which the door is closed after the passengers are allowed to get off.

2. An elevator control device in which there is provided at an elevator car an air conditioner and a drain tank, as well as there is provided at the lowermost floor a drain equipment; and in which said lowermost floor is set to be a non-service floor in normal operation, as well as said lowermost floor is set to be a floor at which the elevator car can be stopped at the time of a tank drain operation for making a drain operation of said drain tank with said drain equipment, the elevator control device comprising:

first control means that causes said elevator car to be once stopped at the nearest service floor at which passengers can get off before said lowermost floor, and makes door opening/closing operation for allowing passengers to get off when said elevator car is traveled to said lowermost floor for said drain operation;

second control means, in the case in which a button of a car control part is operated in a time period after said door opening/closing operation is done but before said elevator car is made to travel to and stop at said lowermost floor while performing notification and display of getting-on rejection, and said water drain operation is started, when an operated button is a car call button of a non-service floor, that notifies that it is a non-service floor and causes said elevator car to travel again from said lowermost floor to said floor at which passengers can get off to be stopped, to make a door opening/closing operation for allowing passengers to get off; and when an operated button is a car call button of a service floor at which passengers can get off, that causes said elevator car to travel from said lowermost floor to a floor of said car call button to be stopped, to make a door opening/closing operation for allowing passengers to get off; and third control means that causes said elevator car to travel to and stop at said lowermost floor again, and makes said drain operation in the state in which the door is closed after the passengers are allowed to get off.

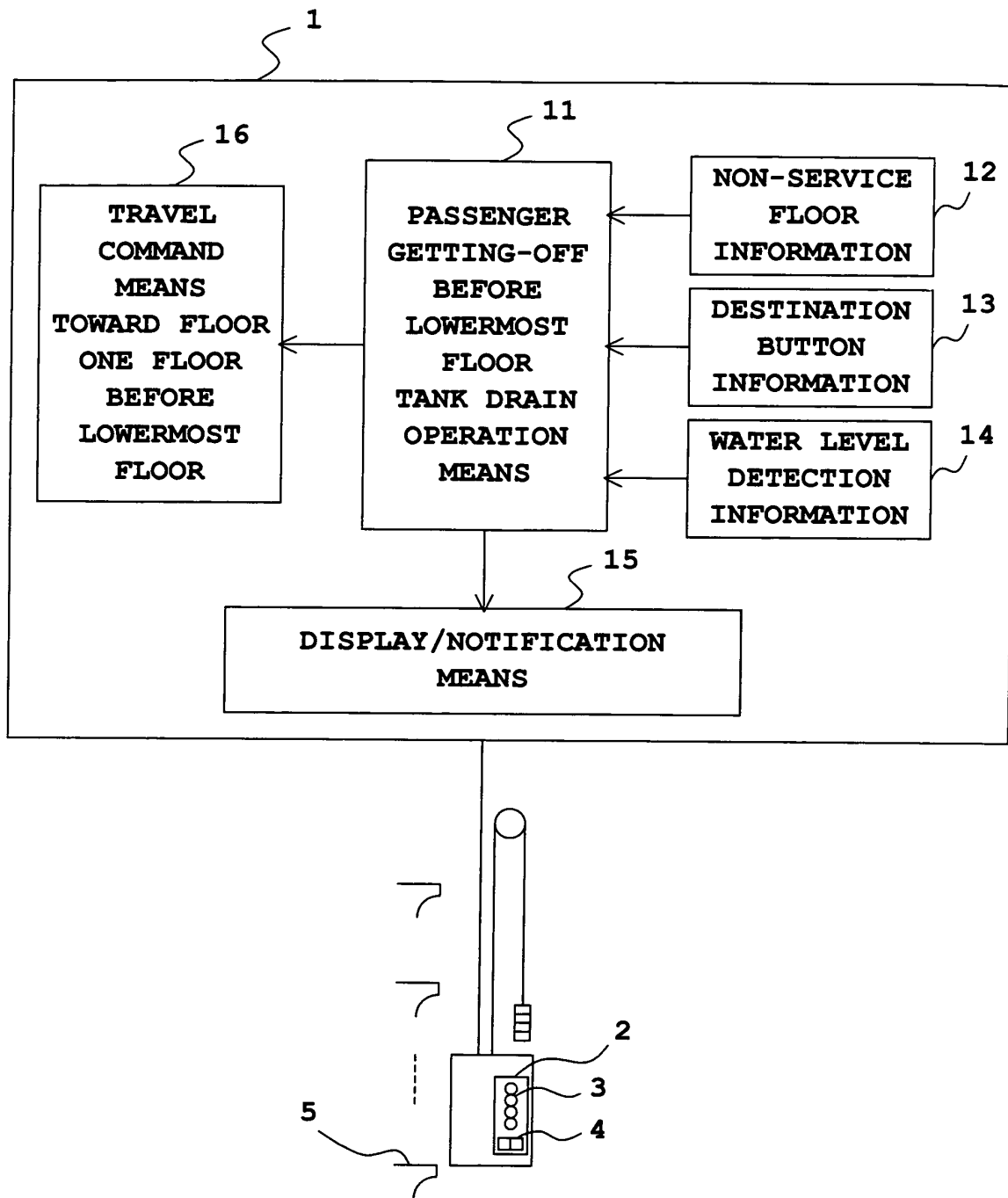


FIG. 1

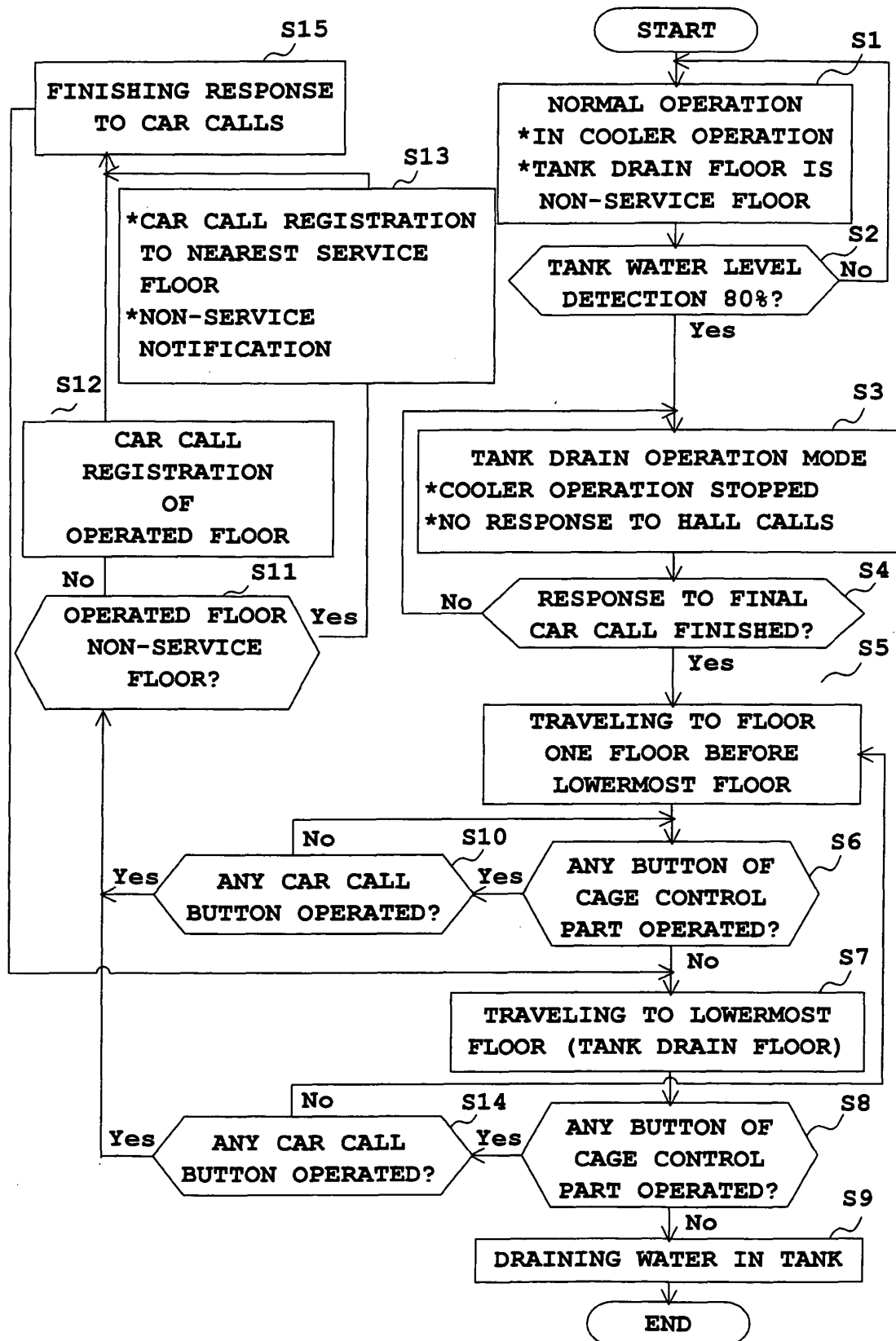


FIG. 2

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2006/302960

A. CLASSIFICATION OF SUBJECT MATTER B66B1/14 (2006.01) , B66B5/00 (2006.01) , B66B11/02 (2006.01)		
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) B66B1/00 (2006.01) - B66B11/08 (2006.01)		
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 1996-2006 Kokai Jitsuyo Shinan Koho 1971-2006 Toroku Jitsuyo Shinan Koho 1994-2006		
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 5-229748 A (Toshiba Corp.), 07 September, 1993 (07.09.93), Par. Nos. [0012] to [0026]; Figs. 1 to 2 (Family: none)	1-2
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 3573/1971 (Laid-open No. 19970/1972) (Mitsubishi Electric Corp.), 06 November, 1972 (06.11.72), Claim 1 (Family: none)	1-2
☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier application or patent but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 26 May, 2006 (26.05.06)		Date of mailing of the international search report 06 June, 2006 (06.06.06)
Name and mailing address of the ISA/ Japanese Patent Office		Authorized officer
Facsimile No.		Telephone No.

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2006/302960

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 2-66082 A (Toshiba Corp.), 06 March, 1990 (06.03.90), Claim 1 (Family: none)	1-2

Form PCT/ISA/210 (continuation of second sheet) (April 2005)

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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