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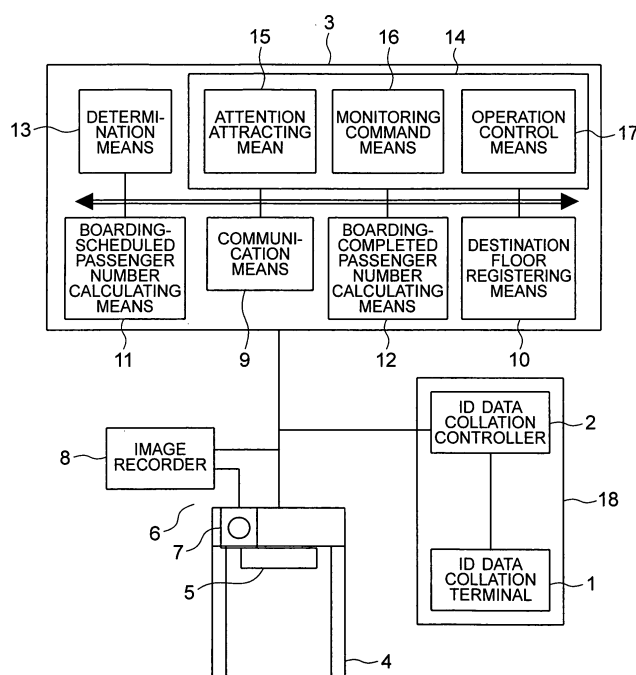
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(54) **ELEVATOR CONTROL DEVICE**

(57) A control device for an elevator includes: boarding-scheduled passenger number calculating means for calculating, based on information from an ID information collating device for reading ID information on each passenger to determine whether to authenticate the ID information or not, the number of passengers scheduled to board a car as a boarding passenger number schedule value; boarding-completed passenger number detecting

means for detecting the number of passengers having boarded the car as a boarding passenger number completion value; determination means for determining whether or not the boarding passenger number schedule value and the boarding passenger number completion value are equal to each other; and travel supervising means for controlling operation of the elevator based on information from the determination means.

FIG. 1



Description

Technical Field

[0001] The present invention relates to a control device for an elevator which controls the operation of the elevator.

Background Art

[0002] Conventionally, with a view to making an improvement in security effect, there has been proposed an elevator having a structure in which the movement of a car is controlled based on information from an ID information collation terminal installed in a hall of an apartment house. In the conventional elevator as described above, ID data input to the ID information collation terminal are collated with pre-registered data. Only when the ID data are authenticated, an electric lock for the hall is unlocked, and the car is moved to a floor where the hall is located (e.g., see Patent Document 1).

[0003] Conventionally, there has also been proposed an elevator having a structure in which a car is allocated based on personal identification information recognized by an identification device installed at each landing. In the elevator as described above, when a passenger boards the car, a destination floor of the passenger is automatically registered (e.g., see Patent Document 2).

[0004] Patent Document 1: JP 2002-129793 A
Patent Document 2: JP 2002-265154 A

Disclosure of the Invention

Problem to be solved by the Invention

[0005] However, when a plurality of passengers board the car at the same time, it is also conceivable that some of them do not input their ID information. Accordingly, in an office building or the like where there is, for example, a dedicated floor intended to permit visits of certain people only, there is a risk that other passengers who have not input their ID information as well as those certain people who have input their ID information enter the dedicated floor.

[0006] The present invention has been made to solve the above-mentioned problem, and it is therefore an object of the present invention to obtain a control device for an elevator capable of making an improvement in security effect.

Means for solving the Problem

[0007] A control device for an elevator according to the present invention includes: boarding-scheduled passenger number calculating means for calculating, based on information from an ID information collating device for reading ID information on each passenger to determine whether to authenticate the ID information or not, the

number of passengers scheduled to board a car as a boarding passenger number schedule value; boarding-completed passenger number detecting means for detecting the number of passengers having boarded the car as a boarding passenger number completion value; determination means for determining whether or not the boarding passenger number schedule value and the boarding passenger number completion value are equal to each other; and travel supervising means for controlling operation of the elevator based on information from the determination means.

Brief Description of the Drawings

[0008]

Fig. 1 is a functional block diagram showing an elevator system according to Embodiment 1 of the present invention.

Fig. 2 is a flowchart for explaining the operation of the elevator system of Fig. 1.

Best Mode for carrying out the Invention

[0009] A preferred embodiment of the present invention will be described hereinafter with reference to the drawings.

Embodiment 1

[0010] Fig. 1 is a functional block diagram showing an elevator system according to Embodiment 1 of the present invention. Referring to Fig. 1, an ID data collation terminal 1 for reading ID information on passengers is installed at a landing of each floor. For example, a card reader for reading information on cards and a fingerprint reading device for reading fingerprints of passengers can be mentioned as the ID data collation terminal 1. The ID information read by the ID data collation terminal 1 is transmitted to an ID data collation controller 2 for determining whether to authenticate the ID information or not.

[0011] The ID information on the passengers is pre-registered in the ID data collation controller 2 as information for collation. The ID data collation controller 2 collates the ID information read by the ID data collation terminal 1 with the information for collation, thereby determining whether to authenticate the ID information or not. When a piece of ID information on a passenger is authenticated, a piece of information for transmission corresponding to the authenticated ID information (e.g., piece of personal information such as destination floor) is transmitted from the ID data collation controller 2 to a control device 3 for an elevator.

[0012] A car 4 is provided with an indicator (information display) 5 for indicating information within the car 4, and a monitoring system 6 for monitoring the interior of the car 4. The monitoring system 6 has a monitoring camera 7 for imaging the interior of the car 4, and an image re-

corder 8 for recording image information from the monitoring camera 7. The car 4 is also provided with a weighing device (not shown) for measuring a weight within the car 4.

[0013] The control device 3 has communication means 9, destination floor registering means 10, boarding-scheduled passenger number calculating means 11, boarding-completed passenger number detecting means 12, determination means 13, and travel supervising means 14.

[0014] The communication means 9 communicates information to and from external components such as the ID data collation controller 2 and the weighing device. That is, the transmission of information between the control device 3 and the external components is carried out via the communication means 9.

[0015] The destination floor registering means 10 registers a destination floor of the car 4 based on information from the ID data collation controller 2. That is, the information from the ID data collation controller 2 includes information on a destination floor of each passenger. A registration of a call for the car 4 is automatically made in the control device 3 based on the information on the destination floor.

[0016] The boarding-scheduled passenger number calculating means 11 calculates the number of passengers scheduled to board the car 4 as a boarding passenger number schedule value, based on the information from the ID data collation controller 2. Specifically, the boarding-scheduled passenger number calculating means 11 detects the number of times of the reading of ID information by the ID data collation terminal 1 from a moment of completion of a last door-closing operation for an elevator doorway to a moment of completion of a current door-closing operation (i.e., during single boarding process), and calculates the detected number of times as a boarding passenger number schedule value.

[0017] The boarding-completed passenger number detecting means 12 detects the number of passengers having boarded the car 4 as a boarding passenger number completion value, based on information from the weighing device. Specifically, the boarding-completed passenger number detecting means 12 detects a weight within the car 4 measured by the weighing device, and divides the detected weight by a preset weight per passenger (65 kg in this example) to calculate a boarding passenger number completion value.

[0018] The determination means 13 determines whether or not the boarding passenger number schedule value and the boarding passenger number completion value are equal to each other, based on information from the boarding-scheduled passenger number calculating means 11 and information from the boarding-completed passenger number detecting means 12.

[0019] The travel supervising means 14 controls the operation of the elevator based on information from the determination means 13 and information from the destination floor registering means 10. The travel supervising

means 14 has attention attracting means 15, monitoring command means 16, and operation control means 17.

[0020] When the boarding passenger number schedule value and the boarding passenger number completion value are different from each other, the attention attracting means 15 outputs an attention indication command to the indicator 5. Upon receiving the attention indication command, the indicator 5 indicates that there is an abnormality in the number of passengers (e.g., "There is at least one person who has not input his/her ID."). That is, when the boarding passenger number schedule value and the boarding passenger number completion value are different from each other, the attention attracting means 15 issues to the interior of the car 4 an announcement that there is an abnormality in the number of passengers.

[0021] When the boarding passenger number schedule value and the boarding passenger number completion value are different from each other, the monitoring command means 16 outputs (issues) a monitoring command to the monitoring system 6. Upon receiving the monitoring command, the monitoring system 6 records image information from the monitoring camera 7 into the image recorder 8.

[0022] When the boarding passenger number schedule value and the boarding passenger number completion value are equal to each other, the operation control means 17 performs normal opening/closing operations for the elevator doorway, and moves the car 4 to destination floors registered by the destination floor registering means 10. When the boarding passenger number schedule value and the boarding passenger number completion value are different from each other, the operation control means 17 causes the car 4 to wait for a predetermined time while holding the elevator doorway in a door-open state, and then performs a door-closing operation to move the car 4 to the destination floors.

[0023] An ID information collating device 18 has the ID data collation terminal 1 and the ID data collation controller 2.

[0024] The control device 3 is constituted by a computer having a calculation processing portion (CPU), a storage portion (ROM, RAM, and the like), and signal input/output portions. The functions of the communication means 9, the destination floor registering means 10, the boarding-scheduled passenger number calculating means 11, the boarding-completed passenger number detecting means 12, the determination means 13, and the travel supervising means 14 are realized by the computer constituting the control device 3.

[0025] That is, control programs for realizing the functions of the communication means 9, the destination floor registering means 10, the boarding-scheduled passenger number calculating means 11, the boarding-completed passenger number detecting means 12, the determination means 13, and the travel supervising means 14 are stored in the storage portion of the computer. The calculation processing portion performs a calculation

processing regarding the function of the control device 3 based on the control programs.

[0026] Next, an operation will be described. Fig. 2 is a flowchart for explaining the operation of the elevator system of Fig. 1. As shown in Fig. 2, when the ID data collation terminal 1 reads ID information on a passenger and the ID data collation controller 2 authenticates the read ID information (S10), personal information on the passenger (e.g., information on a destination floor) is transmitted from the ID data collation controller 2 to the control device 3. In a case where a plurality of pieces of ID information are authenticated by the ID data collation controller 2, pieces of personal information on passengers corresponding to the respective pieces of ID information are transmitted to the control device 3.

[0027] After that, the boarding-scheduled passenger number calculating means 11 detects the number of times of transmission of information from the ID data collation controller 2 to the control device 3, thereby calculating a boarding passenger number schedule value (S11).

[0028] After that, the boarding-completed passenger number detecting means 12 calculates the number of passengers having boarded the car 4 as a boarding passenger number completion value, based on information from the weighing device (S12).

[0029] After that, the destination floor registering means 10 automatically registers destination floors of the passengers having boarded the car 4, based on the information from the ID data collation controller 2 (S13).

[0030] After that, the determination means 13 determines whether or not the boarding passenger number schedule value calculated by the boarding-scheduled passenger number calculating means 11 and the boarding passenger number completion value calculated by the boarding-completed passenger number detecting means 12 are equal to each other (S14). When the boarding passenger number schedule value and the boarding passenger number completion value are equal to each other, the door-closing operation for the elevator doorway is performed (S15), and the car 4 is moved to the automatically registered destination floors.

[0031] When the boarding passenger number schedule value and the boarding passenger number completion value are not equal to each other, the attention attracting means 15 outputs an attention indication command to the indicator 5, so the indicator 5 indicates an attention attracting message such as "There is at least one person who has not input his/her ID." (S16). The monitoring command means 16 outputs a monitoring command to the monitoring system 6, so image information from the monitoring camera 7 is recorded into the image recorder 8 (S17).

[0032] Then, after the lapse of a predetermined time, the door-closing operation for the elevator doorway is performed (S15), and the car 4 is moved to the automatically registered destination floors.

[0033] In the control device for the elevator configured

as described above, the number of passengers scheduled to board the car 4 is calculated as a boarding passenger number schedule value based on information from the ID information collating device 18, the number of passengers having boarded the car 4 is calculated as a boarding passenger number completion value, and it is then determined whether or not the boarding passenger number schedule value and the boarding passenger number completion value are equal to each other. It is therefore possible to determine with ease whether or not an outsider other than the passengers having registered their ID information has boarded the car 4. Accordingly, it is possible to prevent an outsider from entering a dedicated floor intended to permit visits of certain people only, and hence make an improvement in security effect.

[0034] When the boarding passenger number schedule value and the boarding passenger number completion value are different from each other, the attention attracting means 15 causes the indicator 5 to indicate that there is an abnormality in the number of passengers. It is therefore possible to inform the passengers within the car 4 that there is at least one outsider among them.

[0035] When the boarding passenger number schedule value and the boarding passenger number completion value are different from each other, the monitoring command means 16 issues a command to the monitoring system 6 for monitoring the interior of the car 4. It is therefore possible to take measures such as recordation of the interior of the car 4 as an image at a time when there is an outsider on board. It is thus possible to identify the outsider and make a further improvement in security effect.

[0036] In the foregoing example, when the boarding passenger number schedule value and the boarding passenger number completion value are different from each other, the attention attracting means 15 causes the indicator 5 to indicate that there is an abnormality in the number of passengers. However, it is also appropriate to provide a speaker within the car 4 and inform the interior of the car 4 through a voice from the speaker that there is an abnormality in the number of passengers.

[0037] In the foregoing example, the door-closing operation for the elevator doorway is started after the lapse of the predetermined time from the start of indication of a warning by the indicator 5. However, it is also appropriate to perform an operation of, for example, blinking a door-closing button provided within the car 4 and keep the door-closing operation from being started until a passenger operates the door-closing button.

[0038] In the foregoing example, the command issued by the monitoring command means 16 is transmitted to the monitoring system 6 provided in the car 4. However, it is also appropriate to transmit a command issued by the monitoring command means 16 to a central supervisory room (monitoring center) for monitoring and controlling the operation of the elevator in a concentrated manner. In this manner as well, it is possible to take measures such as alteration in the operation of the elevator and

make an improvement in security effect.

[0039] In the foregoing example, the boarding-scheduled passenger number calculating means 11 calculates the number of times of the reading of ID information by the ID data collation terminal 1 as a boarding passenger number schedule value. However, it is also appropriate to pre-register in the ID data collation controller 2 information on the number of passengers corresponding to the ID information, and hence ensure that the information on the number of passengers is included in the information from the ID data collation controller 2. In this case, the boarding-scheduled passenger number calculating means 11 integrates the number of passengers included in the information from the ID data collation controller 2, thereby calculating a boarding passenger number schedule value.

[0040] It is also appropriate to cause the ID data collation terminal 1 to read information on, for example, a card for changing the number of passengers, and hence ensure that information for changing the number of passengers is additionally included in the information on the number of passengers included in the information from the ID data collation controller 2. In this manner, it is possible to ensure that information such as "plural" or "arbitrary number" is included in the information on the number of passengers. Thus, even when a passenger who has not registered his/her ID information is invited or guided, the indicator 5 can be prevented from indicating an unnecessary warning or the like.

[0041] In the foregoing example, the boarding passenger number completion value is calculated based on information from the weighing device for measuring the weight within the car 4. However, it is also appropriate to calculate a boarding passenger number completion value based on information from a photoelectric sensor for detecting passengers passing through the elevator doorway. In this case, the number of times of detection of passengers by the photoelectric sensor is adopted as the boarding passenger number completion value. The photoelectric sensor is provided on an elevator door for opening/closing the elevator doorway.

senger number completion value;
determination means for determining whether or not the boarding passenger number schedule value and the boarding passenger number completion value are equal to each other; and
travel supervising means for controlling operation of the elevator based on information from the determination means.

2. The control device for an elevator according to Claim 1, wherein the travel supervising means has attention attracting means for announcing to an interior of the car that there is an abnormality in the number of passengers when the boarding passenger number schedule value and the boarding passenger number completion value are different from each other.
3. The control device for an elevator according to Claim 1 or 2, wherein the travel supervising means has monitoring command means for announcing to a monitoring system for monitoring the interior of the car that there is an abnormality in the number of passengers when the boarding passenger number schedule value and the boarding passenger number completion value are different from each other.

Claims

1. A control device for an elevator, comprising:

boarding-scheduled passenger number calculating means for calculating, based on information from an ID information collating device for reading ID information on each passenger to determine whether to authenticate the ID information or not, the number of passengers scheduled to board a car as a boarding passenger number schedule value;
boarding-completed passenger number detecting means for detecting the number of passengers having boarded the car as a boarding pas-

FIG. 1

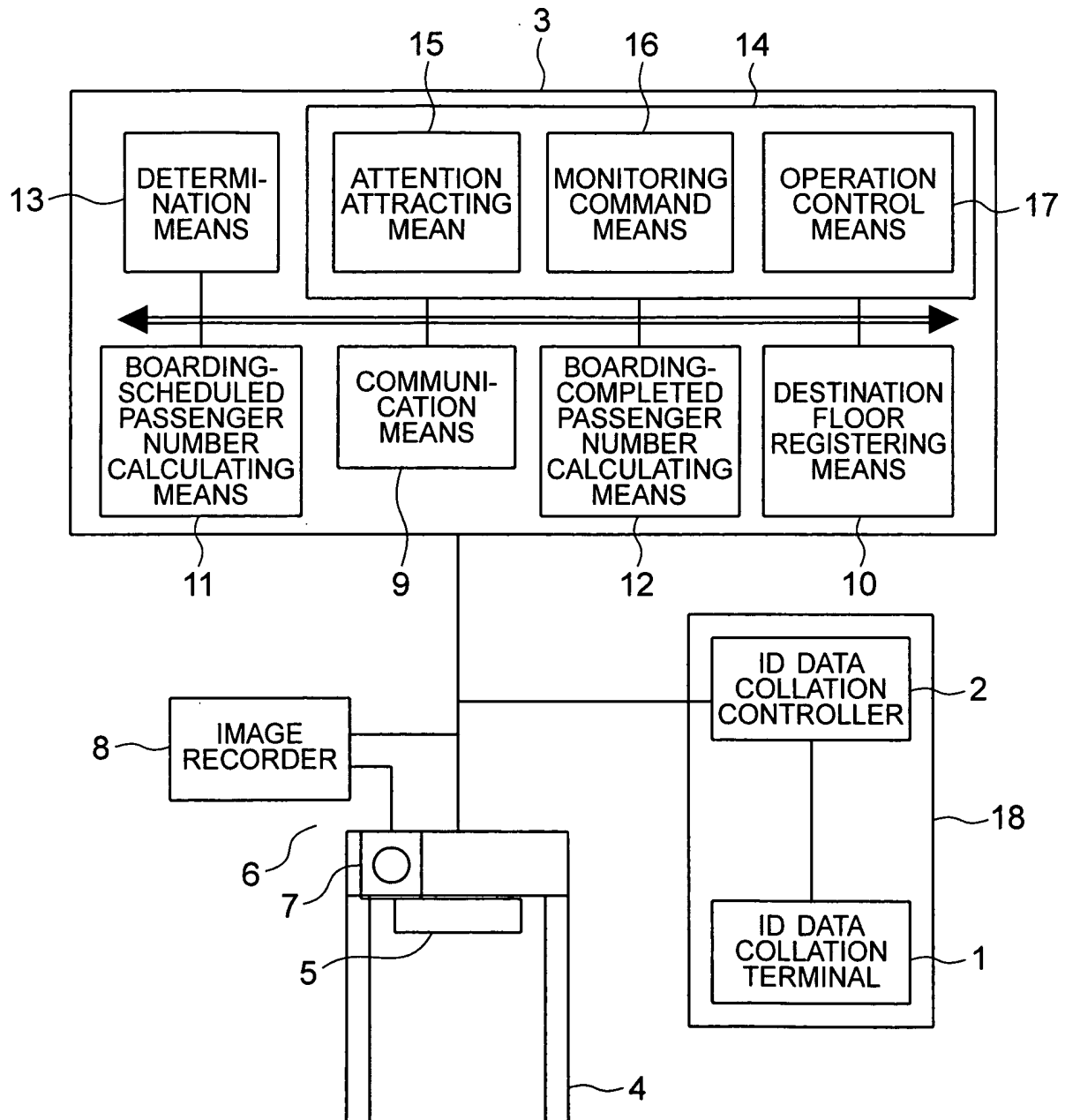
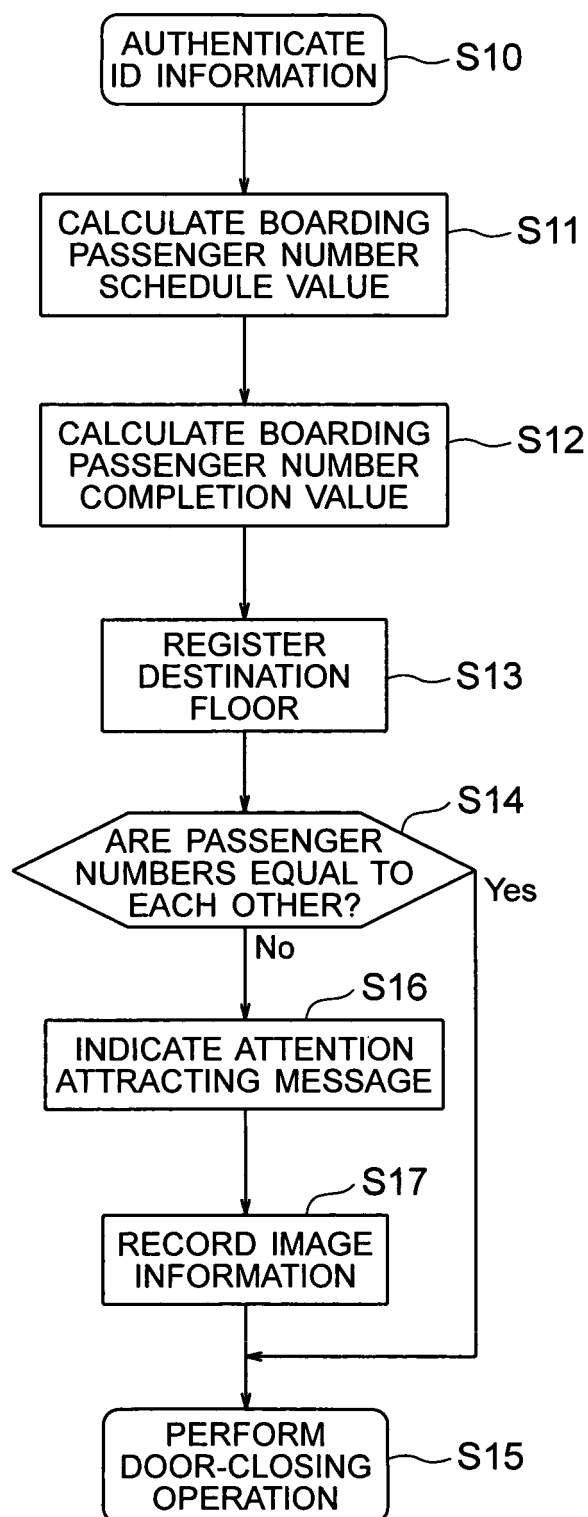


FIG. 2



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2005/017603

A. CLASSIFICATION OF SUBJECT MATTER

B66B1/14 (2006.01), **B66B3/00** (2006.01), **B66B5/00** (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) - **B66B5/28** (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.
X	JP 2005-132549 A (Toshiba Corp.),	1-2
Y	26 May, 2005 (26.05.05), Claims 1 to 5 (Family: none)	3
Y	JP 2000-351547 A (Toshiba Corp.), 19 December, 2000 (19.12.00), Claims 1 to 9 (Family: none)	3

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

* Special categories of cited documents:

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Date of the actual completion of the international search
23 June, 2006 (23.06.06)Date of mailing of the international search report
04 July, 2006 (04.07.06)Name and mailing address of the ISA/
Japanese Patent Office

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INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2005/017603

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	Microfilm of the specification and drawings annexed to the request of Japanese Utility Model Application No. 31646/1988 (Laid-open No. 137978/1989) (Hitachi Elevator Service Kabushiki Kaisha), 20 September, 1989 (20.09.89), Description, page 6, line 10 to page 9, line 18; drawings (Family: none)	1-3
Y	JP 7-237837 A (Toshiba Elevator Technos Kabushiki Kaisha), 12 September, 1995 (12.09.95), Claims 1 to 3 (Family: none)	1-3

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

- JP 2002129793 A [0004]
- JP 2002265154 A [0004]