

DESCRIPTION

ELEVATOR REGISTRATION METHOD AND ELEVATOR SYSTEM

FIELD

[0001] Embodiments described herein relate generally to an elevator registration method and an elevator system.

BACKGROUND

[0002] In elevator systems, there has been known technique having a user register in advance a target destination floor to dispatch an elevator such that an elevator car arrives at the destination floor efficiently and to give the user display guidance of the dispatched elevator.

CITATION LIST

Patent Literature

[0003] Patent Literature 1: Japanese Laid-open Patent Publication No. 2006-290543

Patent Literature 2: Japanese Laid-open Patent Publication No. 2014-85219

SUMMARY OF THE INVENTION

Problem to be Solved by the Invention

[0004] In such conventional elevator systems, a need exists for enhanced convenience on the part of the user by dispatching an elevator more efficiently and by assigning and guiding an elevator to the user such that the elevator arrives at a destination site more easily and more efficiently regardless of whether the user is a first-time visitor to a building in which the elevator is installed or a visitor to the building from outside.

Means for Solving Problem

[0005] According to a first aspect of the present invention, there is provided an elevator registration method performed by an elevator system that comprises: a registration device disposed at a security gate of a building in which an elevator is installed; and a control device that assigns the elevator to a user and that moves an elevator car of the assigned elevator to a landing on a floor on which the user is waiting, the elevator registration method comprising: receiving, by the registration device, an input of destination information relating to a destination of the user within the building; transmitting, by the registration device, the input destination information to the control device; receiving, by the control device, the destination information; assigning, by the control device, the elevator to the user based on the destination information such that a path from the security gate to the destination is optimized for the user; transmitting, by the control device, identification information of the assigned elevator to the registration device; receiving, by the registration device, from the control device the identification information of the elevator assigned based on the destination information; and displaying, by the registration device, on a display the identification information of the assigned elevator, wherein in the assigning, the control device assigns the elevator to the user from a smaller number of elevators than a total number of the elevators, the smaller number of elevators being determined as candidates through a prescribed evaluation calculation for all of the elevators.

[0005a] According to a second aspect of the present invention, there is provided an elevator system comprising: a registration device disposed at a security gate of a building in which an elevator is installed; and a control device that assigns the elevator to a user and that moves an elevator car of the assigned elevator to a landing on a floor on which the user is waiting, the registration device including: an input unit that receives an input of destination information relating to a destination of the user within the building; a first communication unit that transmits the input destination information to the control device and receives, from the control device, identification information of the elevator assigned based on the destination information; and a

display that displays the identification information of the assigned elevator, the control device including: a group management control device that determines a number of elevators as candidates through a prescribed evaluation calculation for all of the elevators, the number of candidate elevators being smaller than a total number of the elevators; a controller that assigns the elevator to the user from the elevators for the candidates based on the destination information such that a path from the security gate to the destination is optimized for the user; and a second communication unit that transmits the identification information of the assigned elevator to the registration device.

BRIEF DESCRIPTION OF DRAWINGS

[0006] FIG. 1 is a block diagram illustrating an exemplary schematic configuration of an elevator system according to a first embodiment.

FIG. 2 is a schematic diagram illustrating an exemplary floor map of the first floor of a building according to the first embodiment.

FIG. 3 is a schematic diagram illustrating an exemplary appearance of a destination registration device and a security gate according to the first embodiment.

FIG. 4 is a block diagram illustrating an exemplary functional configuration of the destination registration device according to the first embodiment.

FIG. 5 is a diagram illustrating exemplary visitor information in the first embodiment.

FIG. 6 is a diagram illustrating exemplary data registered in a two-dimensional code in the first embodiment.

FIG. 7 is a diagram illustrating exemplary position data according to the first embodiment.

FIG. 8 is a diagram illustrating an exemplary floor map of the fifth floor in the first embodiment.

FIG. 9 is a flowchart illustrating exemplary steps of an elevator registration process according to the first embodiment.

FIG. 10 is a diagram illustrating an exemplary floor of a destination floor in a modification of the first embodiment.

FIG. 11 is a flowchart illustrating exemplary steps of an elevator registration process according to a second

embodiment.

FIG. 12 is a diagram illustrating an exemplary floor map of the first floor on which a destination on the fifth floor is superimposed in a third embodiment.

FIG. 13 is a flowchart illustrating exemplary steps of an elevator registration process according to the third embodiment.

DETAILED DESCRIPTION

[0007] FIG. 1 is a block diagram illustrating an exemplary schematic configuration of an elevator system according to a first embodiment. FIG. 2 is a schematic diagram illustrating an exemplary floor map of the first floor of a building according to the first embodiment. This elevator system 1 in the present embodiment includes, as illustrated in FIG. 1, a destination registration device 11 and a control device 50. The elevator system 1 provides efficient operating service through group management of three elevator groups 3A, 3B, and 3C.

[0008] The elevator groups 3A, 3B, and 3C are disposed in three landing zones (zone A, zone B, and zone C) illustrated in FIG. 2 within a building. As illustrated in FIG. 2, the elevator groups 3A, 3B, and 3C each include eight elevators 4 identified as car A to car H. A plurality of elevator cars 5 each move up and down a hoistway to provide the operating service. It should be noted that the elevator groups 3A, 3B, and 3C will hereinafter be collectively referred to simply as an elevator group 3. Additionally, FIG. 1 illustrates only elevator groups 3 of zone A and zone B, each including four elevators identified as car A to car D only.

[0009] It should be noted that the following description assumes that the elevator group 3 includes eight elevators

4 identified as car A to car H. The configuration is nonetheless illustrative only and each elevator group 3 may include two to seven elevators or nine or more elevators. Additionally, the following description assumes that three elevator groups 3 are involved. The configuration is nonetheless illustrative only and may include one, two, or four or more elevator groups 3. In addition, the eight elevators 4 identified as car A to car H will be referred to simply as the elevator 4 unless otherwise specified.

[0010] The control device 50 assigns an elevator 4 to a user and moves a car of the assigned elevator to a landing of a floor on which the user is waiting. The control device 50 will be detailed later.

[0011] The destination registration device 11 allows the user of the elevator, who may, for example, be a visitor to a building, to register a destination, for example, within the building. Specifically, the destination registration device 11 outputs a call registration signal to the control device 50 in accordance with an input by the user, to thereby perform what is called landing call registration.

[0012] FIG. 3 is a schematic diagram illustrating an exemplary appearance of the destination registration device 11 and a security gate 220 according to the first embodiment. FIG. 4 is a block diagram illustrating a functional configuration of the destination registration device 11 according to the first embodiment.

[0013] As illustrated in FIG. 3, the destination registration device 11 of the present embodiment is integrated into the security gate 220. The security gate 220 in the present embodiment is what is called a flapper gate. The security gate 220 is disposed, for example, at an entrance/exit of the building to which the elevator system 1 is applied.

[0014] As illustrated in FIG. 4, the destination registration device 11 primarily includes a read unit 221, a display 216, an analysis unit 101, a display controller 102, and a communication unit 103. The destination registration device 11 is connected to a communication unit 54 in the control device 50.

[0015] The read unit 221 reads a two-dimensional code on building visitor information 19 carried by the visitor. As illustrated in FIG. 3, the read unit 221 is configured to be exposed from the security gate 220. The visitor information 19 is a document that is issued, in advance, to the visitor by, for example, an employee of the destination company within the building. As illustrated in FIG. 3, the user causes the read unit 221 to read the two-dimensional code on the visitor information 19 when he or she moves past the security gate 220.

[0016] FIG. 5 is a diagram illustrating exemplary visitor information 19 in the present embodiment. As illustrated in FIG. 5, the visitor information 19 contains a destination (company name in the example of FIG. 5), a destination floor, and a two-dimensional code 401.

[0017] The two-dimensional code 401 is, for example, a QR code (registered trademark), a barcode and the like. FIG. 6 is a diagram illustrating exemplary data registered in the two-dimensional code in the present embodiment. In the present embodiment, destination information, a guest ID, and an issuer address are coded and registered in the two-dimensional code 401. The destination information relates to a destination of the visitor (user). The destination information corresponds, for example, to a destination ID that serves as identification information for identifying the destination. The issuer address is a mail address of a person who has issued the visitor information 19 to the

visitor. The guest ID is identification information of the visitor assigned to the visitor when the issuer issues the visitor information 19.

[0018] Reference is made back to FIG. 4. The analysis unit 101 analyzes the two-dimensional code read by the read unit 221 to thereby acquire the destination information, the issuer address, and the guest ID. It should be noted that the read unit 221 and the analysis unit 101 constitute an exemplary input unit that receives an input of, for example, the destination information by the visitor as the user of the elevator.

[0019] The communication unit 103 transmits the destination information, the issuer address, and the guest ID which are acquired through analysis made by the analysis unit 101 as a call registration signal to the control device 50 over a network. As will be described later, the control device 50 assigns (dispatches) an optimum elevator 4 to the user on the basis of the destination information included in the received call registration signal and transmits, as dispatch information, information of a car ID as identification information for the assigned elevator 4, to the destination registration device 11. The communication unit 103 receives the information of the car ID (dispatch information) of the elevator 4 assigned to the user by the control device 50. The communication unit 103 is an exemplary first communication unit.

[0020] As illustrated in FIG. 3, the display 216 is configured to be exposed from the security gate 220. The display 216 is capable of displaying various types of information, such as text and graphics, as images. The display controller 102 controls display on the display 216. In the present embodiment, the display controller 102 controls to display on the display 216 the information of

the car ID of the elevator 4 assigned to the user, received by the communication unit 103. The display 216 thereby displays the information of the car ID of the elevator 4 assigned to the user. The display 216 displays, for example, "car B of zone A". The display on the display 216 allows the user to know the car ID of the optimum elevator 4 to reach the destination when the user moves past the security gate 220, so that the user can go to the specified elevator 4 smoothly. Specifically, the user is prompted to move to a spot in front of the door of the elevator car displayed on the display 216 and wait, so that the user can smoothly ride the corresponding elevator car 5.

[0021] The following details the control device 50. As illustrated in FIG. 1, the control device 50 includes the communication unit 54, a controller 51, a plurality of group management control devices 2, a plurality of unit control devices 9, and position data 53. The position data 53 is stored in a HDD, a SSD, or a storage medium such as a memory.

[0022] Each elevator 4 includes the elevator car 5, a counterweight 6, a main rope 7, a hoist 8, the unit control device 9, and the like. The elevator 4 is what is called a traction elevator that connects the elevator car 5 that can move up and down in the hoistway disposed in the building to the counterweight 6 as a balance weight with the main rope 7. The main rope 7 is wound around, for example, a main sheave 8a or a deflection sheave (not illustrated) of the hoist 8 disposed at an upper portion of the hoistway. The main rope 7 has a first end connected to the elevator car 5 and a second end connected to the counterweight 6. The hoist 8 includes, for example, an electric motor (motor) 8b that generates drive power. Driving the electric motor 8b causes the main sheave 8a connected to

the electric motor 8b to be rotationally driven and a friction force generated between the main sheave 8a and the main rope 7 is used to electrically wind up the main rope 7. Each elevator 4 can move to the landing of any target floor when the unit control device 9 integrally controls drive of different parts to raise and lower the elevator car 5 inside the hoistway.

[0023] The unit control device 9 includes a microcomputer and a drive circuit. The microcomputer includes a central processing unit (CPU) mutually coupled by an ordinary type bi-directional common bus, a read only memory (ROM) that stores, for example, prescribed control programs in advance, a random access memory (RAM) that temporarily stores results of calculation performed by the CPU, a backup RAM that stores information including previously prepared map data and specifications of the elevator 4, and an input/output port unit. The unit control device 9 is electrically connected to various types of sensors and detectors, and different parts of the elevator 4 including the hoist 8, thereby integrally controlling different parts of each elevator 4.

[0024] It should here be noted that the elevator system 1 in the present embodiment is a landing destination floor registration system or what is called a destination control system (DCS), which has, for example, a user register a destination by way of the destination registration device 11 as a registration device disposed at the security gate 220 outside the elevator car 5 and, in accordance with the registration, improves operating efficiency through group management of the elevator groups 3.

[0025] The group management control devices 2 are associated with the respective elevator groups 3. The group management control devices 2 each include a

microcomputer and a drive circuit. The microcomputer includes a central processing unit (CPU) mutually coupled by an ordinary type bi-directional common bus, a read only memory (ROM) that stores, for example, prescribed control programs in advance, a random access memory (RAM) that temporarily stores results of calculation performed by the CPU, a backup RAM that stores information including previously prepared map data and specifications of the elevator 4, and an input/output port unit. The group management control device 2 transmits and receives detection signals and drive signals, and communication signals such as control command information, to/from the unit control devices 9 of the elevators 4, thereby performing group management of the elevator group 3.

[0026] As described above, when the user performs an operation to read the two-dimensional code via the destination registration device 11, the destination registration device 11 transmits a call registration signal. The communication unit 54 receives the call registration signal from the destination registration device 11. Additionally, the communication unit 54 transmits the car ID as dispatch information to the destination registration device 11, the car ID is the identification information for the elevator 4 assigned to the user, and is determined by the controller 51 and the group management control device 2, as will be described later. The communication unit 54 is an exemplary second communication unit.

[0027] The controller 51 assigns the elevator 4 to a user such that a path from the security gate 220 to the destination is optimized. Specifically, the controller 51 refers to the position data 53 and cooperates with the group management control device 2 to determine the optimum elevator group 3 for the user in accordance with the

destination information included in the call registration signal. In the present embodiment, the controller 51 assigns an elevator 4 to a user such that a distance from an exit position on the destination floor to a destination position is the shortest.

[0028] The position data 53 is a table that associates position information of, for example, each tenant as the destination and the closest elevator 4 thereto. FIG. 7 is a diagram illustrating exemplary position data 53 in the embodiment. As illustrated in FIG. 7, the position data 53 associates the destination ID, the position information, and the closest elevator with each other.

[0029] The destination ID serves as identification information of, for example, the destination tenant. The position information represents the position of, for example, the destination tenant. In the present embodiment, the position information is configured as "floor - position" to represent a combination of the floor and the position. The position indicates a coordinate position predetermined for each floor by the map data. In the example illustrated in FIG. 7, the position information "2-01" indicates that the tenant having a destination ID of "A0001" is located at position 01 on the second floor.

[0030] The closest elevator indicates the car ID of the elevator having the exit position close to the destination tenant having the destination ID. When a plurality of closest elevators have been registered, the elevators are deemed to be closer to the tenant having the destination ID in the order of entry. The closest elevator is represented by "zone - car ID". In the example illustrated in FIG. 7, the tenant having a destination ID of "A0001" is closest to the exit positions of the elevators in the order of "C-E"; specifically, the elevator car E in zone C is the closest,

and car A in zone C is the second closest, and car F in zone C is the third closest.

[0031] The controller 51 refers to the position data 53, and from among a plurality of candidates for the optimum elevator 4 nominated by the group management control device 2, assigns the elevator car of the closest elevator 4 as selected from among the closest elevators associated with the destination ID of the destination information included in the call registration signal.

[0032] FIG. 8 is a diagram illustrating an exemplary floor map of the fifth floor in the first embodiment. In FIG. 8, reference numeral P is assumed to denote the destination having the destination ID included in the call registration signal. The controller 51 refers to the position data 53 and acquires the closest elevators "A-A, A-E, and A-B" that are associated with the destination ID "Z0065". The controller 51 then acquires candidates for the optimum elevator 4 from the group management control device 2 of zone A, compares the candidates with the closest elevators "A-A, A-E, and A-B", and assigns the elevator car of the elevator 4 that has the exit position closest to the destination.

[0033] When, for example, the group management control device 2 of zone A outputs A-A, A-B, and A-C as the elevator cars of the candidates for the optimum elevator 4, the controller 51 assigns, to the user, the elevator car of the A-A elevator 4 that is, out of the candidates, closest to the destination among the closest elevators "A-A, A-E, and A-B". The communication unit 54 thus transmits to the destination registration device 11 the car ID "A-A" as the dispatch information.

[0034] When, for example, the group management control device 2 of zone A outputs A-B, A-E, and A-H as the

elevator cars of the candidates for the optimum elevator 4, the controller 51 assigns, to the user, the elevator car of the A-E elevator 4 that is, out of the candidates, closest to the destination among the closest elevators "A-A, A-E, and A-B". The communication unit 54 thus transmits to the destination registration device 11 the car ID "A-E" as the dispatch information.

[0035] The group management control device 2 performs group management control that, for example, determines, from among the elevator cars 5 of the elevators 4, the candidate for the optimum elevator car 5 to respond to the landing call registration from the landing of the elevator 4 according to the status of each elevator car 5. It should here be noted that the number of candidates may be one or in plurality.

[0036] The group management control device 2 performs a prescribed evaluation calculation for a generated call on the basis of, for example, the total number of calls (total number of users) of the elevator group 3 or the number of calls for each destination floor based on the call registration signal, outputs from the various sensors and detectors, current positions and moving directions (up/down directions) of the elevator cars 5, estimated future landing calls and car calls, and conditions of the elevators 4 and the elevator cars 5 on, for example, the estimated destination floor. The group management control device 2 establishes, for example, a landing order for the elevator cars 5 such that each elevator car 5 moves reasonably to optimally respond to each call in accordance with the prescribed evaluation calculation and performs an assignment process to assign candidates for the elevator car 5 to respond to each call and to determine a specific elevator car 5 to respond to the call, to thereby

efficiently schedule the elevator cars 5 for the efficient operating service as the entire elevator group 3.

[0037] The unit control device 9 controls drive of the hoist 8 according to the assignment by the group management control device 2 to thereby move the elevator car 5 to the target floor. This control allows each elevator 4 to have the elevator car 5 move up and down the hoistway in a vertical direction to the landing on any target floor. Each elevator 4 has a door opened when the elevator car 5 is detected to have landed on the landing of the target floor and at a predetermined landing position. This allows a user who is waiting at the landing to get on the elevator car 5, and allows a user inside the elevator car 5 to exit onto the landing.

[0038] The following describes an elevator registration process in the present embodiment that is configured as described above.

FIG. 9 is a flowchart illustrating exemplary steps of the elevator registration process according to the first embodiment.

[0039] A user visits a building and holds the two-dimensional code on the visitor information 19 acquired from an issuer against the read unit 221 of the destination registration device 11. The read unit 221 reads the two-dimensional code (S11). The analysis unit 101 analyzes the read two-dimensional code and acquires destination information, a guest ID, and an issuer address (S12). The communication unit 103 transmits as a call registration signal the destination information, the guest ID, and the issuer address to the control device 50 (S13).

[0040] In the control device 50, the communication unit 54 receives the call registration signal and the controller 51 sends to the issuer address included in the call

registration signal a mail that reads something to the effect that the user represented by the guest ID has arrived at the building (S21). The controller 51 acquires from the group management control device 2 candidates for the elevator 4 to be dispatched (S22).

As described previously, the controller 51 refers to the position data 53 and assigns, from among the candidates for the elevator 4 to be dispatched, the elevator car of the elevator 4 having the exit position closest to the destination, to be dispatched (S23). The communication unit 54 transmits to the destination registration device 11 the car ID of the elevator car of the assigned elevator 4, as dispatch information (S24).

[0041] In the destination registration device 11, the communication unit 103 receives the dispatch information from the control device 50. The display controller 102 displays on the display 216 the received dispatch information, specifically, the car ID of the elevator 4 assigned to the user (S14).

[0042] In summary, in accordance with the present embodiment, the user causes the security gate 220 to read the two-dimensional code in which the destination information has been registered and, in accordance with the destination information, the control device 50 assigns an elevator car of the elevator 4 such that the path from the security gate 220 to the destination is optimized for the user. Specifically, the controller 51 of the control device 50 assigns an elevator such that the distance from the exit position on the destination floor on which the destination is located to the destination is the shortest and causes the car ID of the assigned elevator 4 to be displayed on the display 216 of the destination registration device 11 at the security gate 220. Thus, the

present embodiment enables a visitor to find the car ID of the optimum elevator 4 by simply holding the two-dimensional code against the read unit 221 of the destination registration device 11 at the security gate 220, regardless of whether the visitor is a first-time visitor to the building or an outsider. Thus, the present embodiment can dispatch an elevator to a visitor, whether he or she be a first-time visitor to the building or a visitor from outside, and guide the visitor to the destination site such that he or she can reach the destination site more easily and more efficiently, thereby further enhancing convenience for the user.

[0043] (Modification)

The controller 51 may be configured to, instead of assigning the elevator 4 having the exit position that results in the shortest distance to the destination, assign an elevator 4 having the exit position closest to the position of an information board that indicates the site of, for example, a tenant located on the floor.

[0044] FIG. 10 is a diagram illustrating an exemplary floor of a destination floor in a modification of the first embodiment. In the example of FIG. 10, reference numeral 300 denotes an information board. In the present modification, position information of the information board and the closest elevator are registered in the position data 53. Examples of data to be registered include A-D and A-H.

[0045] In the present modification, the controller 51 assigns, to a user, an elevator 4 that is registered as being close to the information board 300 in the position data 53, as selected from among the candidates for the elevator 4 to be dispatched, acquired from the group management control device 2. In the example illustrated in

FIG. 10, A-D or A-H that is close to the information board 300, for example, may be assigned.

[0046] The present modification assigns the elevator 4 having the exit position closest to the position of the information board that indicates the site of, for example, the tenant located on the floor. The modification thus further enhances convenience for even a stranger in the building.

[0047] (Second Embodiment)

In a second embodiment, a control device 50 assigns the elevator car of an elevator 4 closest to a destination registration device 11 at the security gate 220.

[0048] An elevator system 1, the control device 50, and the destination registration device 11 according to the second embodiment have configurations similar to the configurations in the first embodiment.

[0049] A controller 51 of the control device 50 in the present embodiment assigns the elevator car of an elevator 4 that is closest to the destination registration device 11 at a security gate 220. In the example illustrated in FIG. 2, for example, B-H, C-D, B-D, and C-H, in this order are registered in advance in, for example, the position data 53 of the control device 50 as the elevators 4 closer to the security gate 220, specifically, the destination registration device 11. The controller 51 has other functions that are similar to the functions in the first embodiment.

[0050] FIG. 11 is a flowchart illustrating exemplary steps of an elevator registration process in the second embodiment. Steps from S11 to S13, and S21 and S22 are the same as those in the first embodiment. The controller 51, having acquired from a group management control device 2 information on car IDs of elevator cars as candidates for

the elevator 4 to be dispatched at S22, assigns the elevator car of the elevator 4 close to the destination registration device 11 registered in advance, as selected from among the candidates for the elevator 4 (S33). A communication unit 54 then transmits the car ID of the elevator car of the assigned elevator 4 as dispatch information to the destination registration device 11 (S24). At the destination registration device 11, a display 216 displays the car ID of the elevator car of the assigned elevator 4 (S14).

[0051] In summary, in the present embodiment, the controller 51, having acquired the information on the candidates for the elevator 4 to be dispatched, assigns the elevator car of the elevator 4 that is close to the destination registration device 11, as selected from among the candidates for the elevator 4. Thus, the present embodiment can assign an elevator to a visitor, whether he or she be a first-time visitor to the building or a visitor from outside, and guide the visitor to the destination site such that he or she can reach the destination site more easily and more efficiently, thereby further enhancing convenience for the user.

[0052] (Third Embodiment)

In a third embodiment, a control device 50 assigns, to the user, an elevator 4 that involves a landing and an exit position resulting in the shortest traveling distance from a security gate 220 to the destination.

[0053] An elevator system 1, the control device 50, and a destination registration device 11 according to the third embodiment have configurations similar to the configurations in the first embodiment.

[0054] In the present embodiment, a controller 51 of the control device 50 assigns, to the user, the elevator 4 that

involves a landing and an exit position resulting in the shortest traveling distance from the security gate 220 to the destination.

[0055] FIG. 12 is a diagram illustrating an exemplary floor map of the first floor on which the destination on the fifth floor is superimposed in the third embodiment. As illustrated in FIG. 12, from among three possible paths 1201, 1202, and 1203 to be followed by a user of the security gate 220 from the position of the destination registration device 11 that has read the two-dimensional code to a destination P, the controller 51 of the control device 50 in the present embodiment selects the path 1201 that involves the shortest traveling distance. It should be noted that possible paths from the security gate 220 to each destination tenant (e.g., the paths 1201 to 1203) and the traveling distance of each path are registered in advance in the control device 50 as, for example, path data.

[0056] From among a plurality of candidates for the elevator 4 to be dispatched, nominated by a group management control device 2, the controller 51 selects and assigns the elevators 4 disposed along the shortest path 1201, specifically, the elevators 4 having car IDs A-A to A-H. Other functions of the controller 51 are the same as those in the first embodiment.

[0057] FIG. 13 is a flowchart illustrating exemplary steps of an elevator registration process according to the third embodiment. Steps from S11 to S13, and S21 and S22 are the same as those in the first embodiment. The controller 51, having acquired from the group management control device 2 information on the candidates for the elevator 4 to be dispatched at S22, assigns, to the user, the elevator 4 that involves the landing and the exit position resulting in the shortest traveling distance from

the security gate 220 to the destination, as selected from among the candidates for the elevator 4 as described previously (S42). A communication unit 54 then transmits the car ID of the elevator car of the assigned elevator 4 as dispatch information to the destination registration device 11 (S24). At the destination registration device 11, a display 216 displays the car ID of the elevator car of the assigned elevator 4 (S14).

[0058] In summary, in the present embodiment, the control device 50 assigns, to the user, the elevator 4 that involves the landing and the exit position resulting in the shortest traveling distance from the security gate 220 to the destination. Thus, the present embodiment can assign an elevator to a visitor, whether he or she be a first-time visitor to the building or a visitor from outside, and guide the visitor to the destination site such that he or she can reach the destination site more easily and more efficiently, thereby further enhancing convenience for the user.

[0059] In the embodiments described above, the destination information, the guest ID, and the issuer address are embedded in the two-dimensional code. This arrangement is, however, illustrative only and is not intended to be in any way limiting. For example, the destination information, the guest ID, and the issuer address may be registered in a visitor IC card and the destination registration device 11 may be configured so as to cause the read unit 221 to read, at the security gate 220, the destination information, the guest ID, and the issuer address from the IC card.

[0060] Alternatively, the destination registration device 11 may even be configured such that the user manually input the destination information and other data

at the security gate 220.

[0061] The elevators 4 go up and down more frequently during morning and evening commuting hours and lunch hours. Thus, the controller 51 may be configured so as to determine the elevator 4 to be assigned depending on the specific time period and the destination information, as selected from among the elevators 4 moving for morning and evening commuting and lunch and as selected from among the candidates for the elevator 4 to be dispatched, nominated by the group management control device 2. This configuration achieves assignment of the optimum elevator 4 in accordance with the specific time period, offering greater convenience for the user.

[0062] While the present invention has been described with reference to the specific embodiments thereof, it should be understood that the embodiments are intended to be illustrative and not restrictive of the scope of the invention. These novel embodiments may be carried out in various other forms and various types of omission, replacement, and changes may be made within the spirit of the invention. All such embodiments and modifications are included in the scope and spirit of the invention and the scope of the appended claims and equivalents thereof.

[0063] (APPENDIX)

The elevator registration method according to above, wherein the assigning assigns an elevator such that a distance is shortest from the exit position on the destination floor on which the destination is located to the position at which guidance information indicating a destination guide is disposed.

The elevator system according to above, wherein the input unit includes a read unit that reads a two-dimensional code in which destination information is

registered and an analysis unit that analyzes the read two-dimensional code and acquires the destination information.

REFERENCE SIGNS LIST

[0064] 1 ELEVATOR SYSTEM
 2 GROUP MANAGEMENT CONTROL DEVICE
 9 UNIT CONTROL DEVICE
 11 DESTINATION REGISTRATION DEVICE
 50 CONTROL DEVICE
 51 CONTROLLER
 53 POSITION DATA
 54 COMMUNICATION UNIT (SECOND COMMUNICATION UNIT)
 101 ANALYSIS UNIT (INPUT UNIT)
 102 DISPLAY CONTROLLER
 103 COMMUNICATION UNIT (FIRST COMMUNICATION UNIT)
 221 READ UNIT (INPUT UNIT)
 216 DISPLAY

CLAIMS

1. An elevator registration method performed by an elevator system that comprises: a registration device disposed at a security gate of a building in which an elevator is installed; and a control device that assigns the elevator to a user and that moves an elevator car of the assigned elevator to a landing on a floor on which the user is waiting, the elevator registration method comprising:

receiving, by the registration device, an input of destination information relating to a destination of the user within the building;

transmitting, by the registration device, the input destination information to the control device;

receiving, by the control device, the destination information;

assigning, by the control device, the elevator to the user based on the destination information such that a path from the security gate to the destination is optimized for the user;

transmitting, by the control device, identification information of the assigned elevator to the registration device;

receiving, by the registration device, from the control device the identification information of the elevator assigned based on the destination information; and displaying, by the registration device, on a display the identification information of the assigned elevator, wherein

in the assigning, the control device assigns the elevator to the user from a smaller number of elevators than a total number of the elevators, the smaller number of elevators being determined as candidates through a prescribed evaluation calculation for all of the elevators.

2. The elevator registration method according to claim 1, wherein the assigning assigns the elevator such that a distance from an exit position on a destination floor on which the destination is located to the destination is a minimum.

3. The elevator registration method according to claim 1 or 2, wherein the assigning assigns, to the user, the elevator that is moving toward a landing located closest to the security gate.

4. The elevator registration method according to claim 1, 2 or 3, wherein the assigning assigns, to the user, the elevator that involves a landing and an exit position resulting in a minimum traveling distance from the security gate to the destination.

5. An elevator system comprising:

- a registration device disposed at a security gate of a building in which an elevator is installed; and

- a control device that assigns the elevator to a user and that moves an elevator car of the assigned elevator to a landing on a floor on which the user is waiting,

- the registration device including:

- an input unit that receives an input of destination information relating to a destination of the user within the building;

- a first communication unit that transmits the input destination information to the control device and receives, from the control device, identification information of the elevator assigned based on the destination information; and

- a display that displays the identification

information of the assigned elevator,

the control device including:

a group management control device that determines a number of elevators as candidates through a prescribed evaluation calculation for all of the elevators, the number of candidate elevators being smaller than a total number of the elevators;

a controller that assigns the elevator to the user from the elevators for the candidates based on the destination information such that a path from the security gate to the destination is optimized for the user; and

a second communication unit that transmits the identification information of the assigned elevator to the registration device.