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(54) **METHOD OF CONTROLLING AN OPERATION OF AN ELEVATOR SYSTEM AND ELEVATOR CONTROLLER FOR CONTROLLING AN ELEVATOR SYSTEM**

VERFAHREN ZUR STEUERUNG EINES BETRIEBS EINER AUFZUGSANLAGE UND AUFZUGSSTEUERGERÄT ZUR STEUERUNG EINER AUFZUGSANLAGE

PROCÉDÉ DE COMMANDE D'UN FONCTIONNEMENT D'UN SYSTÈME D'ASCENSEUR ET DISPOSITIF DE COMMANDE D'ASCENSEUR POUR COMMANDER UN SYSTÈME D'ASCENSEUR

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## Description

**[0001]** The present invention relates to a method of controlling an operation of an elevator system and elevator controller for controlling an elevator system.

**[0002]** When an elevator car is at a first floor and a call to a second floor is received, the elevator shaft door(s) and the elevator car door(s) are closed and the elevator car is being moved from the first floor to the second floor regardless of any call for the first floor after the elevator shaft door(s) and the elevator car door(s) have been closed. The elevator car travels to the second floor and only then travels back to the first floor to answer the elevator call for the first floor. This uses a lot of energy for moving the elevator car. Furthermore, the management of the calls is inefficient, since it can take a long time for moving the elevator car from the first floor to the second floor and back to the first floor.

**[0003]** JP 2017 088328 A describes a special operation mode of an elevator for safe driving with a pet, wherein the driving car can stop and then move back to the dispatching floor if a passenger presses a door-open-button which is inside of the car, while the car is in a door zone indicated by a prescribed height range including the landing level of the car with respect to a departure floor.

**[0004]** There may be a need for a method of controlling an operation of an elevator system and elevator controller for controlling an elevator system, respectively, which saves energy and which manages elevator calls efficiently.

**[0005]** Such needs may be met with the subject-matters of the independent claims. Advantageous embodiments are defined in the dependent claims.

**[0006]** According to a first aspect of the present invention, a method of controlling an operation of an elevator system is proposed, wherein the method comprises the following steps: checking as a first condition if an elevator shaft door of a first floor has been closed to move an elevator car to a second floor; checking as a second condition if the elevator car is still within a door zone of the first floor, in which an elevator car door of the elevator car is not yet locked; and if the first condition and the second condition are fulfilled when an elevator call for the first floor is received, moving the elevator car back to an entrance level of the first floor and/or opening the elevator shaft door of the first floor before moving the elevator car to the second floor; and checking as a third condition if no person is inside the elevator car; wherein the step of moving the elevator car back to the entrance level of the first floor and/or opening the elevator shaft door of the first floor before moving the elevator car to the second floor is only executed if the first condition, the second condition and the third condition are fulfilled when the elevator call for the first floor is received.

**[0007]** One advantage hereof is that energy is saved in general, since the distances, which the elevator is moved, are minimized. Furthermore, typically, the elevator calls are managed efficiently, since the elevator call for the first floor is serviced, before the elevator car, which is still at or close to the first floor, is moved (further) away from the first floor and only then is returned to the first floor. Thus, generally, the time needed for servicing the elevator calls for the second floor and the elevator for the first floor is reduced. And a further advantage is that the management of the calls and the movement of the elevator car is even more efficient. If the elevator car is not returned to the first floor before being moved to the second floor if the described conditions are fulfilled when the elevator call for the first floor is received, an empty elevator car would be moved first from the first floor to the second floor and later back to the first floor, even though an elevator call for the first floor has been received while the elevator car still was at or near the first floor. Thus, typically, the time needed for servicing the elevator calls for the second floor and for the first floor is reduced.

**[0008]** According to a second aspect of the present invention, an elevator controller for controlling an elevator system wherein an elevator car is moved in an elevator shaft is proposed, wherein the elevator controller is adapted such that the elevator controller checks as a first condition if an elevator shaft door of a first floor has been closed to move the elevator car to a second floor, the elevator controller checks as a second condition if the elevator car is still within a door zone of the first floor, in which an elevator car door of the elevator car is not yet locked, the elevator controller moves the elevator car back to an entrance level of the first floor and/or opens the elevator shaft door of the first floor before moving the elevator car to the second floor, if the first condition and the second condition are fulfilled when an elevator call for the first floor is received, and the elevator controller is further adapted for checking if no person is inside the elevator car as a third condition and wherein the elevator controller is adapted such that the elevator controller moves the elevator car back to the entrance level of the first floor and/or opens the elevator shaft door of the first floor before moving the elevator car to the second floor if the first condition, the second condition and the third condition are fulfilled when the elevator call for the first floor is received.

**[0009]** One advantage hereof is that the elevator controller saves energy typically, since the distances, which the elevator is moved by the elevator controller, are minimized. Furthermore, normally, the elevator calls are managed efficiently by the elevator controller, since the elevator call for the first floor is serviced, before the elevator car, which is still at or close to the first floor, is moved (further) away from the first floor and only then is returned to the first floor. Moreover, a further advantage is that the management of the calls and the movement of the elevator car is even more efficient. If the elevator car is not returned to the first floor before being moved to the second floor if the described conditions are fulfilled, an empty elevator car would be moved first from the first floor to the second floor and later back to the first floor, even

though an elevator call for the first floor has been received while the elevator car still was at or near the first floor. Thus, the time needed for servicing the elevator calls for the second floor and for the first floor is reduced by the elevator controller, in general.

**[0010]** According to an embodiment of the method, the step of closing the elevator shaft door of the first floor to move the elevator car to the second floor is executed due to receiving an elevator call from the second floor. Normally, one advantage hereof is that even when a person has called the elevator car from the second floor, the elevator car is moved back to the first floor and/or the elevator shaft door is opened at the first floor upon receiving the elevator call for the first floor shortly after closing the elevator shaft door of the first floor to let in a person into the elevator who has called the elevator car at the first floor. Typically, this way, the management of the elevator calls is even more efficient.

**[0011]** According to an embodiment of the method, the door zone is formed symmetrically around a center level of the first floor. In particular, typically, if the first floor is not the lowest floor or ground floor, a symmetric door zone is advantageous since the probability that the elevator car has to be moved a long distance to the second floor is essentially the same for both directions along the elevator shaft. Furthermore, in general, a symmetric door zone is technically simple.

**[0012]** According to an embodiment of the method, the door zone is formed asymmetrically around a center level of the first floor. In particular, if the first floor is close to a first end of the elevator shaft, the door zone can be larger in the direction which points away from the first end of the elevator shaft than in the direction which points to the first end of the elevator shaft, typically. Normally, in the direction of the first end of the elevator shaft, the elevator car has to be moved a shorter distance before the elevator car can come back to the first floor, since there are fewer floors, than in the direction away from the first end of the elevator shaft, where there are more floors. Thus, generally, the elevator calls are managed even more efficiently.

**[0013]** According to an embodiment of the elevator controller, the door zone is formed symmetrically around the entrance level of the first floor. In particular, if the first floor is not the lowest floor or ground floor, a symmetric door zone is advantageous since the probability that the elevator car has to be moved a long distance to the second floor is essentially the same for both directions along the elevator shaft, in general. Furthermore, typically, a symmetric door zone is technically simple.

**[0014]** According to an embodiment of the elevator controller, the door zone is formed asymmetrically around the entrance level of the first floor. In particular, if the first floor is close to a first end of the elevator shaft, the door zone can be larger in the direction which points away from the first end of the elevator shaft than in the direction which points to the first end of the elevator shaft, in general. Typically, in the direction of the first end of the elevator shaft, the elevator car has to be moved a shorter distance before the elevator car can come back to the first floor, since there are fewer floors, than in the direction away from the first end of the elevator shaft, where there are more floors. Thus, in general, the elevator calls can be managed even more efficiently.

**[0015]** The entrance level of the first floor can be the height along the elevator shaft, where there is no level difference between the sill of the floor of the first floor and the cabin of the elevator car. I.e., a wheelchair can enter or leave the elevator car essentially without having to overcome a step or level difference, if the elevator car is at the entrance level of the first floor.

**[0016]** It shall be noted that possible features and advantages of embodiments of the invention are described herein partly with respect to a method of controlling an operation of an elevator system, partly with respect to an elevator controller for controlling an elevator system.

**[0017]** In the following, advantageous embodiments of the invention will be described with reference to the enclosed drawings. However, neither the drawings nor the description shall be interpreted as limiting the invention.

Fig. 1 shows a schematic view of a building with an elevator system wherein a method of an embodiment according to the present invention and an elevator controller of an embodiment according to the present invention, respectively, is used; and

Fig. 2 shows a schematic flow diagram of a method according to the present invention.

**[0018]** The figures are only schematic and not to scale. Same reference signs refer to same or similar features.

**[0019]** Fig. 1 shows a schematic view of a building with an elevator system 1 wherein a method of an embodiment according to the present invention and an elevator controller 10 of an embodiment according to the present invention, respectively, is used. Fig. 2 shows a schematic flow diagram of a method according to the present invention.

**[0020]** The elevator system 1 comprises an elevator car 25, which can be moved in an elevator shaft 20 to different floors of the building. The building comprises an exemplary number of five floors. The number of floors can be higher or lower than five.

**[0021]** Each floor comprises at least one elevator shaft door and a door zone 35, 55. The door zone 35, 55 comprises a part/section of the elevator shaft 20 along the height of the shaft, which runs from bottom to top in Fig. 1. The door zone 35, 55 is the part/section of the door(s) are open/opened to let in persons and/or cargo into and/or out of the elevator car 25. Then, the elevator shaft door(s) and the elevator car door(s) are closed, since the elevator should be moved to another floor, e.g., a second floor 50 (which can but does not have to be the second floor in the physical sense). This can be due to an elevator call from the second floor 50 or due to an elevator con-

troller 10 policy that the elevator car 25 should be at the second floor 50 when it is not used. The movement can also be done since a person entered the elevator car 25 at the first floor 30 and requested to be transported to the second floor 50.

**[0022]** If, after the elevator shaft door(s) and the elevator car door (s) have been closed and the elevator car 25 is still (fully) within the door zone 35 of the first floor 30, when an elevator call for the first floor 30 is received, the elevator shaft door(s) (and the elevator car door(s)) will be opened and, if the elevator car 25 has already been moved from the entrance level, the elevator car 25 will be moved back to the entrance level of the first floor 30.

**[0023]** The elevator call for the first floor 30 can come from within the elevator car 25 or from the first floor 30. I.e., the movement of the elevator car 25 from the first floor 30 to the second floor 50 is postponed. Firstly, the elevator call for the first floor 30 is serviced, when the elevator car 25 is still within the door zone 35 of the first floor 30 when the elevator call for the first floor 30 is received by the elevator controller 10, before the elevator call for the second floor 50 is serviced.

**[0024]** Thus, energy can be saved since the elevator car 25 is not moved from the first floor 30 to the second floor 50 and back to the second floor 50 when an elevator call for the first floor 30 is received shortly after closing the elevator shaft door of the first floor 30. Furthermore, passengers of the elevator system 1 are more happy, since when the person missed the elevator car 25 by a few moments or seconds, i.e., the elevator shaft door of the first floor 30 has been closed shortly before the person triggers an elevator call for the first floor 30, they normally have to wait a long time according to the state of the art. With the present invention, the person does not have to wait very long in this situation, since the elevator shaft door of the first floor 30 will be opened again soon after the elevator call for the first floor 30 has been received, if the elevator car 25 is still at or close to the first floor 30 when the elevator call for the first floor 30 is triggered/received.

**[0025]** The same applies to the situation when a person is inside of the elevator car 25 which has stopped at the first floor 30 and the elevator shaft door of the first floor 30 has been opened, the person does not get out of the elevator car 25 at the first floor 30 while the elevator shaft door is opened at first, but wants to get out of the elevator car 25 at the first floor 30 after the elevator shaft door has been closed. Then, according to the present invention, the elevator shaft door at the first floor 30 will be opened again and, if the elevator car 25 has already been moved from the entrance level of the first floor 30, the elevator car 25 will be moved back to the entrance level of the first floor 30 before opening the elevator shaft door of the first floor 30.

**[0026]** The following two conditions are checked by the controller:

1. Has the elevator shaft door been closed to move the elevator car 25 from the first floor 30 to the second floor 50?
2. Is the elevator car 25 still within the door zone 35 of the first floor 30 (i.e., the elevator car 25 has not left the door zone 35 of the first floor 30 after closing the elevator shaft door of the first floor 30)?

**[0027]** If these two conditions are fulfilled when an elevator call for the first floor 30 has been received, the elevator will be moved back to the entrance level of the first floor 30 (if it has been moved already) and the elevator shaft door of the first floor 30 will be opened again.

**[0028]** As an additional third condition according to the present invention, the elevator controller 10 checks if no person is inside the car. This can be done via an infrared sensor, a weight sensor etc. Only if this additional condition is fulfilled together with the condition that an elevator shaft door of a first floor 30 has been closed to move an elevator car 25 to a second floor 50 and that the elevator car 25 is still within a door zone 35 of the first floor 30, in which an elevator car door of the elevator car 25 is not yet locked, the elevator car 25 will be moved back to the entrance level of the first floor 30 and/or the elevator shaft door of the first floor 30 will be opened. Since no person is inside of the elevator car 25, no person/passenger can be annoyed that the elevator car 25 does not move immediately from the first floor 30 after closing the elevator shaft door of the first floor 30 but the elevator shaft door of the first floor 30 is opened again.

**[0029]** When the elevator shaft door of the first floor 30 is being opened, the elevator car door will be opened, too. The same applies to the closing of the elevator shaft door of the first floor 30.

**[0030]** The check if the elevator shaft door of the first floor 30 has been closed to move the elevator from the first floor 30 to a second floor 50 by the elevator controller 10 can be done at set intervals (e.g., every 10 s or every second) or continuously. Alternatively, the elevator controller 10 checks this only when the elevator call for the first floor 30 is received, i.e., immediately after the elevator call for the first floor 30 is received.

**[0031]** Also, the checking if the elevator car 25 is still within a door zone 35 of the first floor 30, in which an elevator car door of the elevator car 25 is not yet locked, can be done by the elevator controller 10 at set intervals (e.g., every 10 s or every second) or continuously. Alternatively, the elevator controller 10 checks this only when the elevator call for the first floor 30 is received.

**[0032]** The elevator shaft door can consist of two or more elevator shaft door elements. The elevator car door can consist of two or more elevator car door elements.

**[0033]** As shown in Fig. 2, the method comprises the following steps, in particular in this order:

1. receiving an elevator call for the first floor is received 70
2. checking as a first condition if an elevator shaft

door of a first floor 30 has been closed to move an elevator car 25 to a second floor 50, 75
3. checking as a second condition if the elevator car 25 is still within a door zone 35 of the first floor 30, in which an elevator car door of the elevator car 25 is not yet locked, 80
4. checking as a third condition if no person is inside the elevator car, 85
5. moving the elevator car back to an entrance level of the first floor and/or opening the elevator shaft door of the first floor before moving the elevator car to the second floor, if all three conditions are fulfilled, when the elevator call for/from the first floor is received 90.

**[0034]** Finally, it should be noted that the term "comprising" does not exclude other elements or steps and the "a" or "an" does not exclude a plurality. Also, elements described in association with different embodiments may be combined within the scope of the appended claims. It should also be noted that reference signs in the claims should not be construed as limiting the scope of the claims.

List of reference signs

**[0035]**

| | |
|---|---|
| 1 | elevator system |
| 10 | elevator controller |
| 20 | elevator shaft |
| 25 | elevator car |
| 30 | first floor |
| 35 | door zone of the first floor |
| 37 | center level |
| 50 | second floor |
| 55 | door zone of the second floor |
| 70 | receiving an elevator call for the first floor is received |
| 75 | checking as a first condition if an elevator shaft door of a first floor has been closed to move an elevator car to a second floor |
| 80 | checking as a second condition if the elevator car is still within a door zone of the first floor, in which an elevator car door of the elevator car is not yet locked |
| 85 | checking as a third condition if no person is inside the car |
| 90 | moving the elevator car back to an entrance level of the first floor and/or opening the elevator shaft door of the first floor before moving the elevator car to the second floor, if at least the first and second conditions, particularly all three conditions, are fulfilled, when the elevator call for/from the first floor is received. |

**Claims**

1. Method of controlling an operation of an elevator system (1), wherein the method comprises the following steps:

   checking (75)
   as a first condition if an elevator shaft door of a first floor (30) has been closed to move an elevator car (25) to a second floor (50);
   checking (80)
   as a second condition if the elevator car (25) is still within a door zone (35) of the first floor (30), in which an elevator car door of the elevator car (25) is not yet locked; and
   if the first condition and the second condition are fulfilled when an elevator call for the first floor (30) is received, moving (90) the elevator car (25) back to an entrance level of the first floor (30) and/or opening the elevator shaft door of the first floor (30) before moving the elevator car (25) to the second floor (50), characterised that the method comprises a further step:

   checking (85) as a third condition if no person is inside the elevator car (25);
   wherein the step of moving (90) the elevator car (25) back to the entrance level of the first floor (30) and/or opening the elevator shaft door of the first floor (30) before moving the elevator car (25) to the second floor (50) is only executed if the first condition, the second condition and the third condition are fulfilled when the elevator call for the first floor (30) is received.

2. Method according to claim 1, wherein
   the step of closing the elevator shaft door of the first floor (30) to move the elevator car (25) to the second floor (50) is executed due to receiving an elevator call from the second floor (50).

3. Method according to one of the preceding claims, wherein
   the door zone (35) is formed symmetrically around a center level (37) of the first floor (30).

4. Method according to claim 1or 2, wherein
   the door zone (35) is formed asymmetrically around a center level (37) of the first floor (30).

5. Elevator controller (10) for controlling an elevator system (1) wherein an elevator car (25) is moved in an elevator shaft (20),

   wherein the elevator controller (10) is adapted such that
   the elevator controller (10) checks as a first con-

dition if an elevator shaft door of a first floor (30) has been closed to move the elevator car (25) to a second floor (50), and
the elevator controller (10) checks as a second condition if the elevator car (25) is still within a door zone (35) of the first floor (30), in which an elevator car door of the elevator car (25) is not yet locked,
the elevator controller (10) moves the elevator car (25) back to an entrance level of the first floor (30) and/or opens the elevator shaft door of the first floor (30) before moving the elevator car (25) to the second floor (50), if the first condition and the second condition are fulfilled when an elevator call for the first floor (30) is received,
**characterized in that**
the elevator controller (10) is further adapted for checking if no person is inside the elevator car (25) as a third condition and wherein the elevator controller (10) is adapted such that the elevator controller (10) moves the elevator car (25) back to the entrance level of the first floor (30) and/or opens the elevator shaft door of the first floor (30) before moving the elevator car (25) to the second floor (50) if the first condition, the second condition and the third condition are fulfilled when the elevator call for the first floor (30) is received.

**6.** Elevator controller (10) according to claim 5, wherein the door zone (35) is formed symmetrically around the entrance level of the first floor (30).

**7.** Elevator controller (10) according to one claim 5, wherein
the door zone (35) is formed asymmetrically around the entrance level of the first floor (30).

**Patentansprüche**

**1.** Verfahren zum Steuern eines Betriebs eines Aufzugssystems (1), wobei das Verfahren die folgenden Schritte umfasst:

Prüfen (75) als eine erste Bedingung, ob eine Aufzugsschachttür eines ersten Stockwerks (30) geschlossen wurde, um eine Aufzugskabine (25) zu einem zweiten Stockwerk (50) zu bewegen;
Prüfen (80) als eine zweite Bedingung, ob sich die Aufzugskabine (25) noch innerhalb einer Türzone (35) des ersten Stockwerks (30) befindet, wobei eine Aufzugskabinentür der Aufzugskabine (25) noch nicht verriegelt ist; und falls die erste Bedingung und die zweite Bedingung erfüllt sind, wenn ein Aufzugsruf für das erste Stockwerk (30) empfangen wird,

Bewegen (90) der Aufzugskabine (25) zurück zu einer Eingangsebene des ersten Stockwerks (30) und/oder Öffnen der Aufzugsschachttür des ersten Stockwerks (30) vor dem Bewegen der Aufzugskabine (25) zu dem zweiten Stockwerk (50), **dadurch gekennzeichnet, dass** das Verfahren einen weiteren Schritt umfasst:

Prüfen (85) als eine dritte Bedingung, ob sich keine Person in der Aufzugskabine (25) befindet;
wobei der Schritt des Bewegens (90) der Aufzugskabine (25) zurück zu der Eingangsebene des ersten Stockwerks (30) und/oder des Öffnens der Aufzugsschachttür des ersten Stockwerks (30) vor dem Bewegen der Aufzugskabine (25) zu dem zweiten Stockwerk (50) nur ausgeführt wird, falls die erste Bedingung, die zweite Bedingung und die dritte Bedingung erfüllt sind, wenn der Aufzugsruf für das erste Stockwerk (30) empfangen wird.

**2.** Verfahren nach Anspruch 1, wobei
der Schritt des Schließens der Aufzugsschachttür des ersten Stockwerks (30), um die Aufzugskabine (25) zu dem zweiten Stockwerk (50) zu bewegen, aufgrund des Empfangens eines Aufzugsrufs von dem zweiten Stockwerk (50) ausgeführt wird.

**3.** Verfahren nach einem der vorhergehenden Ansprüche, wobei
die Türzone (35) symmetrisch um eine Mittelebene (37) des ersten Stockwerks (30) ausgebildet ist.

**4.** Verfahren nach Anspruch 1 oder 2, wobei
die Türzone (35) asymmetrisch um eine Mittelebene (37) des ersten Stockwerks (30) ausgebildet ist.

**5.** Aufzugssteuerung (10) zum Steuern eines Aufzugssystems (1), wobei eine Aufzugskabine (25) in einem Aufzugsschacht (20) bewegt wird,

wobei die Aufzugssteuerung (10) derart ausgelegt ist, dass
die Aufzugssteuerung (10) als eine erste Bedingung prüft, ob eine Aufzugsschachttür eines ersten Stockwerks (30) geschlossen wurde, um die Aufzugskabine (25) zu einem zweiten Stockwerk (50) zu bewegen, und
die Aufzugssteuerung (10) als eine zweite Bedingung prüft, ob sich die Aufzugskabine (25) noch innerhalb einer Türzone (35) des ersten Stockwerks (30) befindet, wobei eine Aufzugskabinentür der Aufzugskabine (25) noch nicht verriegelt ist,
die Aufzugssteuerung (10) die Aufzugskabine (25) zurück zu einer Eingangsebene des ersten

Stockwerks (30) bewegt und/oder die Aufzugsschachttür des ersten Stockwerks (30) vor dem Bewegen der Aufzugskabine (25) zu dem zweiten Stockwerk (50) öffnet, falls die erste Bedingung und die zweite Bedingung erfüllt sind, wenn ein Aufzugsruf für das erste Stockwerk (30) empfangen wird,
**dadurch gekennzeichnet, dass**
die Aufzugssteuerung (10) ferner zum Prüfen, ob sich keine Person in der Aufzugskabine (25) befindet, als eine dritte Bedingung ausgelegt ist, und wobei die Aufzugssteuerung (10) derart ausgelegt ist, dass
die Aufzugssteuerung (10) die Aufzugskabine (25) zurück zu der Eingangsebene des ersten Stockwerks (30) bewegt und/oder die Aufzugsschachttür des ersten Stockwerks (30) vor dem Bewegen der Aufzugskabine (25) zu dem zweiten Stockwerk (50) öffnet, falls die erste Bedingung, die zweite Bedingung und die dritte Bedingung erfüllt sind, wenn der Aufzugsruf für das erste Stockwerk (30) empfangen wird.

**6.** Aufzugssteuerung (10) nach Anspruch 5, wobei die Türzone (35) symmetrisch um die Eingangsebene des ersten Stockwerks (30) ausgebildet ist.

**7.** Aufzugssteuerung (10) nach einem Anspruch 5, wobei
die Türzone (35) asymmetrisch um die Eingangsebene des ersten Stockwerks (30) ausgebildet ist.

**Revendications**

**1.** Procédé de commande d'un fonctionnement d'un système d'ascenseur (1), le procédé comprenant les étapes suivantes :

la vérification (75) comme première condition si une porte de cage d'ascenseur d'un premier étage (30) a été fermée pour déplacer une cabine d'ascenseur (25) vers un second étage (50) ;
la vérification (80) comme deuxième condition si la cabine d'ascenseur (25) se trouve toujours dans une zone de porte (35) du premier étage (30), dans laquelle une porte de cabine d'ascenseur de la cabine d'ascenseur (25) n'est pas encore verrouillée ; et si la première condition et la deuxième condition sont remplies lorsqu'un appel d'ascenseur pour le premier étage (30) est reçu,
le déplacement (90) retour de la cabine d'ascenseur (25) vers un niveau d'entrée du premier étage (30) et/ou l'ouverture de la porte de cage d'ascenseur du premier étage (30) avant le déplacement de la cabine d'ascenseur (25) vers le second étage (50), caractérisé que le procédé comprend une étape supplémentaire :

la vérification (85) comme troisième condition si personne ne se trouve à l'intérieur de la cabine d'ascenseur (25) ;
dans lequel l'étape de déplacement (90) retour de la cabine d'ascenseur (25) vers le niveau d'entrée du premier étage (30) et/ou d'ouverture de la porte de la cage d'ascenseur du premier étage (30) avant le déplacement de la cabine d'ascenseur (25) vers le second étage (50) n'est exécutée que si la première condition, la deuxième condition et la troisième condition sont remplies lorsque l'appel d'ascenseur pour le premier étage (30) est reçu.

**2.** Procédé selon la revendication 1, dans lequel l'étape de fermeture de la porte de cage d'ascenseur du premier étage (30) pour déplacer la cabine d'ascenseur (25) vers le second étage (50) est exécutée en raison de la réception d'un appel d'ascenseur depuis le second étage (50).

**3.** Procédé selon l'une des revendications précédentes, dans lequel
la zone de porte (35) est formée symétriquement autour d'un niveau central (37) du premier étage (30).

**4.** Procédé selon la revendication 1 ou 2, dans lequel la zone de porte (35) est formée de manière asymétrique autour d'un niveau central (37) du premier étage (30).

**5.** Dispositif de commande d'ascenseur (10) destiné à commander un système d'ascenseur (1) dans lequel une cabine d'ascenseur (25) est déplacée dans une cage d'ascenseur (20),

dans lequel le dispositif de commande d'ascenseur (10) est adapté de telle sorte que
le dispositif de commande d'ascenseur (10) vérifie comme première condition si une porte de cage d'ascenseur d'un premier étage (30) a été fermée pour déplacer la cabine d'ascenseur (25) vers un second étage (50), et
le dispositif de commande d'ascenseur (10) vérifie comme deuxième condition si la cabine d'ascenseur (25) se trouve toujours dans une zone de porte (35) du premier étage (30), dans laquelle une porte de cabine d'ascenseur de la cabine d'ascenseur (25) n'est pas encore verrouillée,
le dispositif de commande d'ascenseur (10) ramène la cabine d'ascenseur (25) à un niveau d'entrée du premier étage (30) et/ou ouvre la porte de la cage d'ascenseur du premier étage

(30) avant le déplacement de la cabine d'ascenseur (25) vers le second étage (50), si la première condition et la deuxième condition sont remplies lorsqu'un appel d'ascenseur pour le premier étage (30) est reçu,
**caractérisé en ce que**
le dispositif de commande d'ascenseur (10) est en outre adapté pour vérifier si personne ne se trouve à l'intérieur de la cabine d'ascenseur (25) comme troisième condition et dans lequel le dispositif de commande d'ascenseur (10) est adapté de telle sorte que
le dispsoitif de commande d'ascenseur (10) ramène la cabine d'ascenseur (25) au niveau d'entrée du premier étage (30) et/ou ouvre la porte de la cage d'ascenseur du premier étage (30) avant le déplacement de la cabine d'ascenseur (25) vers le second étage (50) si la première condition, la deuxième condition et la troisième condition sont remplies lorsque l'appel d'ascenseur pour le premier étage (30) est reçu.

**6.** Dispositif de commande d'ascenseur (10) selon la revendication 5, dans lequel
la zone de porte (35) est formée symétriquement autour du niveau d'entrée du premier étage (30).

**7.** Dispositif de commande d'ascenseur (10) selon l'une revendication 5, dans lequel
la zone de porte (35) est formée de manière asymétrique autour du niveau d'entrée du premier étage (30).

Fig. 1

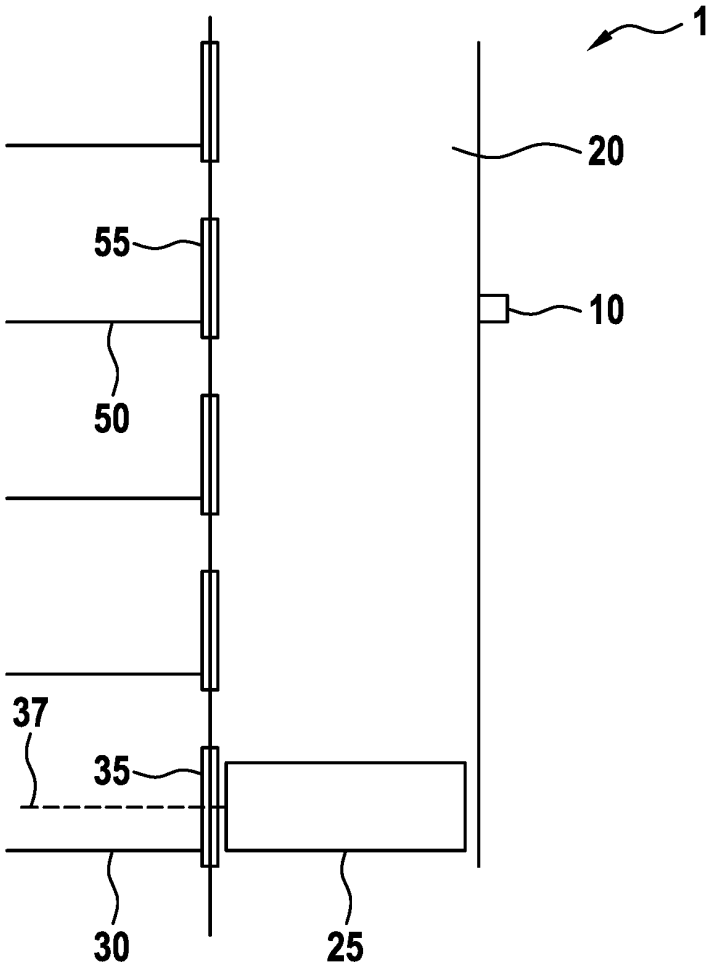
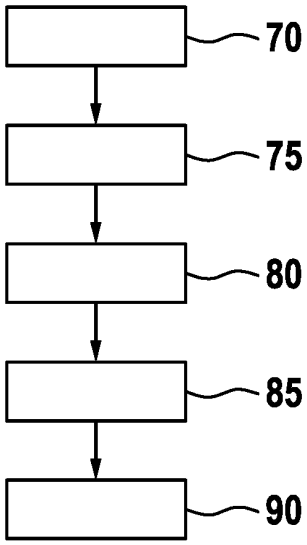



Fig. 2



## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


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