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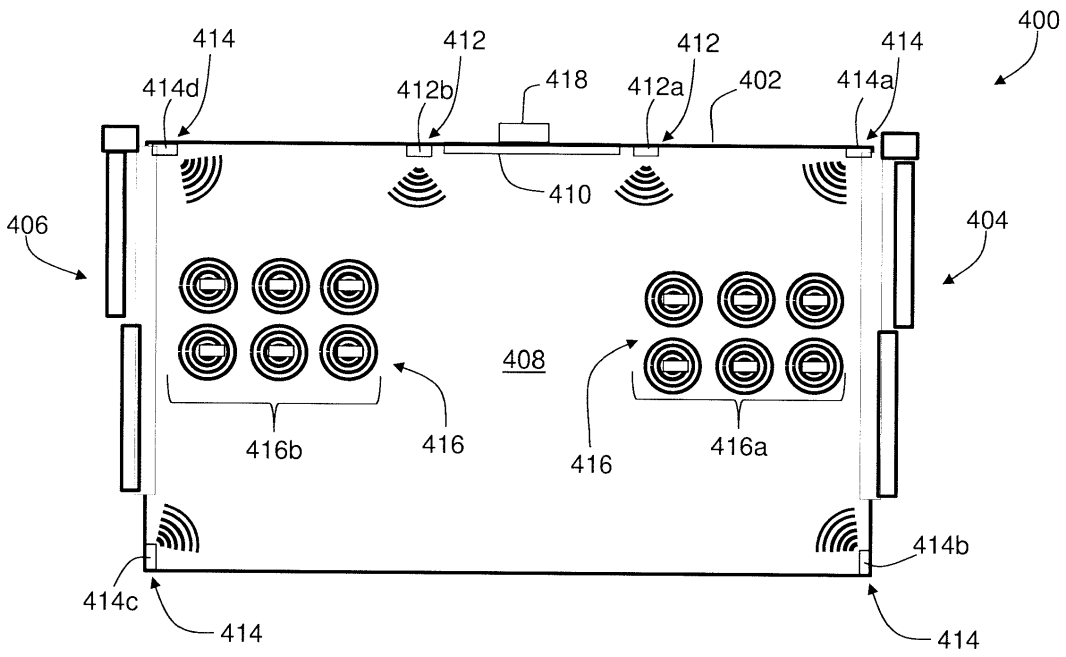
(54) ELEVATOR PASSENGER ASSISTANCE SYSTEMS

(57) Elevator passenger assistance systems for elevators are provided. The passenger assistance systems include an elevator car defining a passenger space, a lighting indicator located within the passenger space, and a controller arranged to control an illumination aspect of the lighting indicator to indicate elevator system information within the passenger space.

FIG. 4



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Description

[0001] The subject matter disclosed herein generally relates to car operating panels of elevator systems and, more particularly, to passenger assistance systems for elevators.

[0002] Elevator systems, and particularly elevator cars, are arranged to convey passengers within a building. When located within an elevator car, particularly crowded elevator cars, passengers may have a difficult time seeing indicator information that is typically located on a car operating panel. For example, a car position indicator located on a car operating panel may be the only way to display messages within an elevator car, but if such car position indicator is not readily visible, a passenger may not be able to readily ascertain the information to be conveyed. Accordingly, improved systems for providing information to passengers within an elevator car may be advantageous.

[0003] According to some embodiments, elevator passenger assistance systems are provided. The elevator passenger assistance systems include an elevator car defining a passenger space, a lighting indicator located within the passenger space, and a controller arranged to control an illumination aspect of the lighting indicator to indicate elevator system information within the passenger space.

[0004] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator passenger assistance systems may include that the lighting indicator is a first lighting indicator located proximate a car operating panel of the elevator car.

[0005] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator passenger assistance systems may include that the first lighting indicator comprises a first lighting element and a second lighting element, where the first and second lighting elements are arrange on opposite sides of the car operating panel.

[0006] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator passenger assistance systems may include a second lighting indicator located on at least one wall of the elevator car.

[0007] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator passenger assistance systems may include that the second lighting indicator comprises a first lighting element in a first corner of the elevator car, a second lighting element in a second corner of the elevator car, a third lighting element in a third corner of the elevator car, and a fourth lighting element in a fourth corner of the elevator car.

[0008] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator passenger assistance systems may include a third lighting indicator located in at least one of a floor and a ceiling of the elevator car.

[0009] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator passenger assistance systems may include that the elevator system information comprises at least one of an elevator car door that will be opening and a percentage of load of the elevator car.

[0010] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator passenger assistance systems may include that the illumination aspect is at least one of brightness, pulse, color, and pattern of blinking.

[0011] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator passenger assistance systems may include that the elevator car comprises at least one elevator car door, the system further comprising at least one additional lighting indicator located proximate the at least one elevator car door.

[0012] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator passenger assistance systems may include the elevator car is substantially rectangular in shape.

[0013] The foregoing features and elements may be combined in various combinations without exclusivity, unless expressly indicated otherwise. These features and elements as well as the operation thereof will become more apparent in light of the following description and the accompanying drawings. It should be understood, however, that the following description and drawings are intended to be illustrative and explanatory in nature and non-limiting.

[0014] The subject matter is particularly pointed out and distinctly claimed at the conclusion of the specification. The foregoing and other features, and advantages of the present disclosure are apparent from the following detailed description taken in conjunction with the accompanying drawings in which:

FIG. 1 is a schematic illustration of an elevator system that may employ various embodiments of the present disclosure;

FIG. 2 is a schematic illustration of an elevator car that may incorporate features of the present disclosure;

FIG. 3 is a schematic illustration of an elevator system that can incorporate embodiments of the present disclosure; and

FIG. 4 is a schematic illustration of an elevator car system in accordance with an embodiment of the present disclosure.

[0015] FIG. 1 is a perspective view of an elevator system 101 including an elevator car 103, a counterweight

105, a roping 107, a guide rail 109, a machine 111, a position encoder 113, and a controller 115. The elevator car 103 and counterweight 105 are connected to each other by the roping 107. The roping 107 may include or be configured as, for example, ropes, steel cables, and/or coated-steel belts. The counterweight 105 is configured to balance a load of the elevator car 103 and is configured to facilitate movement of the elevator car 103 concurrently and in an opposite direction with respect to the counterweight 105 within an elevator shaft 117 and along the guide rail 109.

[0016] The roping 107 engages the machine 111, which is part of an overhead structure of the elevator system 101. The machine 111 is configured to control movement between the elevator car 103 and the counterweight 105. The position encoder 113 may be mounted on an upper sheave of a speed-governor system 119 and may be configured to provide position signals related to a position of the elevator car 103 within the elevator shaft 117. In other embodiments, the position encoder 113 may be directly mounted to a moving component of the machine 111, or may be located in other positions and/or configurations as known in the art.

[0017] The controller 115 is located, as shown, in a controller room 121 of the elevator shaft 117 and is configured to control the operation of the elevator system 101, and particularly the elevator car 103. For example, the controller 115 may provide drive signals to the machine 111 to control the acceleration, deceleration, leveling, stopping, etc. of the elevator car 103. The controller 115 may also be configured to receive position signals from the position encoder 113. When moving up or down within the elevator shaft 117 along guide rail 109, the elevator car 103 may stop at one or more landings 125 as controlled by the controller 115. Although shown in a controller room 121, those of skill in the art will appreciate that the controller 115 can be located and/or configured in other locations or positions within the elevator system 101.

[0018] The machine 111 may include a motor or similar driving mechanism. In accordance with embodiments of the disclosure, the machine 111 is configured to include an electrically driven motor. The power supply for the motor may be any power source, including a power grid, which, in combination with other components, is supplied to the motor.

[0019] Although shown and described with a roping system, elevator systems that employ other methods and mechanisms of moving an elevator car within an elevator shaft may employ embodiments of the present disclosure. FIG. 1 is merely a non-limiting example presented for illustrative and explanatory purposes.

[0020] Turning to FIG. 2, schematic illustrations of an elevator system 201 having an elevator car 203 that may employ embodiments described herein are shown. FIG. 2 is a schematic illustration of the elevator car 203 as viewed from a landing 225. A passenger 231 may call the elevator car 203 using a hall call panel 233. Upon arrival of the elevator car 203 at the landing 225, the passenger 231 may enter the elevator car 203 and attempt to access or reach a car operating panel (as shown in FIG. 3) to select a desired destination floor.

[0021] Turning now to FIG. 3, a schematic illustration of an elevator car system 300 that can incorporate embodiments of the present disclosure is shown. FIG. 3 illustrates a car operating panel 335 located within the elevator car 303. The elevator car 303 is relatively crowded as illustrated by the number of already present passengers 331a. In the illustration of FIG. 3, a new passenger 331b is shown outside the elevator car 303 (e.g., on a landing floor). When the new passenger 331b enters the elevator car 303, the new passenger 331b may have trouble seeing a car operating panel display 337 of the car operating panel 335. The car operating panel display 337 can be a car position indicator system and/or notification system to display information to passengers 331a, 331b. Such information can include current landing, direction of travel of the elevator car 303, load information (e.g., too many passengers or other weight within the elevator car 303), destination landing information, indication of which doors may open at a landing (e.g., in a dual-entry/exit elevator car system), etc.

[0022] Accordingly, embodiments provided herein are directed to systems for providing improved information display such that passengers within an elevator car can readily ascertain information related to operation of the elevator car. For example, in accordance with some embodiments, lighting systems within the elevator car are programmable and controllable to inform the passengers regarding elevator system status, elevator system events, and/or other elevator system related information (hereinafter "elevator system information"). In some embodiments, LED lighting located within the elevator car can be used to convey information through colors, pulses, strobes, sequential lighting, etc. For example, using RGB LED it is possible to display and/or convey elevator system information with color animations and/or color variations.

[0023] Turning now to FIG. 4, a schematic illustration of an elevator car system 400 in accordance with an embodiment of the present disclosure is shown. The elevator car system 400 is a dual-entry elevator car 402 having a first entry 404 and a second entry 406. The first entry 404 is opposite the second entry 406 with a passenger space 408 defined within the elevator car 402. Each of the first entry 404 and the second entry 406 include elevator car doors that are operable with landing doors of an elevator system to enable ingress and egress from the elevator car 402. A car operating panel 410 is located within the passenger space 408 and can include various buttons, screens, displays, and other features as will be appreciated by those of skill in the art.

[0024] As noted above, the car operating panel 410 (or components thereof) can be used to display and convey elevator system information to passengers within the passenger space 408. However, when the elevator car

402 is crowded, it may be difficult for some passengers within the passenger space 408 to see the car operating panel 410, and thus these passengers may not be able to ascertain necessary or desired information that is being displayed at the car operating panel 410.

[0025] Accordingly, the elevator car 402 of the present embodiment is shown having lighting indicators 412, 414, 416. The lighting indicators 412, 414, 416 shown herein are example arrangements and locations, and those of skill in the art will appreciate that more or fewer lighting indicators and/or additional or different locations of lighting indicators may be employed without departing from the scope of the present disclosure. The lighting indicators 412, 414, 416 may be LED lights, and in some embodiments may be RGB LED lights. Further, in some embodiments, the lighting indicators 412, 414, 416 can be floor-to-ceiling lights that extend from the floor of the elevator car 402 to the ceiling thereof, within the passenger space 408. However, in other embodiments, non-full length lighting indicators may be employed. The lighting indicators 412, 414, 416 can be operably connected to a controller 418. As shown, the controller 418 is located on an exterior of the elevator car 402. However, those of skill in the art will appreciate that the controller for the lighting indicators 412, 414, 416 can be located anywhere on or in the elevator car, located elsewhere within the elevator system, and/or can be a software within a more general elevator control system (e.g., controller 115 shown in FIG. 1).

[0026] A first lighting indicator 412 is shown proximate the car operating panel 410, and includes a first lighting element 412a and a second lighting element 412b. The first lighting indicator 412 may be referred to as a car operating panel lighting indicator, and in this illustrative embodiments shows two lighting elements 412a, 412b located on each side of the car operating panel 410.

[0027] A second lighting indicator 414, as shown, comprises lighting elements 414a, 414b, 414c, 414d located in each corner of the passenger space 408 of the elevator car 402. As shown, a first lighting element 414a and a second lighting element 414b are located proximate the first entry 404 and a third lighting element 414c and a fourth lighting element 414d are located proximate the second entry 406.

[0028] A third lighting indicator 416, as shown, includes one or more sets of lighting elements 416a, 416b located on a floor of the passenger space 408. A first set of lighting elements 416a of the third lighting indicator 416 is provided proximate the first entry 404. Similarly, a second set of lighting elements 416b of the third lighting indicator 416 is provided proximate the second entry 406.

[0029] The controller 418 is arranged and configured to control the lighting indicators 412, 414, 416 to generate light to convey information to passengers within the elevator car 402. For example, one or more of the lighting elements 412a, 412b, 414a, 414b, 414c, 414d, 416a, 416b of the lighting indicators 412, 414, 416 can be lit up to indicate which of the two entries 404, 406 will be opening at an upcoming stop of the elevator car. In such arrangement, for example, the lighting elements 412a, 414a, 414b, 416a of the lighting indicators 412, 414, 416 that are closest to the first entry 404 may be lit up when the first entry 404 is to open while all other lighting elements 412b, 414c, 414d, 416b of the lighting indicators 412, 414, 416 may remain off Thus, a passenger within the passenger space 408 can be notified that the first entry 404 will be opening. Those of skill in the art will appreciate that other controlled lightings can be performed to indicate various other information - such as the opening of the second entry 406, etc. In some embodiments, a color can be controlled to indicate the entry that will be opening. For example, in one non-limiting embodiment, the lighting elements proximate an opening entry can be lit up green while the lighting elements proximate an entry that is not opening can be lit up red, thus providing visual indication of which entry will be opening.

[0030] In some embodiments, the lighting elements 412a, 412b, 414a, 414b, 414c, 414d, 416a, 416b of the lighting indicators 412, 414, 416 can be selectively controlled to provide additional information. For example, in some embodiments, the lighting elements 416a, 416b of the third lighting indicator 416 can be pulsed in sequence to indicate a walking direction, such that the lighting elements 416a, 416b farthest from a respective entry 404, 406 can be lit up first, and then in sequence, each closer lighting element 416a, 416b of the respective third lighting indicator 416 may be lit up, such that a running set of lights can indicate a direction to walk. The controller 418 can be used to provide animations or other types of indication by controlling the lighting elements 412a, 412b, 414a, 414b, 414c, 414d, 416a, 416b to blink, slide, light-up, scroll, cycle, change color, dynamic operations, etc.

[0031] The lighting indicators 412, 414, 416 of the present disclosure can be used as ambient lights during normal operation (i.e., when not being controlled to convey information). That is, the lighting indicators 412, 414, 416 can be used to provide light within the passenger space 408 of the elevator car 402 when not in use to convey information.

[0032] In a non-limiting example of a control operation for conveying elevator system information to passengers, the controller can actively control a timing and an illumination aspect of the lighting elements. As used herein, illumination aspects of the lighting elements includes, but are not limited to, brightness, pulse, color, pattern of blinking, etc.

[0033] In one example, with reference again to FIG. 4, the first lighting indicator 412 can be controlled to indicate a car load with a color graduation. For example, the first lighting indicator 412 can be controlled to illuminate between the color green (indicating below load limit of the elevator car 402) and red (indicating that a load limit is close or reached). Such illumination aspect can be controlled to provide a color changing gradient as the load in the elevator car 402 changes, transitioning, for example, from green to yellow to orange to red, based on a

percentage of load as compared to a maximum load of the elevator car 402. Such control indicating a weight or load can be displayed while the elevator car doors are open, thus letting current and loading passengers know the state of the load of the elevator car. As soon as the elevator car doors close the first lighting indicator can return to a normal operation illumination (e.g., ambient lighting for the passenger space 408).

[0034] In another example, the corner lighting elements (e.g., second lighting indicator 414) can be controlled to indicate which elevator car door (e.g., entry 404, 406) is going to be opened in a case of two entrances before arrival of the elevator car at a designated floor or landing.

[0035] The above described lighting schemes are merely for example, and those of skill in the art will appreciate that other types of control, illumination, lighting, and elevator system information display can be employed without departing from the scope of the present disclosure. For example, in another embodiment, the lighting indicators 412, 414, 416 can be illuminated in the event of an emergency and can be used to assist in an evacuation or to convey other instruction to passengers within the elevator car 402.

[0036] Although shown and described herein with respect to a square or rectangular shaped elevator car, those of skill in the art will appreciate that embodiment provided herein are not so limited to such elevator car. For example, rounded, curved, or circular elevator cars can incorporate embodiments without departing from the scope of the present disclosure. In such elevator cars, lighting indicators can be located adjacent to elevator car doors, elevator car operating panels, the floor, the ceiling, or at any desirable or suitable location on a wall or wall panel of the elevator car.

[0037] Advantageously, embodiments provided herein enable improved information dissemination within an elevator car. For example, embodiments provided herein enable additional and/or new visibility for conveying elevator system information to passengers within an elevator car about various elevator system information and/or events. Further, advantageously, improved convenience and efficiency to passengers is enabled through embodiments of the present disclosure. For example, as passengers become accustomed to the indicators provided through embodiments of the present disclosure, little to no interaction with a car operating panel may be necessary to know that status of the elevator car.

[0038] While the present disclosure has been described in detail in connection with only a limited number of embodiments, it should be readily understood that the present disclosure is not limited to such disclosed embodiments. Rather, the present disclosure can be modified to incorporate any number of variations, alterations, substitutions, combinations, sub-combinations, or equivalent arrangements not heretofore described, but which are commensurate with the scope of the present disclosure. Additionally, while various embodiments of the present disclosure have been described, it is to be understood that aspects of the present disclosure may include only some of the described embodiments.

[0039] Accordingly, the present disclosure is not to be seen as limited by the foregoing description, but is only limited by the scope of the appended claims.

Claims

1. An elevator passenger assistance system comprising:

   an elevator car defining a passenger space;
   a lighting indicator located within the passenger space; and
   a controller arranged to control an illumination aspect of the lighting indicator to indicate elevator system information within the passenger space.

2. The elevator passenger assistance system of claim 1, wherein the lighting indicator is a first lighting indicator located proximate a car operating panel of the elevator car.

3. The elevator passenger assistance system of claim 2, wherein the first lighting indicator comprises a first lighting element and a second lighting element, where the first and second lighting elements are arrange on opposite sides of the car operating panel.

4. The elevator passenger assistance system of any of claims 2-3, further comprising a second lighting indicator located on at least one wall of the elevator car.

5. The elevator passenger assistance system of claim 4, wherein the second lighting indicator comprises a first lighting element in a first corner of the elevator car, a second lighting element in a second corner of the elevator car, a third lighting element in a third corner of the elevator car, and a fourth lighting element in a fourth corner of the elevator car.

6. The elevator passenger assistance system of any of claims 2-5, further comprising a third lighting indicator located in at least one of a floor and a ceiling of the elevator car.

7. The elevator passenger assistance system of any preceding claim, wherein the elevator system information comprises at least one of an elevator car door that will be opening and a percentage of load of the elevator car.

8. The elevator passenger assistance system of any preceding claim, wherein the illumination aspect is at least one of brightness, pulse, color, and pattern

of blinking.

9. The elevator passenger assistance system of any preceding claim, wherein the elevator car comprises at least one elevator car door, the system further comprising at least one additional lighting indicator located proximate the at least one elevator car door.

10. The elevator passenger assistance system of any preceding claim, wherein the elevator car is substantially rectangular in shape.

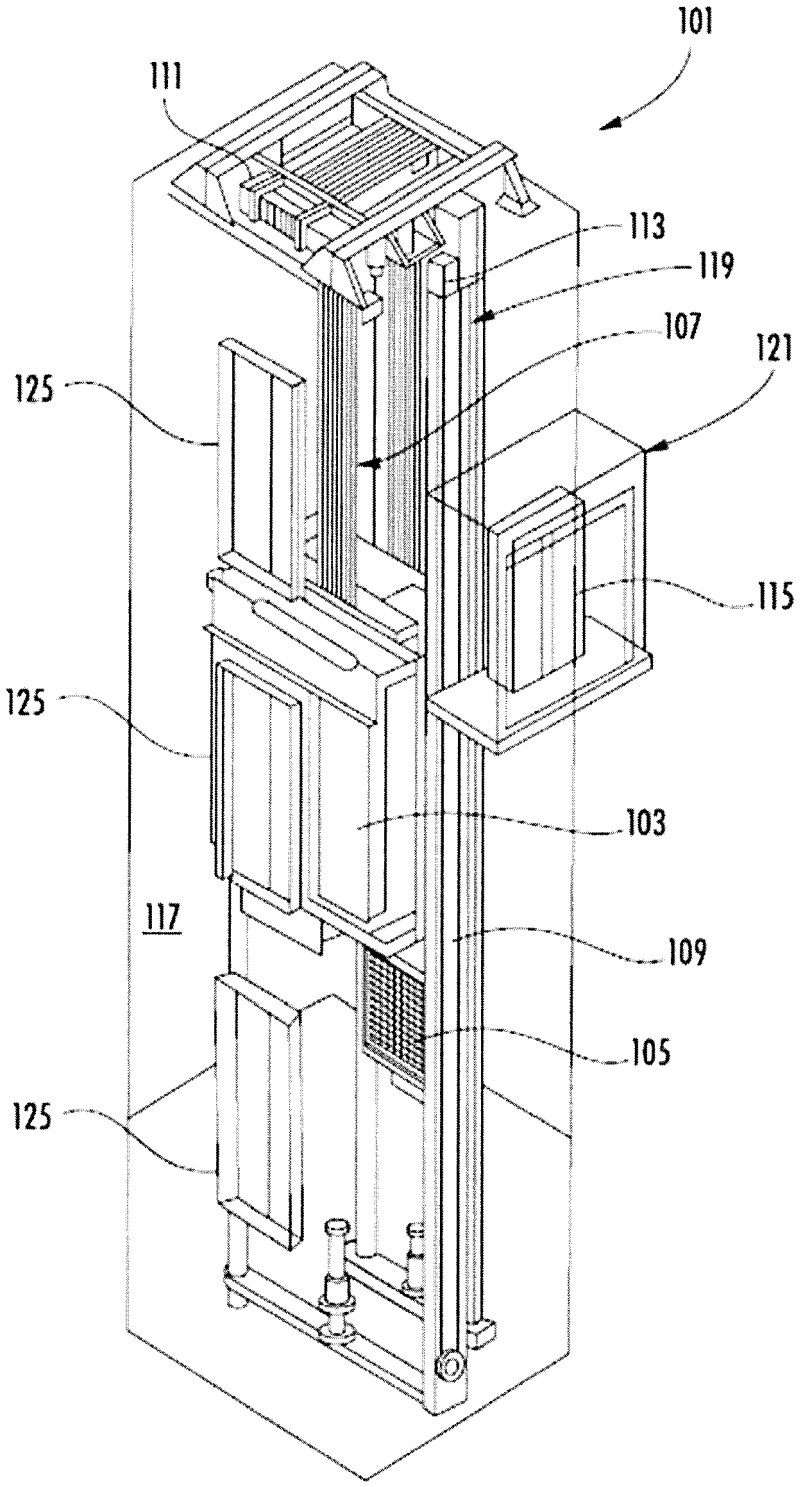


FIG. 1

FIG. 2

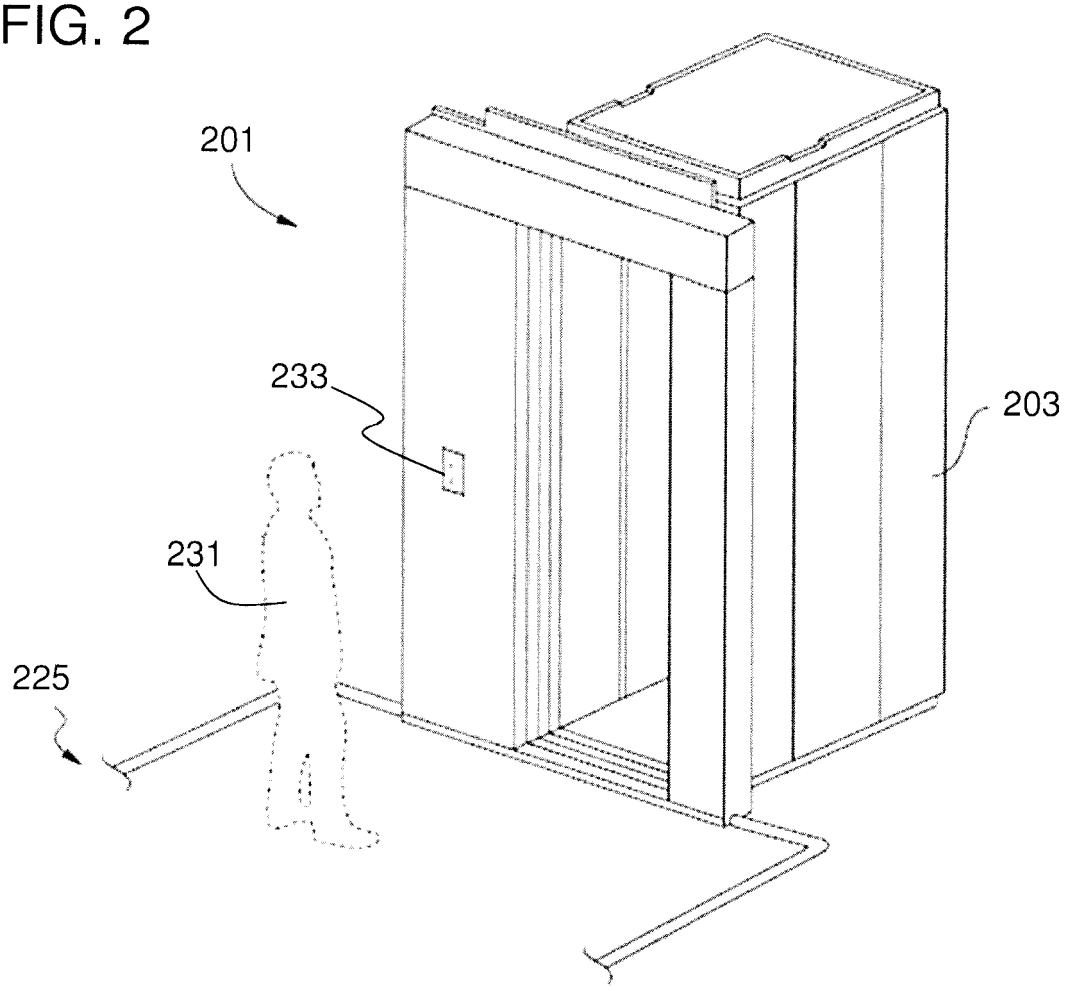


FIG. 3

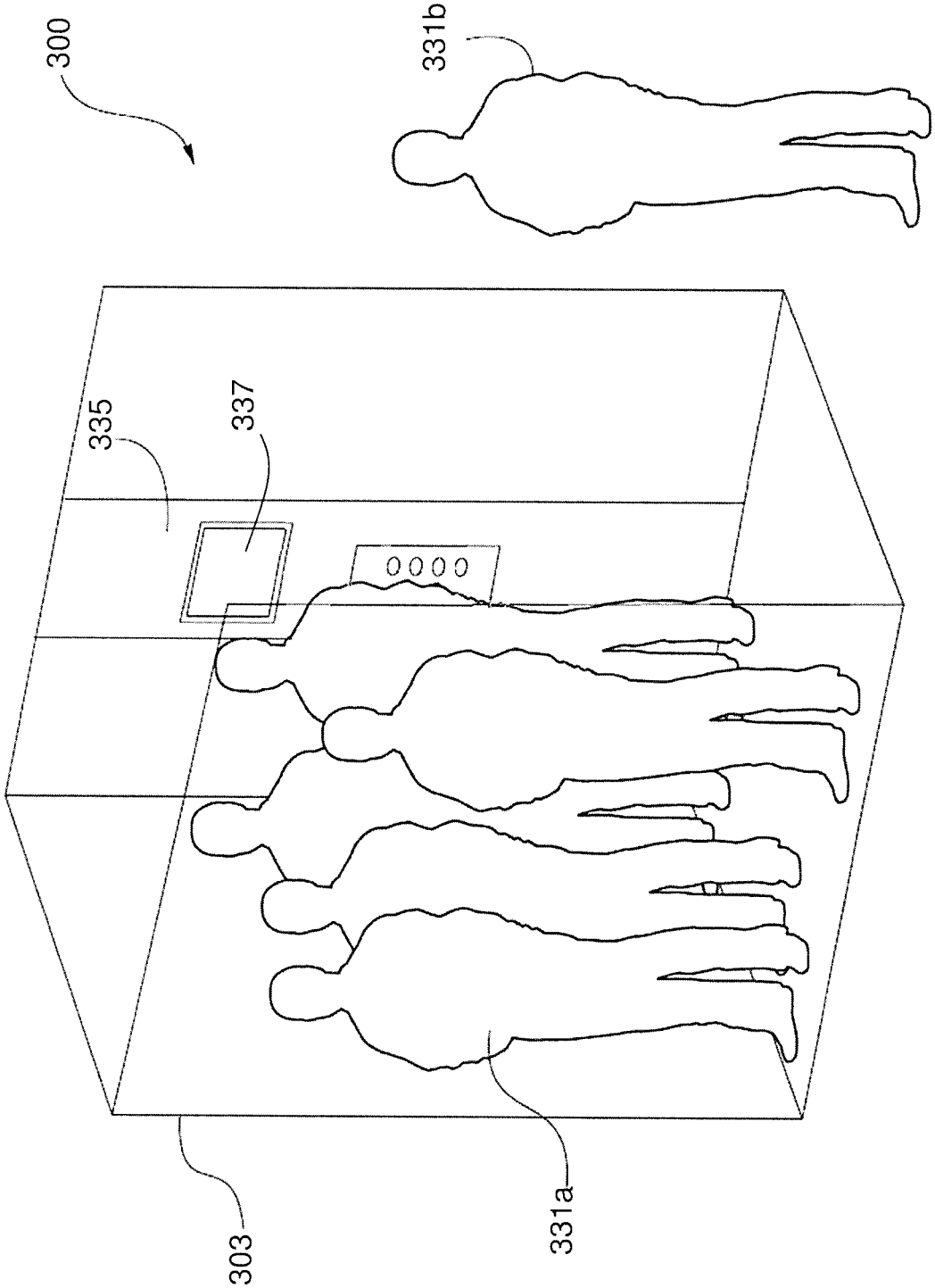
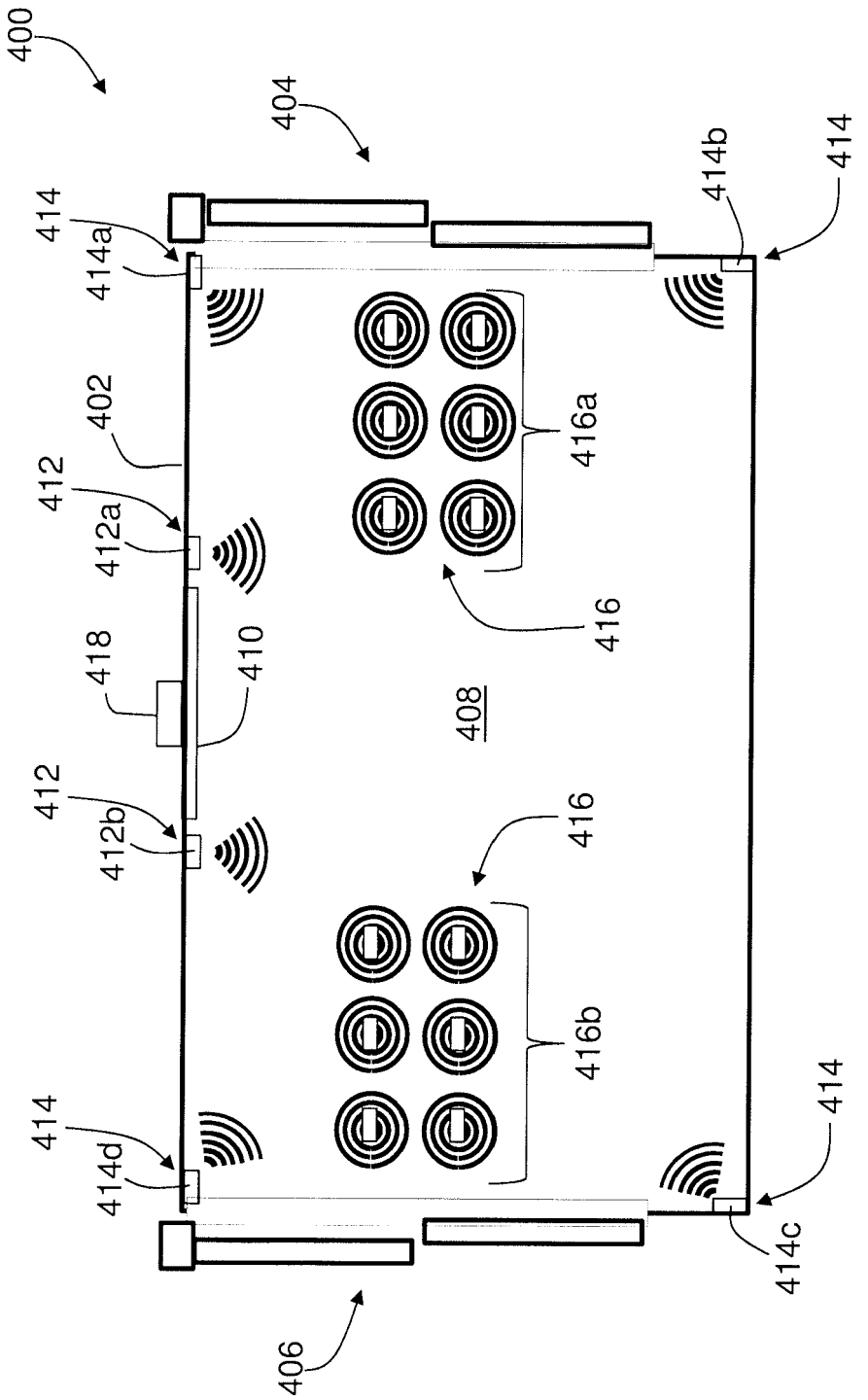


FIG. 4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EUROPEAN SEARCH REPORT

Application Number
EP 18 30 5015

DOCUMENTS CONSIDERED TO BE RELEVANT

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TECHNICAL FIELDS SEARCHED (IPC)
B66B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	18 July 2018	Lenoir, Xavier

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 18 30 5015

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