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(54) ELEVATOR PASSENGER SUPPORT AND CALL SYSTEMS

(57) Elevator systems are provided. The elevator systems include an elevator controller, an elevator car, a plurality of landings, and a passenger support and call system having a passenger support structure located at at least one landing. The passenger support structure includes a resting surface and a sensor arranged to detect a presence of a person in contact with the resting surface, wherein, when a person is detected contacting the resting surface, an elevator call request is sent from the passenger support structure to the elevator controller.

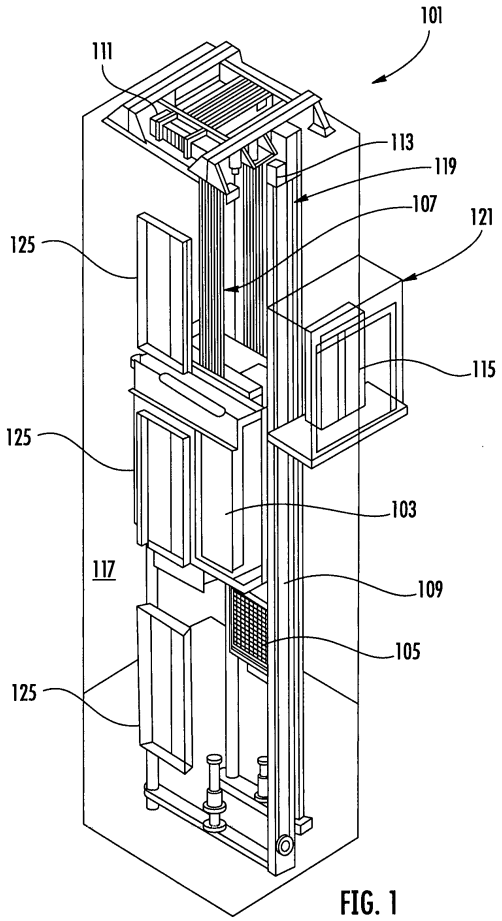

FIG. 1

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Description

[0001] The subject matter disclosed herein generally relates to elevator systems and, more particularly, to elevator systems and passenger support and call systems for operating elevator systems.

[0002] Elevators are provided with user interfaces to enable passengers to access and use the elevator (e.g., to call elevator cars to travel to different floors within a building). One type of such user interface is a hall call panel located proximate an elevator landing door in a hallway, lobby, or landing of an elevator system. The hall call panel is a user interface device (e.g., operating panel) that is located on a landing of the elevator system (e.g., hallway, lobby, etc.) and traditionally is located near or proximate to elevator landing doors. Such hall call panels can be configured to enable passengers to call elevator cars and to provide information to potential passengers (e.g., indicating that an elevator car has already been called).

[0003] Although hall call panels are traditionally provided, persons having reduced mobility may have difficulty accessing and/or using such panels. Further, once an elevator call request is made, such persons must wait in proximity to the landing door to enable entering of the called elevator car. However, such waiting may be unpleasant or difficult for such persons. Accordingly, improved passenger experiences may be advantageous.

[0004] According to some embodiments, elevator systems are provided. The elevator systems include an elevator controller, an elevator car, a plurality of landings, and a passenger support and call system having a passenger support structure located at at least one landing. The passenger support structure includes a resting surface and a sensor arranged to detect a presence of a person in contact with the resting surface, wherein, when a person is detected contacting the resting surface, an elevator call request is sent from the passenger support structure to the elevator controller.

[0005] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator systems may include that the sensor is at least one of an optical sensor, a pressure sensor, a touch sensor, a proximity detector, and a weight sensor.

[0006] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator systems may include that the resting surface is at least one of a seat and a bench.

[0007] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator systems may include that the resting surface is configured to support a standing person.

[0008] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator systems may include that the passenger support structure comprises a notification element.

[0009] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator systems may include that the notification element comprises at least one of a display and a speaker.

[0010] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator systems may include that the notification element comprises an interactive element configured to receive input from a user.

[0011] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator systems may include that the passenger support structure comprises an electronics package configured to generate elevator call requests and transmit the requests to the elevator controller.

[0012] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator systems may include that the electronics package comprises a wireless access point.

[0013] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator systems may include that the passenger support structure comprises a lighting element.

[0014] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator systems may include that the passenger support structure comprises at least one handle.

[0015] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator systems may include at least one additional passenger support structure located at the at least one landing having the passenger support structure.

[0016] In addition to one or more of the features described above, or as an alternative, further embodiments of the elevator systems may include that at least one additional passenger support structure is located at each landing of the plurality of landings.

[0017] 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.

[0018] 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 a landing of an elevator system that may employ various embodi-

ments of the present disclosure;

FIG. 3 is a schematic illustration of a landing of an elevator system that may employ various embodiments of the present disclosure;

FIG. 4 is a schematic illustration of a passenger support and call system in accordance with an embodiment of the present disclosure;

FIG. 5 is a schematic illustration of a passenger support structure in accordance with an embodiment of the present disclosure; and

FIG. 6 is a schematic illustration of passenger support structures in accordance with an embodiment of the present disclosure.

[0019] 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 an elevator 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.

[0020] 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.

[0021] The elevator 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 elevator controller 115 may provide drive signals to the machine 111 to control the acceleration, deceleration, leveling, stopping, etc. of the elevator car 103. The elevator 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 elevator controller 115. Although shown in a controller room 121, those of skill in the art will appreciate that the elevator controller 115 can be located and/or configured in other locations or positions within the elevator system 101.

[0022] 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. 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.

[0023] FIG. 2 is a schematic illustration of an elevator system 201 that may incorporate embodiments disclosed herein. As shown in FIG. 2, an elevator car 203 is located at a landing 225. The elevator car 203 may be called to the landing 225 by a user 227 (e.g., a passenger, mechanic, operator, emergency personnel, etc.) that desires to travel to another floor within a building using the elevator car 203. The elevator call may be made using a hall call panel 229. Traditional hall call panels 229 are physical, mechanical, and/or electromechanical components that are installed into the wall or frame 231 about an elevator landing door 233. The hall call panel 229 can be used as an interface command to call the elevator car 203 to the landing 225 and also can provide an indication to a user to inform such user about a status of the elevator request and/or arrival of the elevator car 203 at the landing 225.

[0024] Turning now to FIG. 3, a schematic illustration of an elevator landing 325 that may incorporate embodiments of the present disclosure is shown. The landing 325 includes an elevator landing door 300 that, as shown, includes three door panels 300a, 300b, 300c that can slide or translate to open when an elevator car is present at the landing door 300. The landing door 300 is housed within a door frame that includes a lintel 302 and one or more frame portions 304. As shown, the lintel 302 is positioned above the landing door 300 and the frame portion 304 is to the side and extends vertically from the floor to the lintel 302. The frame (e.g., the lintel 302 and the frame portions 304) are mounted within a wall 306 of the building in which an elevator system is located. As shown, an elevator status indicator 308 is positioned above the lintel 302 and can be used to display the current location of an elevator car that services the landing 325. The elevator car can be called by a user (e.g., passenger) by operation of a button 312 or other interactive element of a hall call panel 310.

[0025] Although hall call panels may provide operability for the majority of users of elevator systems, the hall call panels may not be optimal for impaired persons (e.g., handicapped, injured, persons with reduced mobility, etc.). When mobility is limited, such impaired persons may have difficulty in calling elevator cars using a hall call panel, and once called, the person may experience discomfort or difficulty in waiting at the elevator landing

for the elevator car to arrive.

[0026] Embodiments provided herein are directed to passenger support structures that improve a waiting experience (e.g., comfort) and facilitates interaction with the elevator system. That is, embodiments of the present disclosure are directed to passenger support structures that are integrated into the elevator control system such that an elevator call request may be made at the passenger support structure rather than requiring a user to interact with a hall call panel. Embodiments of the passenger support structures may function wirelessly or through a wired connection and are configured and desired to reduce redundant movements that are difficult and painful for some users. In accordance with some embodiments, the passenger support structures can provide ergonomic designs that are adapted for building environments. In some embodiments, seats and/or supports of the passenger support structures are designed to call an elevator, automatically upon interaction by a user. The passenger support structures may include embedded technologies that provide feedback to users, including, but not limited to, visual, vibrations, and auditory feedback to the user indicating that an elevator has been called and/or has arrived at the landing.

[0027] Turning now to FIG. 4, a schematic illustration of a landing 400 having a passenger support and call system 402 in accordance with an embodiment of the present disclosure is shown. The passenger support and call system 402 is located at the landing 400 and is arranged to provide a resting or waiting area and features for passengers that may wish to call an elevator to the landing 400. At the landing 400, there is an elevator system door 404 that allows for ingress and egress from an elevator car that can be called to the landing 400. A hall call panel 406 is located adjacent the elevator system door 404, as typically installed for elevator systems. The hall call panel 406 includes one or more buttons or other interactive elements that are connected to and/or in communication with an elevator controller to enable elevator service requests, as will be appreciated by those of skill in the art.

[0028] Additionally, as noted, the passenger support and call system 402 is provided at the landing 400. The passenger support and call system 402 includes a first passenger support structure 408 and a second passenger support structure 410. The passenger support structures 408, 410 are positioned relative to the elevator system door 404 in proximity to be close enough to allow easy travel between the respective passenger support structure 408, 410 and the elevator system door 404. As shown, the first passenger support structure 408 includes a first resting surface 412, such as a seat or bench. The second passenger support structure 410 includes a resting surface 414 that may be comfortably leaned against (e.g., standing user). Both the first and second passenger support structures 408, 410 are provided to enable a resting surface for a passenger that is waiting for an elevator car to arrive at the elevator system door 404.

[0029] Each of the first and second passenger support structures 408, 410 is arranged in communication with the elevator controller to enable elevator service requests due to interaction with the respective passenger support structure 408, 410. For example, when a user sits on the first resting surface 412, an elevator call request is made to have an elevator car provide service to the landing 400. The request may be made when a potential passenger sits on the first resting surface 412, or in some embodiments, when the potential passenger interacts with some feature or element of the first passenger support structure 408, such as a touch surface, button, switch, etc. In some embodiments, only a portion of the first resting surface 412 is arranged for making elevator call requests. Similarly, when a user leans against the second resting surface 414, an elevator call request is made to have an elevator car provide service to the landing 400. The request may be made when a potential passenger leans on the second resting surface 414, or in some embodiments, when the potential passenger interacts with some feature or element of the first passenger support structure 408, such as a touch surface, button, switch, etc. In some embodiments, only a portion of the second resting surface 414 is arranged for making elevator call requests.

[0030] As shown, the passenger support structures 408, 410 each include an optional respective notification element 416, 418. The notification elements 416, 418 may be elements that generate, for example, audio, visual, vibration, and/or forced air to provide information and/or notification to users of the passenger support structures 408, 410. For example, in some embodiments, the notification elements 416, 418 may be displays to provide visual information and/or notification to a user that an elevator call request has been made, that an elevator car is about to arrive, and/or that an elevator car has arrived. Further, the notification elements 416, 418 may include speakers to provide audio information as well. Moreover, in some embodiments, when configured as a display, the notification elements 416, 418 may display commercials, provide information regarding the building in which they are installed, and/or provide other information or entertainment when not providing information regarding the elevator system. Further, when arranged as or with speakers, music or other audio may be generated at the speakers.

[0031] Although shown in FIG. 4 with the passenger support and call system 402 having two distinct and different passenger support structures 408, 410, such arrangement is not to be limiting. For example, in some embodiments, a single passenger support structure may be provided at a landing, and in still other embodiments, more than two passenger support structures may be provided. For example, in a lobby setting, multiple passenger support structures may be provided, but on various other floors of the building, only a single passenger support structure may be provided.

[0032] The resting surfaces of the passenger support

and call system, as noted, are arranged to make elevator service requests. Accordingly, various types of detectors or sensors may be arranged on or around the respective passenger support structure. Sensors or detectors can include, but are not limited to optical sensors, pressure sensors, touch sensors, proximity detectors, weight sensors, etc.

[0033] In some embodiments, the passenger support and call systems disclosed herein may be arranged to operate automatically. For example, when the sensor(s) or detector(s) of the passenger support structure detect the presence of a person within a predetermined area (e.g., at or on the passenger support structure), an elevator request may be automatically generated and transmitted to the elevator controller to call an elevator car to the landing. Accordingly, in some embodiments, the elevator call request may be passive with respect to the potential passengers, wherein the system generates the elevator call request without the interaction of the potential passenger.

[0034] In other embodiments, passenger interaction may be required. For example, in some embodiments, when a passenger is detected in proximity to the passenger support structure, a notification may be provided (e.g., auditory, visual, forced air, vibrations, etc.) requesting confirmation from the passenger that an elevator call request should be made. In some such embodiments, the passenger support structure may include a button or other interactive element that is provided to allow the potential passenger to confirm the request should be made. Such interactive elements may be provided on various surfaces, handles, uprights and/or support elements of the passenger support structure.

[0035] Upon detection of the presence of a user at the passenger support structure, a signal is sent to the elevator controller to make a request for elevator car service at the respective landing. In some embodiments, the request may trigger an indicator to be provided at the landings, such as on a hall call panel. For example, in some embodiments, when the request is sent from the passenger support structure, a visual indicator may be illuminated on the hall call panel (e.g., light-up button). Further, additional notification may be provided on or at the passenger support structure, such as with a speaker, with a light, on a display, or some other notification may be provided on or as part of the notification element of the passenger support structure or may be independent therefrom. For example, in some embodiments, the notification element may be a touch screen display, that provides a prompt and interactive surface for confirmation requests. In some such embodiments, the notification element and interactive aspect thereof may enable destination selection from the passenger to indicate a destination floor in addition to making a general elevator call request.

[0036] Turning now to FIG. 5, a schematic illustration of a passenger support structure 530 in accordance with an embodiment of the present disclosure is shown. The passenger support structure 530 may be part of a passenger support and call system, such as shown and described above. The passenger support structure 530 includes a first resting surface 532 in the form of a bench or similar sitting surface and a second resting surface 534, which may be arranged for sitting or leaning against. One or both of the resting surfaces 532, 534 may include sensors to detect when a user is sitting or in contact with the respective resting surface 532, 534. The passenger support structure 530 further includes a proximity detector 536 which is arranged beneath the first resting surface 532. The proximity detector 536 may be configured to detect when a user is standing in an area or region around the base of the passenger support structure 530.

[0037] The passenger support structure 530 includes one or more handles 538 provided to aid a user in standing, sitting, or otherwise resting at the passenger support structure 530. In some embodiments, one or more of the handles 538 can include interactive elements, such as buttons, to enable elevator calls and/or confirmation, as described above. The passenger support structure 530 further includes a lighting element 540 arranged to illuminate the area around the passenger support structure 530, that may be activated based on detection of a user by the proximity detector 536 and/or the sensors of the resting surfaces 532, 534 (or may be a light operated on a timer, based on a switch, or other mechanism). The passenger support structure 530 further includes an electronics package 542, in this embodiment located at the top of the passenger support structure 530. The electronics package 542 can include various control elements, such as mechanisms to receive input signals from the proximity detector 536 and/or the sensors of the resting surfaces 532, 534. Further, the electronics package 542 can provide a connection or communication with an elevator controller to enable elevator calls. Moreover, in some embodiments, the electronics package 542 can provide a wireless connection or wireless access point for users in proximity to the passenger support structure 530. Furthermore, in some embodiments, the electronics package 542 can control a display and/or speaker for providing information to users of the passenger support structure 530.

[0038] FIG. 6 is a schematic illustration of alternative designs of passenger support structures 650, 652 in accordance with an embodiment of the present disclosure. The passenger support structures 650, 652 may be part of a passenger support and call system, such as shown and described above. The passenger support structures 650, 652 may provide a resting space for one or more passengers or users, as illustratively shown. The passenger support structures 650, 652 may include sensors or detectors to detect the presence of the users and in response to such detection may generate an elevator call to call an elevator car to the landing that has the passenger support structures 650, 652. In this embodiments, the passenger support structures 650, 652 provide a standing resting structure, as compared to the sitting structure shown in FIG. 5.

[0039] Advantageously, embodiments described herein provide for a dual-function waiting area at an elevator landing. The passenger support and call systems of the present disclosure enable automatic elevator call requests and a waiting area to be provided to potential passengers. The waiting area may be ergonomically designed to enable a comfortable waiting area, whether sitting or standing. When a passenger interacts with the waiting area of the passenger support and call system, an elevator call request may be automatically made, thus reducing the effort required by potential passengers when attempting to travel within an elevator system.

[0040] The use of the terms "a", "an", "the", and similar references in the context of description (especially in the context of the following claims) are to be construed to cover both the singular and the plural, unless otherwise indicated herein or specifically contradicted by context. The modifier "about" used in connection with a quantity is inclusive of the stated value and has the meaning dictated by the context (e.g., it includes the degree of error associated with measurement of the particular quantity). All ranges disclosed herein are inclusive of the endpoints, and the endpoints are independently combinable with each other.

[0041] 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.

[0042] 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 system comprising:

an elevator controller;
an elevator car;
a plurality of landings; and
a passenger support and call system having a passenger support structure located at at least one landing, wherein the passenger support structure comprises:

a resting surface; and
a sensor arranged to detect a presence of a person in contact with the resting surface, wherein, when a person is detected contacting the resting surface, an elevator call request is sent from the passenger support structure to the elevator controller.

2. The elevator system of claim 1, wherein the sensor is at least one of an optical sensor, a pressure sensor, a touch sensor, a proximity detector, and a weight sensor.

3. The elevator system of any preceding claim, wherein the resting surface is at least one of a seat and a bench.

4. The elevator system of any of claims 1-2, wherein the resting surface is configured to support a standing person.

5. The elevator system of any preceding claim, wherein the passenger support structure comprises a notification element.

6. The elevator system of claim 5, wherein the notification element comprises at least one of a display and a speaker.

7. The elevator system of any of claims 5-6, wherein the notification element comprises an interactive element configured to receive input from a user.

8. The elevator system of any preceding claim, wherein the passenger support structure comprises an electronics package configured to generate elevator call requests and transmit the requests to the elevator controller.

9. The elevator system of claim 8, wherein the electronics package comprises a wireless access point.

10. The elevator system of any preceding claim, wherein the passenger support structure comprises a lighting element.

11. The elevator system of any preceding claim, wherein the passenger support structure comprises at least one handle.

12. The elevator system of any preceding claim, further comprising at least one additional passenger support structure located at the at least one landing having the passenger support structure.

13. The elevator system of any preceding claim, wherein at least one additional passenger support structure is located at each landing of the plurality of landings.

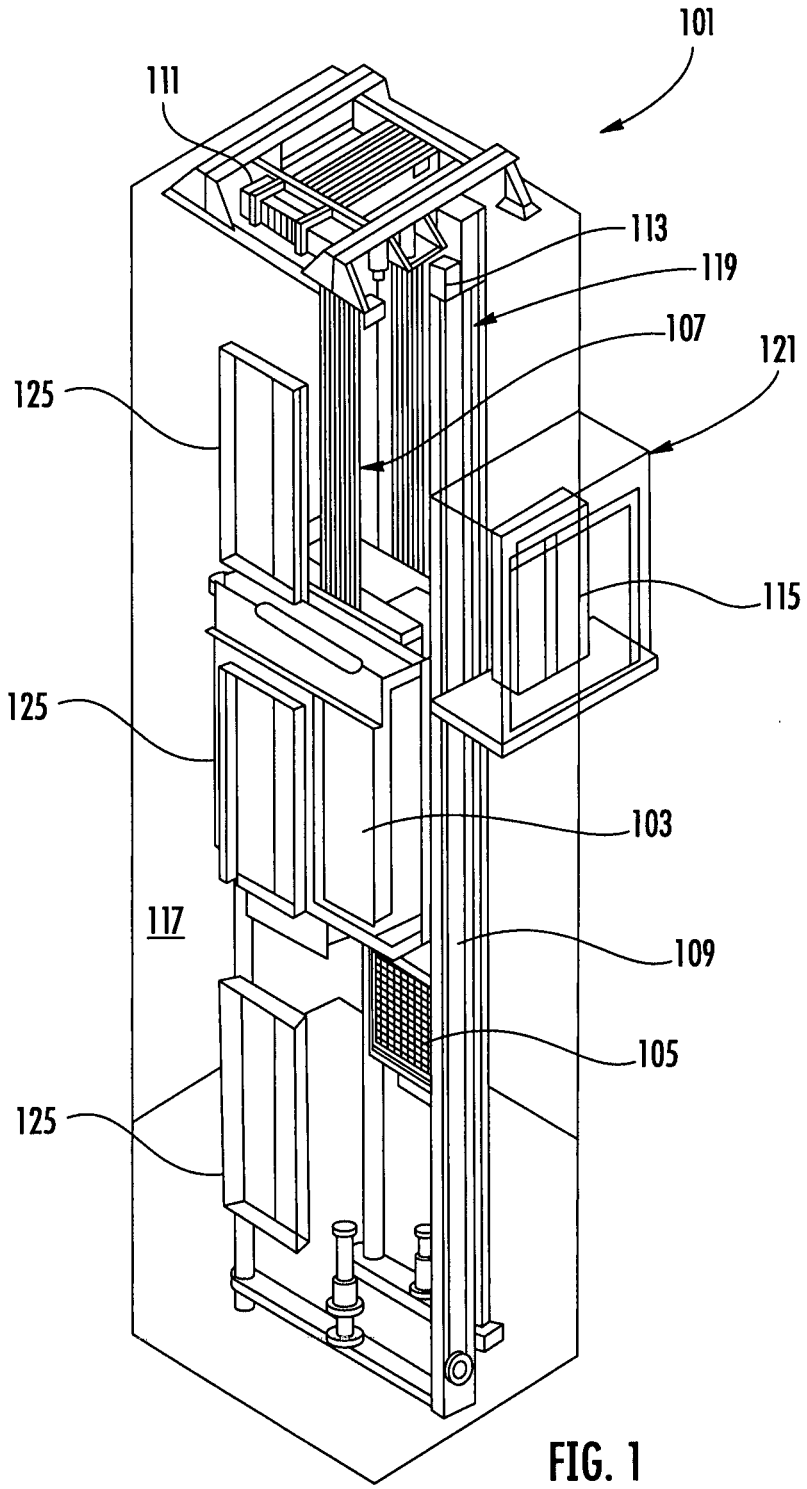

FIG. 1

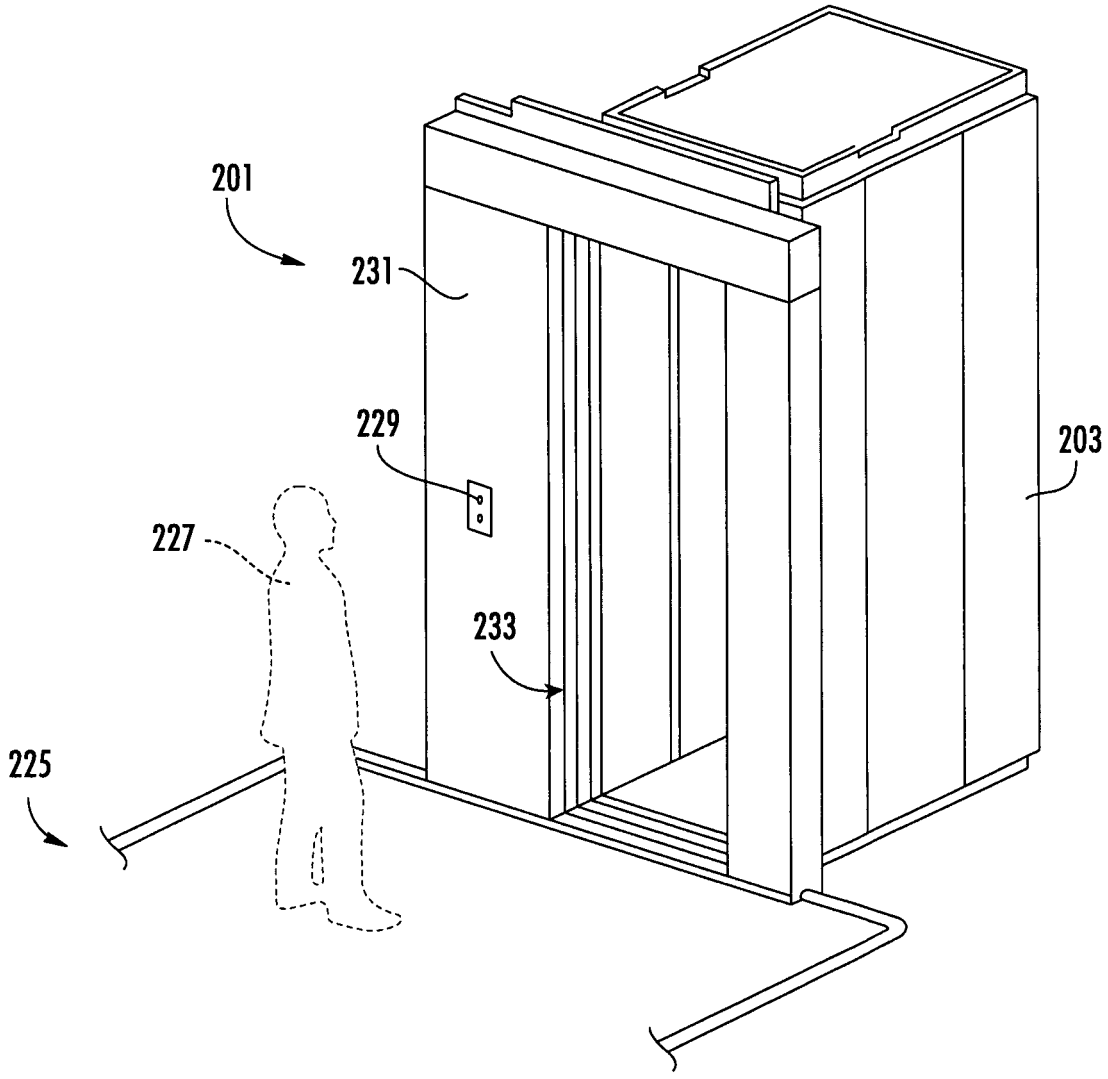

FIG. 2

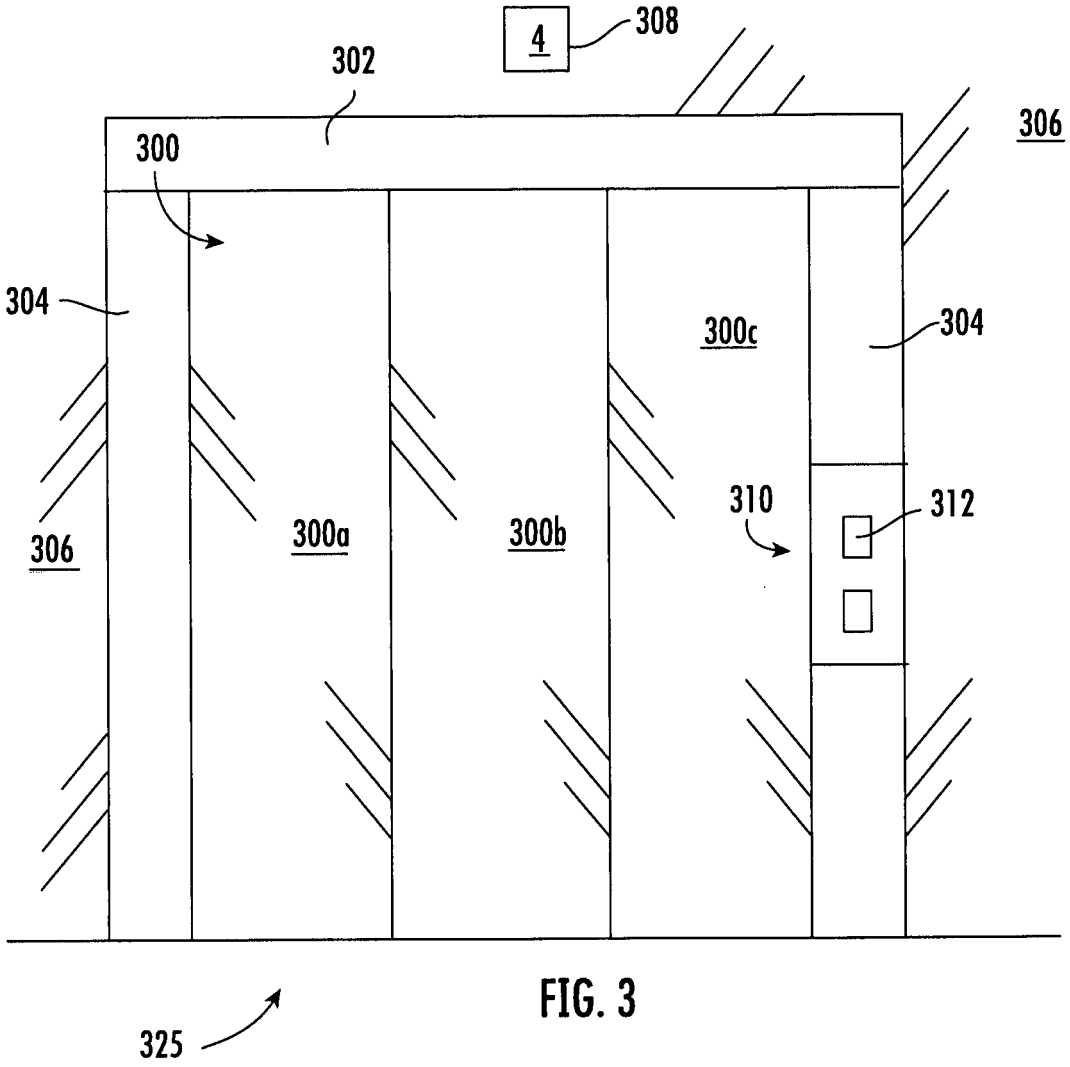

FIG. 3

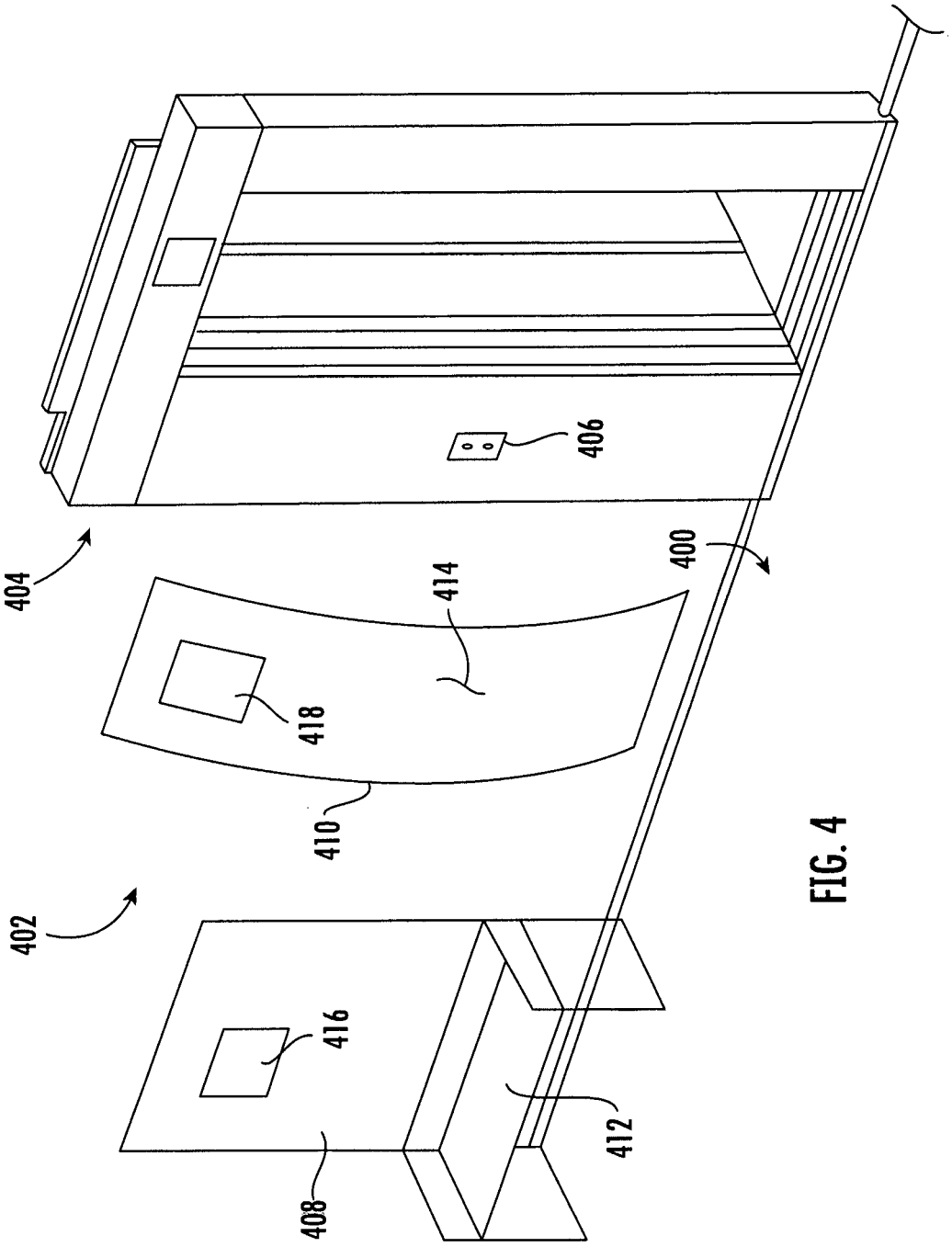

FIG. 4

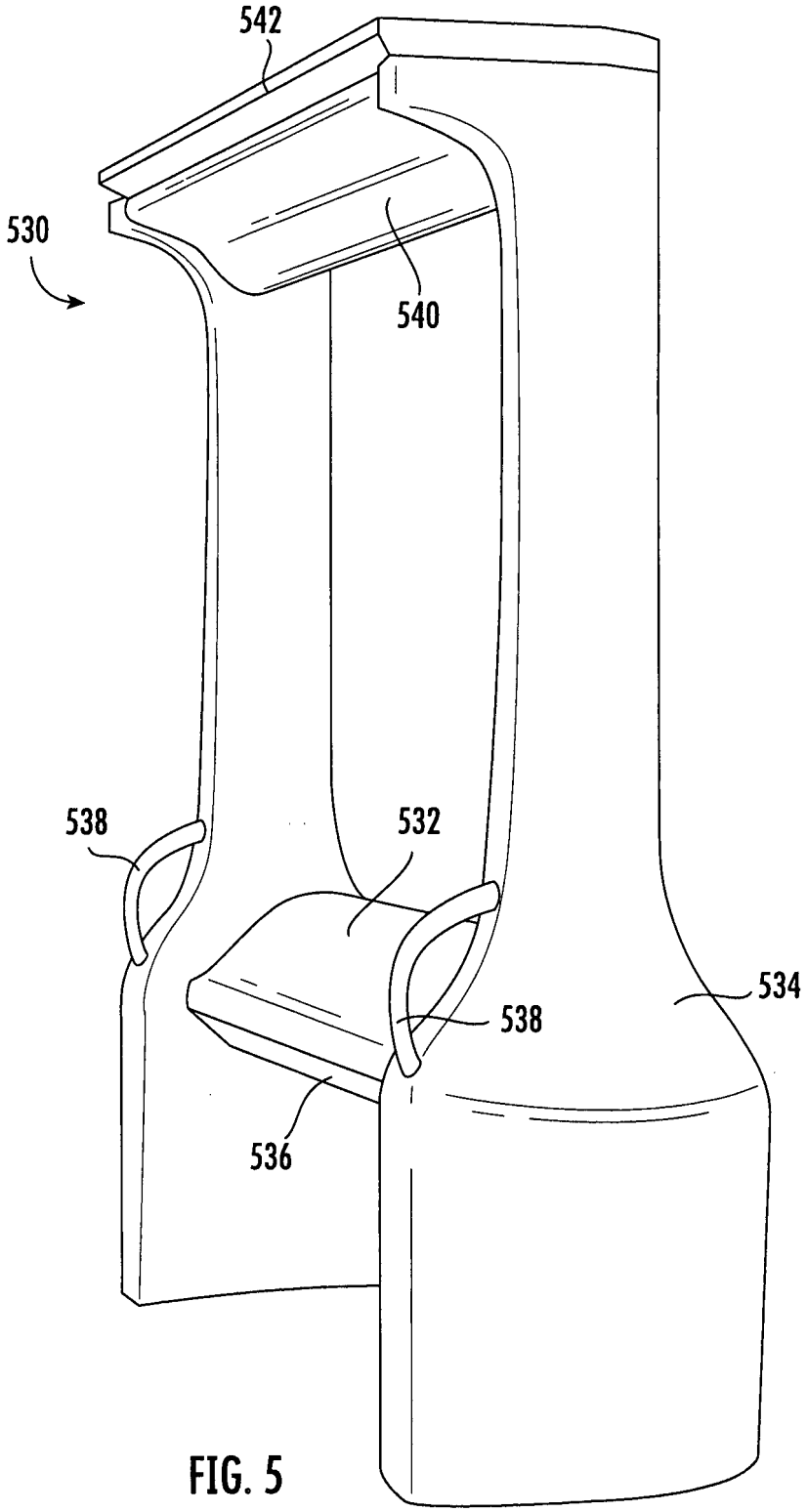

FIG. 5

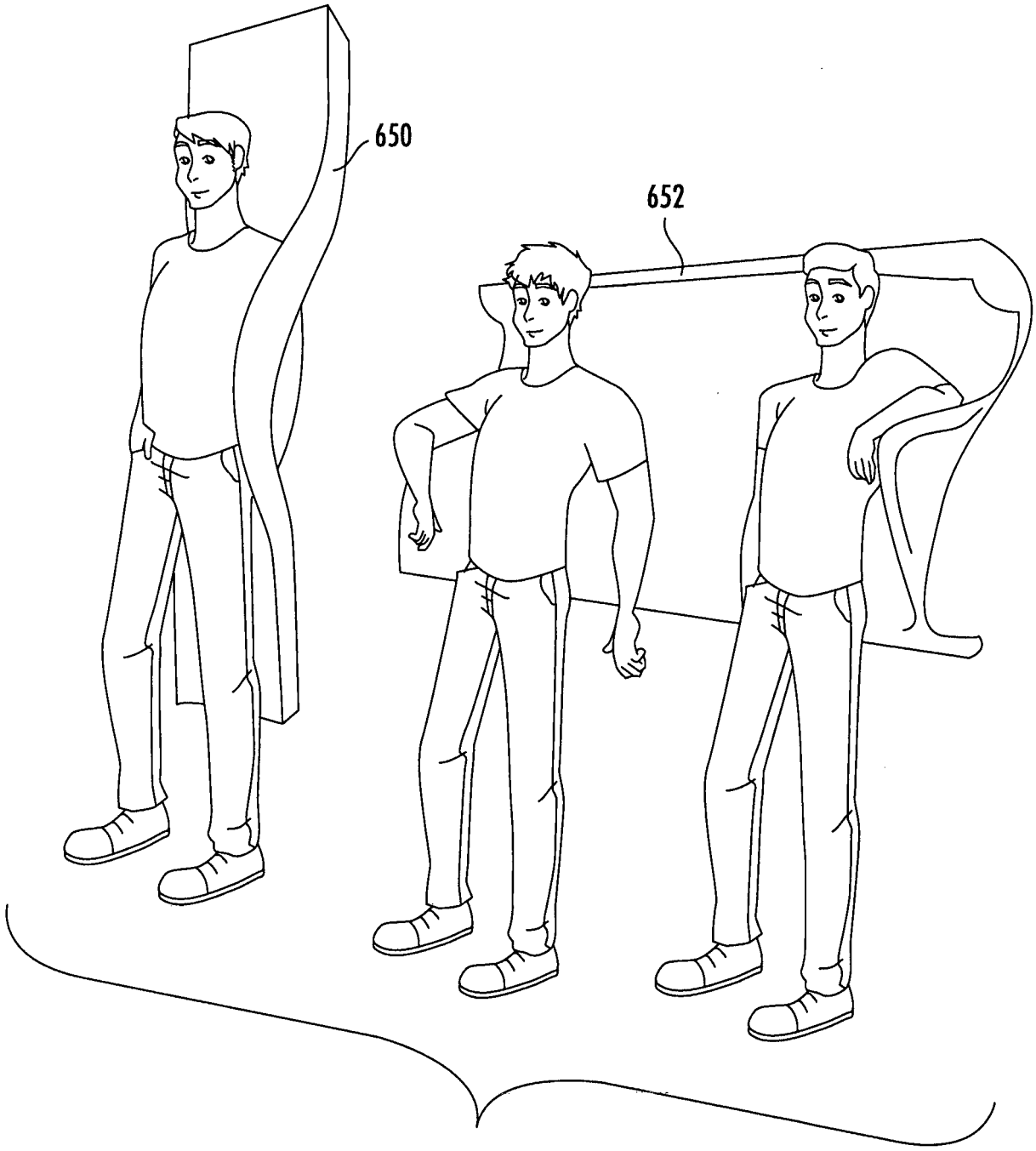

FIG. 6

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EUROPEAN SEARCH REPORT

Application Number
EP 18 30 5697

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	16 November 2018	Lohse, Georg

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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E : earlier patent document, but published on, or after the filing date
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EPO FORM 1503 03.82 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 18 30 5697

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