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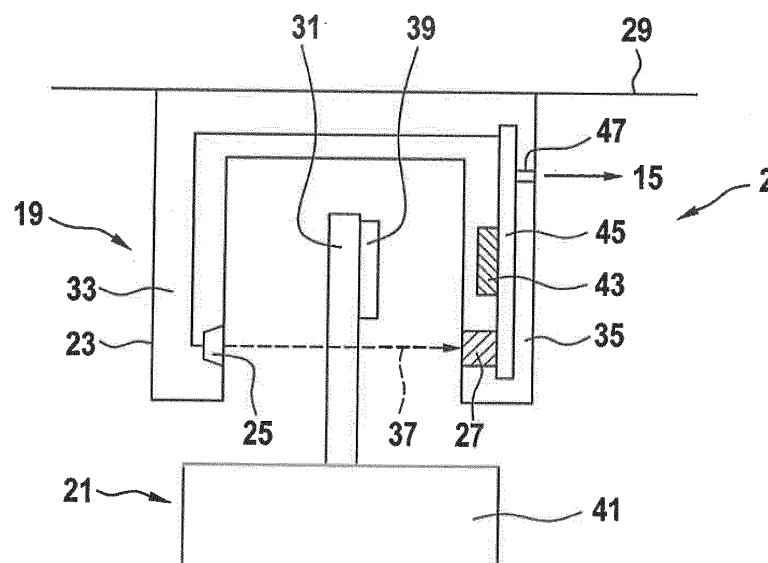
(54) **RFID POSITION DETECTOR ARRANGEMENT FOR AN ELEVATOR**

(57) A position detector arrangement for an elevator (1) is proposed to comprise multiple flags (21), a flag detection sensor (19) such as e.g. a photo sensor, multiple RFID tags (39) and an RFID detector (43) for reading the identification information stored in the RFID tags (39). Each of the flags (21) is to be attached at a fixed position within an elevator shaft (5). The flag detection sensor is to be attached at a car (3) of the elevator (1). Furthermore, the flag detection sensor (19) is adapted for optically detecting a presence of the flag (21) using e.g. a light barrier arrangement. Each RFID tag (39) stores individual identification information.

Furthermore, each of the RFID tags (39) is mechanically attached to one of the flags (21).

Reading the individual information stored in the RFID tag (39), the position detector arrangement may provide not only information that the car (3) is located at an arbitrary one of the shaft doors but also information about the identity, i.e. about the location, of the shaft door. Accordingly, e.g. upon power cycling, the elevator may easily determine the position of the car without necessarily performing a lengthy synchronisation run.

Fig. 3



Description

[0001] The present invention relates to a position detector arrangement for an elevator.

[0002] Elevators are generally used for transporting passengers or items between various levels within a building. Typically, an elevator car may be driven through an elevator shaft towards floors at the various levels within the building.

[0003] For proper operation of the elevator, an elevator control needs to know a sufficiently accurate position of the elevator car at all times for the operation it has to perform. Accordingly, before starting any operation, the elevator control needs to acquire information about an initial positioning of the elevator car.

[0004] For such purpose, the elevator car may control an engine of the elevator driving the elevator car to perform a so-called synchronization trip. In such synchronization trip, the elevator car is generally driven to an extreme position within the elevator shaft such as for example to a lowest or highest position. This allows to be able to obtain and analyse information about a correct positioning of the elevator car within the elevator shaft.

[0005] Then, during subsequent normal operation, the elevator control may monitor all relative motions of the elevator car in order to constantly track the positioning of the elevator car.

[0006] However, during such normal operation of the elevator, it may sometimes happen that initially acquired absolute position information is lost. Such information loss may for example occur upon power cycling, also sometimes referred to as power blackout, or failure of an elevator component.

[0007] In earlier elevator systems, a new synchronization trip had to be performed after each position information loss. Particularly, for high-rise-elevators where an elevator car has to travel a long distance during a synchronization trip, such repeated synchronization trips may be time-consuming and annoying for users of the elevator. This is specifically true in countries where for example power cycling frequently occurs.

[0008] Accordingly, an elevator position determination system has been developed and described in US 5,682,024. Such system serves for determining the position of an elevator car disposed in an elevator hoistway and includes a transceiver disposed on the elevator car for generating a query signal and a transponder disposed in the elevator hoistway for providing an identification signal in response to the query signal. Therein, the elevator position determination system determines the elevator car position in response to the identification signal.

[0009] There may be a need for a position detector arrangement further developing such known elevator position determination systems and providing advantages over such systems such as simplified installation within an elevator system, reduced costs and/or reduced maintenance requirements. Furthermore, there may be a need for an elevator comprising such position detector

arrangement.

[0010] Such needs may be met with the subject-matter of the independent claims. Advantageous embodiments are defined in the dependent claims and in this specification.

[0011] According to a first aspect of the invention, a position detector arrangement for an elevator is proposed to comprise multiple flags, a flag detection sensor, multiple RFID tags and an RFID detector. Therein, each of the multiple flags is to be attached at a fixed position within an elevator shaft. The flag detection sensor is to be attached at a car of the elevator. The flag detection sensor is adapted for detecting a presence of a flag in a close neighbourhood, i.e. for example within a distance of less than 10cm, preferably, less than 5cm or 2cm, to the flag detection sensor. Each of the multiple RFID tags stores individual identification information. The RFID detector is adapted for reading the identification information stored in the RFID tags. Specifically, each of the RFID tags is mechanically attached to one of the flags.

[0012] Ideas underlying embodiments of the present invention may be interpreted as being based, inter alia, on the following observations and recognitions.

[0013] While a basic principle of using radiofrequency transceivers and transponders to enable elevator position determination has already been described in US 5,682,024, only few details have been described on how to specifically implement such elevator position determination system.

[0014] Presently, it has been found that RFID (radio frequency identification) tags comprising identification information which may be used for elevator position determination may be beneficially applied in combination with other components typically provided within an elevator arrangement. Specifically, it has been found to be beneficial to attach RFID tags providing identification information to so-called flags, such flags typically being components provided within an elevator arrangement for enabling precise positioning of the elevator car relative to a shaft door provided at the elevator shaft adjacent to one of the floors in the building. In principle, as used herein, a flag may have any arbitrary shape.

[0015] For such precise positioning of the elevator car with respect to a shaft door, a flag detection sensor is typically attached to the car. A positioning of the flag detection sensor relative to the elevator car may be precisely predetermined. Such flag detection sensor is adapted for detecting a presence of the flag. For example, the flag detection sensor may detect whether a flag comes into its close neighbourhood, i.e. the flag detection sensor and the flag are spaced from each other by less than e.g. 10cm or less than e.g. 2cm or even engage with each other. Correspondingly, flags are provided within the elevator shaft at a precise spatial relationship relative to a shaft door.

[0016] When the flag detection sensor detects a presence of a flag, a corresponding signal may be transmitted to an elevator control such that the elevator control may

determine a precise relative positioning of the car with respect to the elevator shaft door and, if necessary, may adjust the car positioning with respect to the shaft door in order to avoid for example a step between a car bottom and a bottom of the adjacent floor.

[0017] In embodiments, the flag detection sensor may be any sensor being able to detecting the nearby presence of a flag. For example, the flag detection sensor may be an optical sensor, a magnetic sensor, a capacitive or simple a mechanically actuated switch. Preferably, the flag detection sensor is adapted to detecting the nearby presence of a flag in a contactless manner.

[0018] In an embodiment, the flag detection sensor is a photo sensor and may comprise a light emitter and a light detector arranged opposite to each other for forming a light barrier upon emitting a light beam from the light emitter towards the light detector. In such arrangement, the flag is adapted for interrupting the light beam when the photo sensor and the flag are in a predetermined position relative to each other, i.e. when the photo sensor and the flag are in such close neighbourhood that the photo sensor shall detect the flag's presence.

[0019] In such embodiment, the flag may be a simple light reflecting and/or light absorbing component which, when positioned within the light barrier of the photo sensor, interrupts its light beam.

[0020] Such local position determining provisions using a flag detection sensor attached to the elevator car and multiple flags provided within the elevator shaft next to each of several shaft doors are generally applied in elevator arrangements. However, using such local positioning provisions, the elevator control only may determine a precise positioning of the elevator car with respect to one specific shaft door. Yet, from such local positioning provisions, the elevator control does not yet know at which of the floors of the elevator shaft the elevator car is currently positioned. In other word, using local position determining provisions, the elevator control may only derive local positioning information for the elevator car being close to one of the shaft doors but may not derive global positioning information as to where the elevator car is positioned within the elevator shaft.

[0021] Accordingly, it is proposed to provide an RFID tag which may supply additional individual identification information thereby enabling the elevator control to determine a position of the elevator car not only locally with respect to one specific shaft door but throughout the entire elevator shaft. Specifically, the individual identification information supplied by the RFID tag may indicate an absolute or relative position of the tag within an elevator shaft. Alternatively, the individual identification information may only be a unique code for each of the RFID tag and, during an initial learning journey, each of the RFID tags is associated to a specific stop or position within the elevator shaft thereby realizing a bidirectional link between the unique code of an RFID and its position. Accordingly, in such implementation, generic random RFID tags may be used and there may be no need for a

special programming related to the elevator application.

[0022] Specifically, it has been found that mechanically attaching the RFID tag to an associated one of the flags may be beneficial. For example, costs, supply logistics and/or installation efforts may be reduced.

[0023] Today, RFID tags may be provided at very low costs and with very small dimensions. Such RFID tags may not have to be provided as separate components to be separately installed within an elevator arrangement but may be provided as small, preferably passive supplementary components which may be attached to the flags which have to be installed within the elevator arrangement anyway. Preferably, the RFID tags may already be attached to the flags during assembly of the flags, i.e. when fabricated in a factory. Such preconfigured combination of flag and RFID tag may then be easily handled, stored and finally mounted by installation personnel during installation of the elevator arrangement.

[0024] According to an embodiment, the flag comprises a portion consisting of an electrically isolating material. Providing at least a portion of the flag with an electrically isolating material may avoid or at least reduce any electromagnetic interaction of the flag with the RFID tag attached thereto. The electrically isolating material may be for example any kind of plastics. Optionally, the entire flag may be made with an electrically isolating material. For example, the flag or a portion thereof may be moulded, preferably injection moulded, from a plastic material. Such flag may be very cheap.

[0025] In such embodiment, the RFID tag may be preferably fixed on top of a surface of the portion consisting of the electrically isolating material. When attaching the RFID tag to the electrically isolating portion of the flag, electromagnetic interactions between the RFID tag and the flag may be minimized such that the identification information stored within the RFID tag may be easily read out by the RFID detector.

[0026] According to an embodiment, the RFID tag comprises a circuitry provided on a flexible substrate. For example, the RFID tag may be provided on a thin foil made for example from a plastic material. Such thin foil may provide for a flexibility enabling to adapt the RFID tag to a surface contour of the flag to which it shall be attached. Furthermore, such RFID tag requires only very little space which may be beneficial e.g. when interacting with the flag detection sensor. The circuitry of the RFID tag may be specifically adapted for storing the individual identification information. For example, a geometry, layout and/or dimension of portions of the circuitry may be adapted to serve as a passive transponder which, upon receiving a query signal, emits a specific individual response signal, i.e. for example a specific unique radiofrequency signal.

[0027] Particularly, the RFID tag may be glued on top of a surface of the flag. Preferably, the RFID tag may be glued on top of a surface of a portion consisting of an electrically isolating material. Therein, "gluing" may be interpreted broadly as representing any kind of perma-

nently or long-term mechanical adherence. Gluing the RFID tag may be easily and reproducibly performed in an industrial manner. For example, the RFID tag may be already glued onto the flag during fabrication of the flag.

[0028] Alternatively, the RFID tag may be moulded inside a plastic part comprising the flag.

[0029] According to an embodiment, the flag detection sensor and the RFID detector may be comprised in a common housing. Accordingly, not only the flag and the RFID tag may be combined to form a common unit but also the flag detection sensor and the RFID detector may be comprised in a common housing thereby forming a common device. Such combination of the flag detection sensor and the RFID detector may simplify the installation thereof as only the common housing has to be installed at the elevator car. More than one flag detection sensor and/or more than one RFID detector may be comprised in a common housing.

[0030] Preferably, the flag detection sensor and the RFID detector may even be comprised in a common circuitry and/or be provided on a common printed circuit board (PCB). Such integration of the RFID detector and the flag detection sensor may reduce complexity of the entire arrangement. Thus, production and/or installation costs may be reduced.

[0031] Optionally, the RFID detector may be provided on a same PCBA, but that there could be a separate antenna, also in the form of a PCBA or a foil or other.

[0032] Generally, the position detector arrangement may further comprise a controller for analysing the identification information read by the RFID detector and for determining a current position of a displaceable elevator component, such as the car, based on the analysed identification information.

[0033] For example, such controller may be part of an elevator control controlling motions of the elevator car. Accordingly, the elevator control may generally control motions of the elevator car during normal operation based on its information about the current position of the elevator car which is achieved by continuously monitoring the elevator motions. If necessary, such monitored position information may be checked and/or confirmed more precisely taking into account the signal from the flag detection sensor when approaching a shaft door as the flag detection sensor may detect the presence of a flag provided at the shaft door with a precision of typically only a few millimetres.

[0034] However, when the elevator control loses its monitored position information due to for example power cycling or component failure, the controller comprised in the elevator control may analyse the identification information provided by the RFID detector upon reading an RFID tag being in the neighbourhood of the elevator car's current position. The elevator control may then determine the current position of the car by analysing such individual identification information.

[0035] For example, the elevator control may compare the read identification information with a look-up table in

which information about the positioning of each of the RFID tags within the elevator shaft is stored. Such look-up table may be created for the elevator arrangement during installation thereof. For example, a learning trip may be performed where the elevator control moves the car from one elevator shaft end to an opposite elevator shaft end and creates the look-up table by linking absolute positions of each of the flags and the individual identification information stored in each of the respective flags.

[0036] It may be noted that not necessarily each of all flags in an elevator has to be supplied with an RFID tag. It may be sufficient for simplifying a synchronization trip to provide only some, e.g. every second or third, flag with an RFID tag, thereby reducing e.g. costs. According to a second aspect of the present invention, an elevator is proposed to comprise an elevator car, several shaft doors, an elevator control and a position detector arrangement according to an embodiment of the above described first aspect of the invention. The elevator car is adapted to be displaced within an elevator shaft between floors in a building. The shaft doors are provided at the floors adjacent to the elevator shaft. The elevator control is adapted for controlling movements of the elevator car within the elevator shaft. Each of the flags of the position detector arrangement is arranged inside the elevator shaft and adjacent to one of the shaft doors. The flag detection sensor and the RFID detector are attached to the elevator car.

[0037] Due to the provision of a position detector arrangement according to embodiments of the above first aspect in such elevator, the elevator control of the elevator may be enabled to always keep or simply acquire precise information about a current positioning of the elevator car within the elevator shaft.

[0038] For example, according to an embodiment, the elevator control may be adapted to, in an initialisation procedure, read and analyse the identification information read by the RFID detector of the position detector arrangement and to determine a current position of the elevator car based on the analysed identification information. Such initialisation procedure may be performed for example each time position information is lost for example due to power cycling. Compared to conventional synchronization trips, such initialisation procedure may be of relatively short duration.

[0039] In fact, it may be noted that, in many applications, elevators are used only for approximately 30 minutes per day. In the remaining time, the elevator car is typically parked at one of the floors, i.e. adjacent to one of the shaft doors. Accordingly, a probability that the car is parked adjacent to one of the shaft doors during for example a power cycling is typically 48 times higher than a probability that the car is situated in between two of the floors at such point in time.

[0040] Accordingly, upon a position information loss due to power cycling, the car being parked at one of the shaft doors may use its RFID detector to read the indi-

vidual identification information stored in the RFID tag attached to the flag provided at this shaft door. Thereby, the elevator control may very quickly acquire information about the identity of the flag, i.e. the identity of the shaft door, and may derive therefrom a current position of the elevator car after the power cycling.

[0041] Alternatively, in an embodiment of the invention, the controller is adapted to, in the initialisation procedure, drive the elevator car to one of the shaft doors, preferably to a next lower shaft door or to a closest one of the shaft doors, such that the RFID detector can read the identification information stored in the RFID tag which is attached to the flag positioned adjacent to this shaft door.

[0042] Accordingly, in the rare cases that position information is lost while the elevator car is positioned in between two shaft doors and is therefore out of reach to one of the RFID tags, the elevator control first moves the car to one of the shaft doors. Then, when for example the flag detection sensor determines that it is positioned at the shaft door as it detects the presence of a flag right next to the shaft door, the RFID detector may read the RFID tag attached to the respective flag and may acquire the individual identification information stored therein.

[0043] According to a further embodiment, the elevator may comprise additional flags. Each of these additional flags is also arranged inside the elevator shaft. However, the additional flags are not associated to one of the shaft doors but are arranged apart from each of the shaft doors. Such additional flags may also be referred to as "blind flags". Such blind flags may be comprised in the elevator shaft for enabling further improving of a positioning determination of the elevator car. For example, when distances between adjacent floors are very long, which may occur for example in case of a very high lobby within a building, it may be beneficial for the elevator control's ability of positioning determination to provide such additional "blind" flags at intermediate positions between adjacent floors.

[0044] However, as such additional flags shall not indicate a presence of a shaft door, the flags itself and/or the RFID tag attached to a respective flag may have to be provided with a different functionality than the flags actually provided at the shaft doors. For example, the blind flags may be equipped with RFID tags with specific information so that the controller knows that they are blind flags. Therefore, it may be beneficial to provide the additional flags with a different visual appearance than the flags to be arranged adjacent to one of the shaft doors such that, e.g. upon installation of the elevator, mounting personnel may easily distinguish between the two types of flags. For example, the additional flags may be provided with a different colouring than the flags to be provided at the shaft doors.

[0045] Similarly, a top-most and a bottom-most flag may be functionally and/or mechanically different e.g. because they contain a mechanical interface for rails or for a contact for a bottom or top-of-shaft detection. Accord-

ingly, associated flags may also be identified with a different RFID information and may be provided with a differing visual appearance.

[0046] It shall be noted that possible features and advantages of embodiments of the invention are described herein partly with respect to a position detector arrangement and partly with respect to an elevator comprising such position detector arrangement. One skilled in the art will recognize that the features may be suitably transferred from one embodiment to another and features may be modified, adapted, combined and/or replaced, etc. in order to come to further embodiments of the invention.

[0047] 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 components of an elevator comprising a position detector arrangement according to an embodiment of the present invention.

Fig. 2 shows a perspective view onto a flag detection sensor for a position detector arrangement according to an embodiment of the present invention.

Fig. 3 shows a top view onto components of a position detector arrangement according to an embodiment of the present invention.

[0048] The figures are only schematic and not to scale. Same reference signs refer to same or similar features.

[0049] Fig. 1 shows an elevator 1 according to an embodiment of the present invention. The elevator 1 comprises an elevator car 3 to be displaced within an elevator shaft 5 between floors 7 in a building. Several shaft doors 9 are provided at the floors 7. The elevator car 3 may be displaced within the elevator shaft 5 by a drive engine 11 driving suspension means 13 such as ropes or belts to which the elevator car 3 is suspended. Motions of the drive engine 11 are controlled via an elevator control 15.

[0050] During normal operation of the elevator 1, the elevator control 15 continuously monitors the motions of the elevator car 3 and therefore has at least rough information available on a current position of the elevator car 3 within the elevator shaft 5. Using such position information, the elevator control 15 may control for example a speed and/or a positioning of the elevator car 3 by suitably controlling the drive engine 11.

[0051] Upon approaching one of the shaft doors 9, the elevator car 3 has to be positioned with high precision relative to the shaft door 9 in order to for example avoid steps between the elevator car 3 and the floor 7. Therefore, a sensor arrangement 17 is attached to the elevator car 3 at a precisely predetermined position. The sensor arrangement 17 comprises one or more flag detection sensors 19. While, in principle, the flag detection sensors 19 may be embodied in various manners, in the exemplary embodiment explained herein, the flag detection

sensors 19 are photo sensors. Each photo sensor is adapted for optically detecting a presence of a flag 21. Therein, the flag 21 is attached to a wall 10 of the elevator shaft 5 and is positioned in a predetermined spatial relationship with respect to the elevator shaft door 9.

[0052] Thus, as the position of the photo sensor 19 with respect to the elevator car 3 is precisely predetermined and the position of the flag 21 with respect to the shaft door 9 is also precisely predetermined, the elevator control 15 may determine precise information about the current position of the elevator car 3 with respect to the shaft door 9 upon receiving a signal from the photo sensor indicating that the presence of the flag 21 being nearby has been detected.

[0053] Fig. 2 shows a perspective view onto the sensor arrangement 17 comprising three photo sensors 19. The three photo sensors 19 are arranged in a specific layout and spaced from each other. Optionally, multiple photo sensors 19 may be comprised in a common housing or encapsulation. Each of the photo sensors 19 comprises a U-shaped housing 23. Therein, the photo sensor 19 comprises a light emitter 25 and a light detector 27 arranged at opposite branches of the U-shaped housing and facing towards each other. The sensors 19 are arranged on a metal sheet substrate 29 via which they can be fixedly attached to the elevator car 3.

[0054] Fig. 3 shows a cross-sectional view through a photo sensor 19 and a cooperating flag 21 of a position detector arrangement 2 according to an embodiment of the present invention. In fact, the position detector arrangement 2 comprises several flags 21 which may be arranged at all of the shaft doors 9 of an elevator 1.

[0055] When the elevator car 3 reaches a correct position with respect to the shaft door 9, a branch 31 of the flag 21 comes into a space between the opposite branches 31, 33 of the U-shaped photo sensor 19. As the protruding branch 31 of the flag 21 is made from an at least partially light absorbing and/or light reflecting material, it interrupts a light beam 37 emitted from the light emitter 25 towards the light detector 27 of the photo sensor 19. Due to such interruption of the light beam 37, the photo sensor 19 may detect the presence of the flag 21.

[0056] Accordingly, the photo sensor 19 may be a simple optical switch providing digital information, i.e. providing only a one-bit signal, indicating whether or not its light barrier is interrupted. However, the photo sensors itself preferably does not provide any position information and/or identification information.

[0057] Additionally to determining the presence of the flag 21, the position detector arrangement 2 is adapted for providing individual identification information. For such purpose, an RFID tag 39 is attached to the flag 21. The RFID tag 39 may store individual identification information. Accordingly, upon reading this individual identification information, an individual identification may be determined for each of the flags 21 provided at each of the floors 7 of a building. Optionally, the position detector arrangement may read the RFID tag before or after the

flag detection sensor detects the flag

[0058] Thus, provided that the individual identification information has been attributed for example to specific positions within the elevator shaft 5 or to specific ones of the shaft doors 9 during for example a preceding learning trip, upon approaching one of the shaft doors 9, the elevator control 15 does not only receive a digital signal from the photo sensors 19 indicating that the elevator car 3 is correctly positioned with respect to a shaft door 9 but also receives individual identification information from which the elevator control 15 may derive at which of the shaft doors 9 the elevator car 3 is currently located.

[0059] In order to be able to read the RFID tag 39, an RFID detector 43 is comprised within the housing 23 of the photo sensor 19. For example, the RFID detector 43 may be provided at a same printed circuit board 45 at which also the light detector 27 and/or the light emitter 25 are provided. Readout signals of the RFID detector 43 comprising the individual identification information may be supplied to the elevator control 15 via an output 47.

[0060] In the example shown, the RFID tag 39 is glued to the protruding branch 31 of the flag 21. However, in alternative embodiments, such RFID tag 39 may also be attached to the flag 21 at different locations such as for example at a base 41 or via any interconnecting component. Therein, it may be beneficial that the RFID tag 39 is mechanically connected to the flag 21 such that it may be handled, stored and finally installed within the elevator as a combined unit.

[0061] Preferably, at least the portion of the flag 21 to which the RFID tag 39 is attached consists of an electrically isolating material such that radio frequency signals may not be interfered during readout of the individual identification information by the RFID detector 43.

[0062] Finally, it should be noted that the term "comprising" does not exclude other elements or steps and the terms "a" or "an" do not exclude a plurality. Also elements described in association with different embodiments may be combined. 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

[0063]

1	elevator
2	position detector arrangement
3	elevator car
5	elevator shaft
7	floor
9	shaft door
10	wall of elevator shaft
11	drive engine
13	suspension means
15	elevator control
17	sensor arrangement

19 photo sensor / flag detection sensor
 21 flag
 23 housing
 25 light emitter
 27 light detector
 29 support
 31 protruding branch of flag
 33 branch of photo sensor
 35 opposite branch of photo sensor
 37 light beam
 39 RFID tag
 41 base of flag
 43 RFID detector
 45 printed circuit board
 47 output

Claims

1. Position detector arrangement for an elevator (1), comprising:

multiple flags (21), each to be attached at a fixed position within an elevator shaft (5);
 a flag detection sensor (19) to be attached at a car (3) of the elevator (1), the flag detection sensor (19) being adapted for detecting a presence of the flag (21) in a close neighbourhood to the flag detection sensor (19);
 multiple RFID tags (39), each storing individual identification information;
 an RFID detector (43) for reading the identification information stored in the RFID tags (39);
 wherein each of the RFID tags (39) is mechanically attached to one of the flags (21).
2. Position detector arrangement of claim 1, wherein the flag (21) comprises a portion consisting of an electrically isolating material.
3. Position detector arrangement of claim 2, wherein the RFID tag (39) is fixed on top of a surface of the portion consisting of the electrically isolating material.
4. Position detector arrangement of one of the preceding claims, wherein the RFID tag (39) comprises a circuitry provided on a flexible substrate.
5. Position detector arrangement of one of the preceding claims, wherein the RFID tag (39) is one of glued on top of a surface of the flag (21) and moulded inside a plastic part comprising the flag (21).
6. Position detector arrangement of one of the preceding claims, wherein the flag detection sensor is one of a photo sensor, a magnetic sensor, a capacitive sensor and a mechanically actuated switch.

7. Position detector arrangement of one of the preceding claims, wherein the flag detection sensor (19) is a photo sensor comprising a light emitter (25) and a light detector (27) arranged opposite to each other for forming a light barrier upon emitting a light beam (37) from the light emitter (25) towards the light detector (27) and wherein the flag (21) is adapted for interrupting the light beam (37) when the photo sensor (19) and the flag (21) are in a predetermined position relative to each other.
8. Position detector arrangement of one of the preceding claims, wherein the flag detection sensor (19) and the RFID detector (43) are comprised in a common housing (23).
9. Position detector arrangement of one of the preceding claims, wherein the flag detection sensor (19) and the RFID detector (43) are comprised in one of a common circuitry and a common printed circuit board.
10. Position detector arrangement of one of the preceding claims, further comprising a controller (15) for analysing the identification information read by the RFID detector (43) and for determining a current position of the car (3) based on the analysed identification information.
11. Elevator (1) comprising:

an elevator car (3) to be displaced within an elevator shaft (5) between floors (7) in a building;
 several shaft doors (9) provided at the floors (7);
 a controller (15) for controlling movements of the elevator car (3);
 a position detector arrangement (2) according to one of claims 1 to 10;
 wherein each of the flags (21) of the position detector arrangement (2) is arranged inside the elevator shaft (5) and adjacent to one of the shaft doors (9);
 wherein the flag detection sensor (19) and the RFID detector (43) are attached to the elevator car (3).
12. Elevator of claim 11, wherein the controller (15) is adapted to, in an initialisation procedure, read and analyse the identification information read by the RFID detector (43) of the position detector arrangement (2) and to determine a current position of the elevator car (3) based on the analysed identification information.
13. Elevator of claim 12, wherein the controller (15) is adapted to, in the initialisation procedure, drive the elevator car (3) to one of the shaft doors (9) such that the RFID detector (43) can read the identification

information stored in the RFID tag (39) which is attached to the flag (21) positioned adjacent to the shaft door (9).

14. Elevator of one of claims 11 to 13, further comprising additional flags, wherein each of the additional flags is arranged inside the elevator shaft (5) and apart from each of the shaft doors (9). 5
15. Elevator of claim 14, wherein the additional flags are provided with at least one of a different functionality and a different visual appearance than the flags to be arranged adjacent to one of the shaft doors (9). 10

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Fig. 1

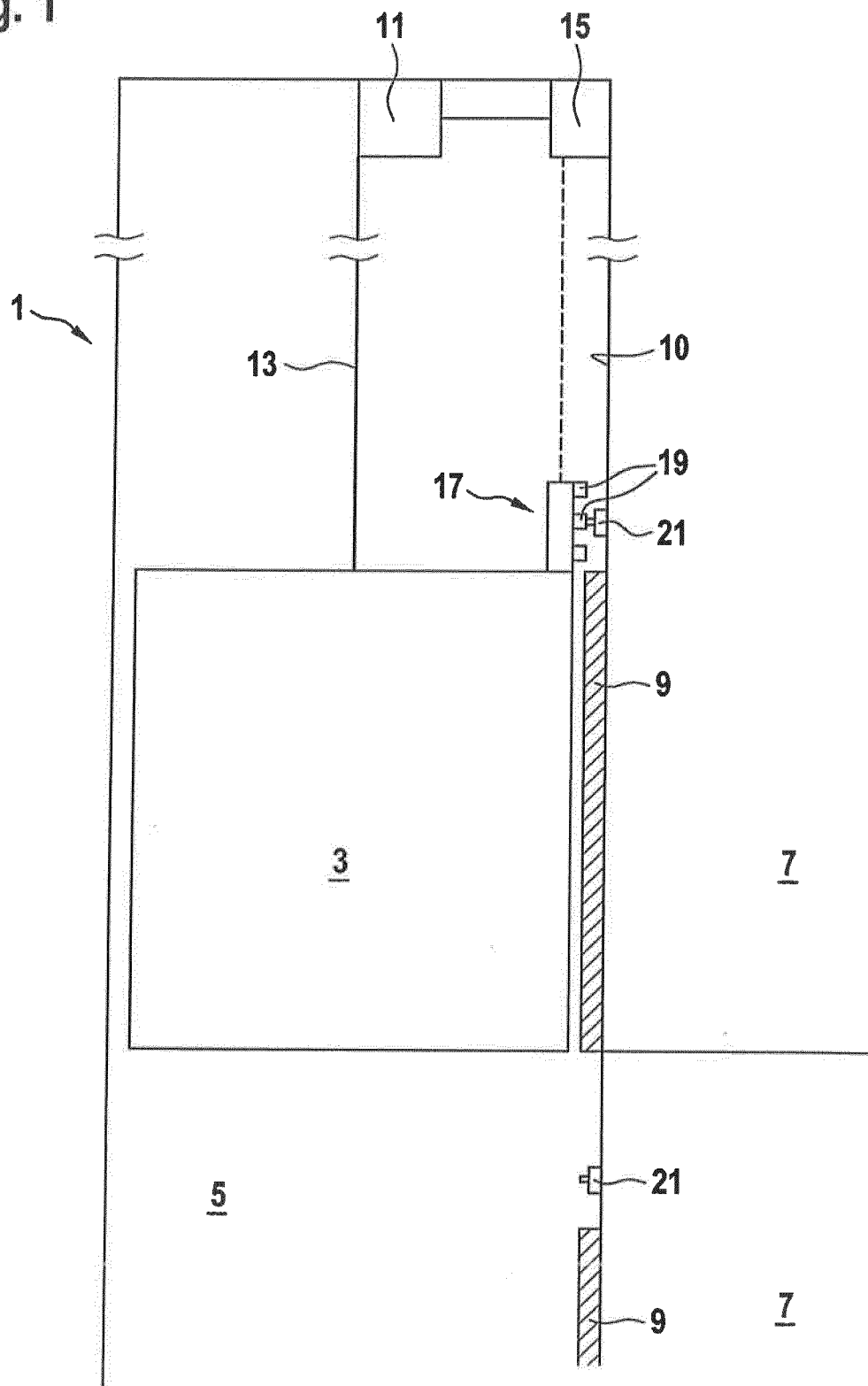


Fig. 2

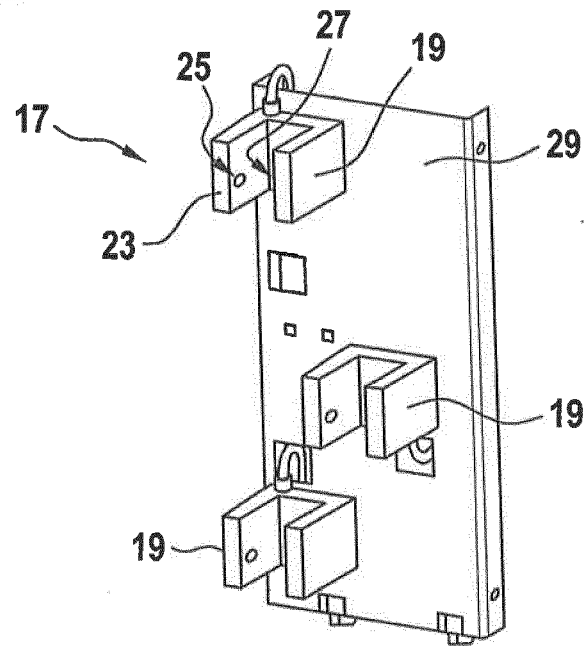
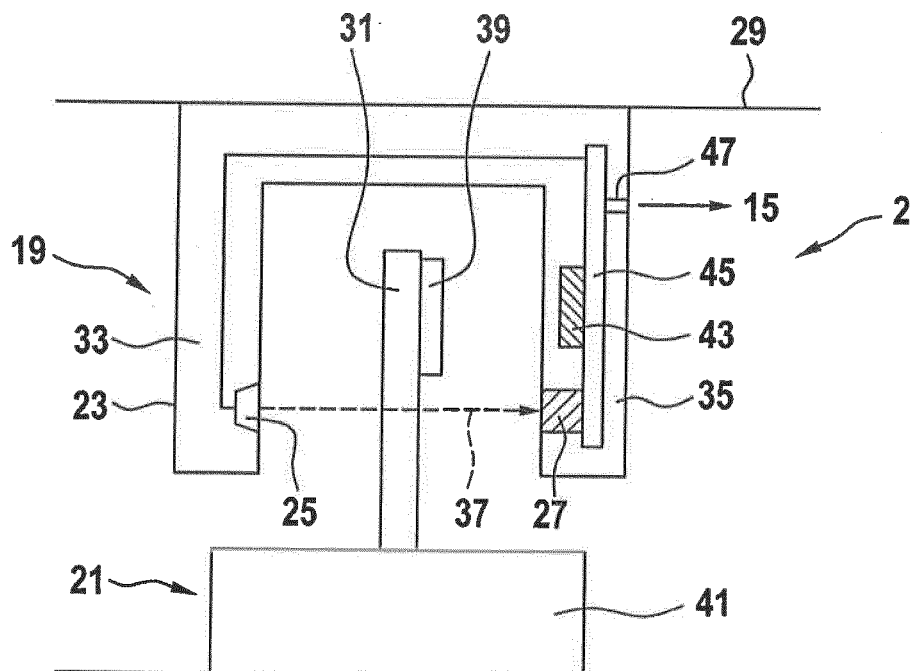


Fig. 3





EUROPEAN SEARCH REPORT

Application Number
EP 15 18 7714

5

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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	EP 2 325 126 A1 (STEM SRL [IT]) 25 May 2011 (2011-05-25)	1-3,6-8, 10-14	INV. B66B1/34
Y	* paragraphs [0016] - [0032]; figures 3-9 *	4,5,9,15	
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