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(54) **ELEVATOR ARRANGEMENT EXHIBITING GUIDE RAIL FIXATION BRACKET UNITS AS WELL AS FIXATION BRACKET UNIT PROVIDED THEREFOR**

(57) The present invention relates to an elevator arrangement exhibiting at least one cabin for a lift shaft, wherein the at least one cabin is guided by means of at least one cabin guide rail, wherein the elevator arrangement exhibits at least one guide rail for at least one counterweight, wherein the elevator arrangement exhibits a plurality of fixation bracket units coupling both the cabin guide rail and the at least one counterweight guide rail

for fixation to at least one side of the lift shaft each in a specific/individual height position within the lift shaft in at least one fixing point, wherein the respective fixation bracket unit is configured for predefining the cabin guide rail's cross position as well as the cabin guide rail's lateral distance respectively with respect to the counterweight guide rail's position(s). This configuration also facilitates handling and mounting procedure.

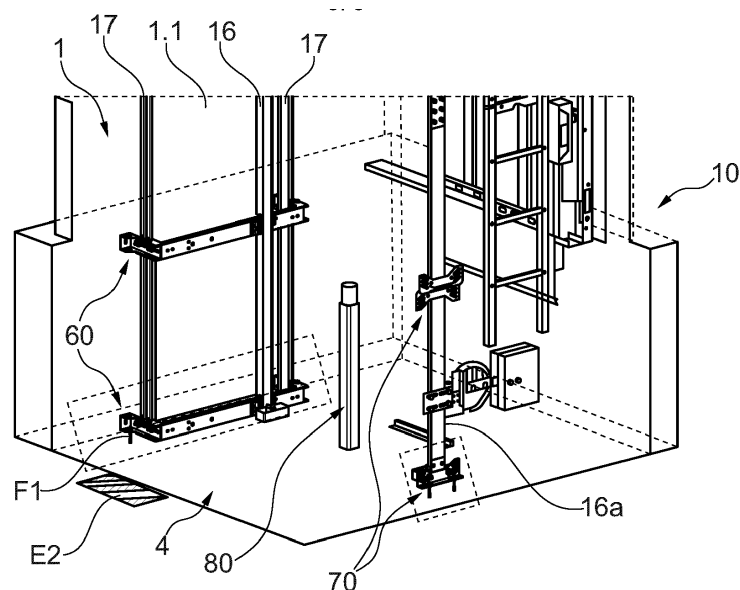


Fig. 8A

Description

TECHNICAL FIELD

[0001] The present invention refers to an elevator arrangement exhibiting at least one cabin for a lift shaft and at least one drive unit, wherein the at least one cabin is coupled with the drive unit by means of at least one traction means interacting with the drive unit, wherein the at least one cabin is guided by means of at least one cabin guide rail, wherein the elevator arrangement exhibits at least one guide rail for at least one counterweight, wherein the elevator arrangement exhibits a plurality of fixation bracket units providing for fixation of the guide rails to of the lift shaft. The present invention also refers to such fixation bracket units provided for favourable coupling and fixation of the guide rails. Furthermore, the present invention refers to use of a plurality of such fixation bracket units for favourably coupling and fixing the guide rails. In particular, the present invention refers to an elevator arrangement according to the respective present independent claim.

BACKGROUND

[0002] Elevator arrangements exhibiting at least one cabin for a lift shaft and at least one drive unit usually comprise at least one cabin guide rail for guiding the at least one cabin and further comprise at least one counterweight guide rail for guiding at least one counterweight. Advantageously, such elevator arrangements comprise two cabin guide rails and two counterweight guide rails, wherein the cabin guide rails are arranged vis-à-vis on opposite sides of the lift shaft, and the counterweight guide rails are arranged on the same side of the lift shaft and on the same lift shaft side one of the cabin guide rails being arranged.

[0003] There is a need for favourable fixation techniques for fixing these guide rails within the lift shaft, especially also in view of easy handling.

SUMMARY

[0004] It is an object of the present invention to provide for favourable fixation techniques for fixing at least one cabin guide rail and at least one counterweight guide rail within a lift shaft in an elevator arrangement exhibiting at least one cabin. In particular, a/the object of the present invention is to provide for favourable fixation techniques also allowing for easy handling and effective mounting, wherein preferably both the at least one cabin guide rail and the counterweight guide rails can be fixed in efficient manner and positioned in exact manner.

[0005] The object of the invention is solved by the features of the independent main claims. Advantageous features are indicated in the subclaims. The features of the subclaims can be combined with the features of the main claims and further subclaims.

[0006] According to a first aspect of the invention, fixation bracket units provide for advantageous fixation and positioning. In particular, the object is solved by an elevator arrangement exhibiting at least one cabin for a lift shaft and at least one drive unit, wherein the at least one cabin is coupled with the drive unit by means of at least one traction means interacting with the drive unit, wherein the at least one cabin is guided by means of at least one cabin guide rail, wherein the elevator arrangement exhibits at least one guide rail for at least one counterweight, wherein the elevator arrangement exhibits a plurality of fixation bracket units coupling both the cabin guide rail and the at least one counterweight guide rail for fixation to at least one side (especially wall) of the lift shaft each in a specific/individual height position within the lift shaft in at least one fixing point, wherein the respective fixation bracket unit is configured for predefining the cabin guide rail's cross position with respect to the counterweight guide rail's position(s), and wherein the respective fixation bracket unit is further configured for predefining the cabin guide rail's lateral distance with respect to the counterweight guide rail's position(s). In other words: The respective fixation bracket unit is configured for predefining the relative positions of the guide rails with respect to each other in both spatial horizontal directions. This configuration also facilitates positioning of the guide rails with respect to each other, and this configuration also favours efficient and easy handling and mounting. Advantageously, the respective fixation bracket unit also provides for assembly tolerance (positional variation) with respect to at least one of the lift shaft walls, especially in order to compensate for any irregularity at/in/within the lift shaft walls.

[0007] In particular, the present invention provides for advantageous technical solutions for fixation of the guide rails to a/the wall in the lift shaft, and for positioning of the guide rails with respect to each other. The respective fixation bracket unit may also be provided as a kind of foldable bracket which is especially favourable in view of easy transportation and easy handling within the lift shaft. Further, the respective fixation bracket unit may also provide for a (first/second) coupling preferably provided by only one single clip or clamp (or only one single clip or clamp for each side of the guide rail) for coupling the respective guide rail, especially in conjunction with at least one cut out within the respective bracket part (which cut out may also define the guide rail's relative position). Further, the respective fixation bracket unit may also exhibit at least one receiving section for receiving the respective counterweight guide rail, e.g. an undercut or an indentation; such configuration may further facilitate mounting and handling and relative positioning.

[0008] According to one embodiment the respective fixation bracket unit exhibits at least one receiving section for receiving and positioning the respective counterweight guide rail in said predefined lateral distance. This configuration further facilitates mounting and positioning. In particular, the receiving section may exhibit an under-

cut or an indentation. Advantageously, the receiving section is configured for predefining said lateral distance of the cabin guide rail by form-fit.

[0009] According to one embodiment the elevator arrangement exhibits two counterweight guide rails, wherein the respective fixation bracket unit is configured for coupling the (first) cabin guide rail and both counterweight guide rails for fixation to the at least one side (especially wall) of the lift shaft, wherein the respective fixation bracket unit is configured for predefining the cabin guide rail's cross position with respect to the positions of both counterweight guide rails, especially an eccentric cabin guide rail's cross position which is arranged eccentrically with respect to half the cross distance between the counterweight guide rails. This allows for coupling and fixing three guide rails by means of only one unit (fixation bracket unit).

[0010] In particular, the at least one cabin can be guided by means of at least two cabin guide rails arranged on opposite sides of the cabin (cabin guide rail and further cabin guide rail vis-à-vis), wherein the respective fixation bracket unit couples the cabin guide rail, and the further guide rail is coupled by means of fixation units.

[0011] According to one embodiment the respective fixation bracket unit exhibits at least one cut out (especially borehole) predefining the cabin guide rail's cross position with respect to the counterweight guide rail's position. This also provides for advantageous positioning with respect to a/the drive unit's drive zone and with respect to traction means which should/shall extend laterally from the cabin guide rail.

[0012] According to one embodiment in a top view in vertical direction, in intended arrangement, the respective fixation bracket unit exhibits a U-shape, wherein the respective fixation bracket unit is configured for coupling the cabin guide rail on a first side of the fixation bracket unit (especially outer side) and for coupling the counterweight guide rail(s) on a second side of the fixation bracket unit (especially inner side), wherein the respective fixing point preferably is arranged laterally outwards the counterweight guide rail(s). This further facilitates handling and mounting and also provides for effective structural support.

[0013] According to one embodiment the respective fixation bracket unit is configured for being fixed to a/the wall of the lift shaft by only one single fixation means (especially anchor bolt), on each side resp. at each fixing point, especially by absolutely two fixation means. This further facilitates handling and mounting. For example, the fixation means are configured for anchoring the respective fixation bracket unit within cracked or uncracked concrete of the wall and/or within a support beam or any kind of support rail (e.g. metallic support rail) provided within the wall.

[0014] According to one embodiment the respective fixation bracket unit is configured for providing/allowing assembly tolerance (positional variation) in at least one spatial direction, especially by at least 25% of distance

variation with respect to the respective distance to the wall of the lift shaft or with respect to the respective extension of the second/third bracket part (preferably at least 35%) preferably in a/the horizontal direction orthogonal to the cross direction, especially by means of elongated holes (slots) and/or oversized boreholes. This also allows for use of same/similar fixation bracket units for different kinds of lift shafts; this also allows for adjustment and compensation of e.g. unevenness of a/the respective wall of the lift shaft.

[0015] According to one embodiment the respective fixation bracket unit resp. its constituent components is/are made of sheet metal material, especially galvanized sheet metal e.g. having a thickness of 2mm. This also allows for a slim and cost-effective design.

[0016] According to one embodiment the respective fixation bracket unit consists of bending parts (bent components), especially of only three bending parts, namely a U-shaped centre part (first bracket part), a first lateral part (second bracket part resp. first arm), a second lateral part (third bracket part resp. second arm) preferably being similar to the second part. This further facilitates handling and mounting, and this configuration also provides for a slim design. Advantageously, these bending parts can be preassembled by means of fastening means.

[0017] According to one embodiment the respective fixation bracket unit exhibits a U-shape provided by a first bracket part (centre part) and by two arms (second and third bracket parts) and consists of three parts which can be folded into one another. This configuration also allows for easy handling and favourable pre-assembly.

[0018] According to one embodiment the respective fixation bracket unit consists of bending parts which can be folded into one another, especially in a preassembled state, especially bending parts which can be folded from laterally outside to the inside. This further facilitates handling and mounting, especially also a/the process of coupling the fixation bracket unit with/to the respective counterweight guide rail. This configuration also allows for minimum packing volume in context with handling and logistics for a plurality of fixation bracket units.

[0019] A folding mechanism allowing for a swivel motion from laterally outside to the inside also facilitates mounting/coupling of a/the preassembled fixation bracket unit to all three guide rails at the same time, especially by arranging the first bracket part and the first coupling at the respective cabin guide rail and by unfolding both the second and third bracket parts from laterally outside to the inside resp. to an orthogonal alignment with respect to the cross direction (main extension of the first bracket part), in order to define a U-shape.

[0020] According to one embodiment the respective fixation bracket unit consists of parts (preferably only three parts) which can be folded into one another, wherein the respective fixation bracket unit exhibits fastening means which are arranged and configured such that a/the swivel axis for a/the folding mechanism of parts of the fixation bracket unit is defined by the fastening

means. This further facilitates logistics and transportation in general, especially also manual handling and mounting.

[0021] According to one embodiment the respective fixation bracket unit consists of parts which can be folded into one another, wherein the respective fixation bracket unit exhibits fastening means which respectively interact with an elongated hole provided in arms of the respective fixation bracket unit. This configuration also allows for easy handling and favourable assembly tolerance (positional variation) in at least one spatial direction with respect to the respective lift shaft wall (e.g. in order to compensate for any lift shaft wall irregularities).

[0022] According to one embodiment the respective fixation bracket unit exhibits fastening means which define a/the swivel axis for a/the folding mechanism, wherein the fastening means remain mounted when pretensioning means are to be mounted for coupling the respective counterweight guide rail. This further facilitates handling and mounting

[0023] According to one embodiment pretensioning means provided for coupling the respective counterweight guide rail also provide for interconnecting means for interconnecting (in pairs) parts of the fixation bracket unit. This further facilitates handling and mounting.

[0024] According to one embodiment the respective fixation bracket unit is symmetric (symmetric construction/design) with respect to the cross direction and preferably also with respect to the vertical direction, especially with respect to the position of cut outs (especially boreholes) predefining the cabin guide rail's cross position with respect to the counterweight guide rail's position. Such symmetric configuration also allows for use of the fixation bracket unit in more flexible manner, e.g. for opposite sides of the lift shaft or for mirror-inverted eccentricity of the cabin guide rail.

[0025] According to one embodiment a/the first coupling of the respective fixation bracket unit for coupling the cabin guide rail is defined by pretensioning means defining the position of at least one pretensioning element (especially a force-fitting pretensioning element) pressing the cabin guide rail to the fixation bracket unit, especially such that the coupling is twist-proof against twisting of the cabin guide rail along its longitudinal axis. This provides for advantageous coupling means for the cabin guide rails.

[0026] According to one embodiment a/the second coupling of the respective fixation bracket unit for coupling the (respective) counterweight guide rail is defined by pretensioning means defining the position of at least one pretensioning element (especially a force-fitting pretensioning element) pressing the counterweight guide rail to the fixation bracket unit, especially such that the coupling is twist-proof against twisting of the cabin guide rail along its longitudinal axis. This provides for advantageous coupling means also for the counterweight guide rails.

[0027] According to one embodiment the respective

fixation bracket unit is configured for preassembling at least one pretensioning means or pretensioning element of the second coupling, especially by providing at least one elongated hole (slot) or oversized borehole for a further pretensioning means or pretensioning element of the second coupling. This also facilitates mounting of the fixation bracket units within the lift shaft, especially by predefining at least one coupling point.

[0028] According to one embodiment the respective fixation bracket unit defines at least two fixing points in two fixing planes which extend orthogonally with respect to each other, especially respectively at both free ends of the fixation bracket unit. This also allows for use of the fixation bracket unit both at a wall and on the ground of the lift shaft, i.e., fixation within the pit of the lift shaft can be ensured by means of the same configuration of the fixation bracket units.

[0029] According to one embodiment the respective fixation bracket unit provides for functionality of routing and supporting at least one cable or conduct, especially by means of at least one retainer plate which is fastened at one part of the fixation bracket unit, especially at a/the first bracket part. This further enhances functional integration of the fixation bracket units to the elevator arrangement in view of broad functionality ensured by only few different parts.

[0030] According to a second aspect of the invention, fixation units provide for advantageous fixation and positioning of a/the further cabin guide rail. In particular, the above mentioned object is also solved by an elevator arrangement exhibiting at least one cabin for a lift shaft and at least one drive unit, wherein the at least one cabin is coupled with the drive unit by means of at least one traction means interacting with the drive unit, wherein the at least one cabin is guided by means of at least one cabin guide rail, wherein the elevator arrangement exhibits at least one guide rail for at least one counterweight, wherein the elevator arrangement exhibits a plurality of fixation units each configured for directly fixing a/the further cabin guide rail to at least one further side of the lift shaft each in a specific/individual height position within the lift shaft in at least one fixing point, especially comprising two parts respectively, namely a first L-angle profile (first part) and a second L-angle profile (second part). Such configuration also provides for advantageous combination with (application together with) the fixation bracket units according to the present disclosure.

[0031] In other words: According to one embodiment the elevator arrangement further exhibits a plurality of fixation units each configured for directly fixing a further cabin guide rail (especially vis-à-vis the cabin guide rail) to at least one further side (especially wall) of the lift shaft each in a specific/individual height position within the lift shaft in at least one fixing point, especially comprising two parts respectively, namely a first L-angle profile (first part) and a second L-angle profile (second part), wherein the respective fixation unit preferably defines at least two fixing points in two fixing planes which extend orthogo-

nally with respect to each other. This also allows for adapting the fixation concept described above also for fixing the further cabin guide rail. In particular, it has been found that each fixation unit can preferably be composed of two times the same part (especially L-form); the constellation of these two parts may also provide for adjustment of the position of the respective cabin guide rail; in other words: the fixation unit may provide for tolerance and adjustment functionality at least in one spatial direction such that depending on the lift shaft's dimensions, the desired relative position of the further cabin guide rail can be adjusted by means of the same type of fixation units.

[0032] According to one embodiment the respective fixation unit is configured for providing/allowing assembly tolerance (positional variation) in at least one spatial direction, especially by at least 25% of distance variation with respect to the respective distance to the wall of the lift shaft (preferably at least 35%) preferably in a/the horizontal direction orthogonal to the cross direction, especially by means of elongated holes (slots) and/or oversized boreholes. This also allows for use of same/similar fixation units for different kinds of lift shafts; this also allows for adjustment and compensation of e.g. unevenness of a/the respective wall of the lift shaft.

[0033] For example, the elevator arrangement is equipped with three types of fixation units each providing for at least 25% of distance variation, thereby providing for an adjustment range of e.g. ca. 100mm for the distance between the guide rail and the wall (e.g. between 25 and 135mm).

[0034] According to one embodiment the respective fixation unit resp. its constituent components is/are made of sheet metal material, especially galvanized sheet metal e.g. having a thickness of 3mm. This also allows for a slim and cost-effective design.

[0035] According to a further aspect of the invention, fixation bracket units and/or fixation units according to the present disclosure provide for favourable fixation/assembly also within a pit of the lift shaft. In particular, the above mentioned object is also solved by an elevator arrangement exhibiting at least one cabin for a lift shaft and at least one drive unit, wherein the at least one cabin is coupled with the drive unit by means of at least one traction means interacting with the drive unit, wherein the at least one cabin is guided by means of at least one cabin guide rail, wherein the elevator arrangement exhibits at least one guide rail for at least one counterweight, wherein the elevator arrangement exhibits at least one fixation bracket unit and/or at least one fixation unit configured for being arranged and fixed within a pit of the lift shaft, especially fixed at the bottom/ground of the lift shaft, thereby defining a/the starting position of the respective guide rail. Preferably, fixation is carried out by fixing the respective fixation bracket unit or fixation unit in a second fixing plane resp. horizontal plane (instead of fixing it within a first fixing plane resp. vertical plane), wherein the second fixing plane can favourably be de-

finied by a section of an L-profile or angle profile of the respective fixation (bracket) unit. In other words: According to one embodiment one fixation bracket unit of the plurality of fixation bracket units and optionally also one fixation unit of a/the plurality of fixation units is/are arranged within a pit of the lift shaft, especially fixed at the bottom/ground of the lift shaft, thereby defining a/the starting position of the respective guide rail. This further facilitates handling and fixation, especially in view of few different parts which can be used for both fixation on the wall and fixation on the ground. In other words: One of the fixation bracket units is mounted within the pit on the bottom, thereby also marking the counterweight's position or zone. Thus, this fixation bracket unit fixed on the ground provides for at least two functions: defining a starting point/position for the installation of the guide rails, and providing for a visual and spatial separation of the pit in order to prevent technicians from walking under/near the counterweight. In other words: There is no need for any additional security provisions within the pit in context with the counterweight, rather, such use of the fixation bracket units may overcome any risk assessment requirements. This configuration also facilitates overcoming prior art requiring a counterweight protection device (e.g. sheet metal) in the pit for protecting and preventing a technician from walking under/near the counterweight.

[0036] According to one embodiment an L-angle profile (first or second part) of one of the fixation units of a/the plurality of fixation units is used for fixing a/the further cabin guide rail at the bottom/ground within the pit of the lift shaft. This configuration also allows for reducing the complexity of required parts, thereby further facilitating handling and mounting. Preferably, the structural composition of the respective fixation unit consists of two L-angle profiles which can be fastened together by means of fastening means allowing for at least 25% of distance variation of the distance between the wall of the lift shaft and the respective guide rail. In other words: According to the invention, the configuration of both the fixation bracket unit(s) and the fixation unit(s) allows for using same/similar parts for the fixation of the respective cabin guide rail(s) not only on the wall (at least one first fixing plane resp. vertical plane) but also within the pit (second fixing plane resp. horizontal plane). Using the fixation unit (resp. only one part of the fixation unit) for the fixation of the further cabin guide rail in the pit resp. on the ground also allows for defining a/the starting point for the guide rail installation.

[0037] In particular, the above mentioned object is also solved by a fixation bracket unit for an elevator arrangement according to the present disclosure, wherein the (respective) fixation bracket unit is processed by providing a first bracket part made of sheet metal material (especially by bending) and second and third bracket parts made of sheet metal material (especially by bending), wherein the second and third bracket parts are similar or at least exhibit a mirror-inverted design, wherein the re-

spective fixation bracket unit is configured for predefining both the cabin guide rail's cross position and lateral distance respectively with respect to the counterweight guide rail's position(s), wherein these three bracket parts can be fastened together in pairs, especially such that fastening means respectively provide for a swivel axis for a folding mechanism ensuring a folded arrangement of at least two or three parts of the fixation bracket unit. This configuration provides for above mentioned advantages.

[0038] In particular, the above mentioned object is also solved by use of a plurality of fixation bracket units for fixing a cabin guide rail and two counterweight guide rails to at least one side (especially wall) of a lift shaft of an elevator arrangement in at least two fixing points by coupling both the cabin guide rail and the counterweight guide rails respectively in a specific/individual height position within the lift shaft by means of first and second couplings, wherein both the cabin guide rail's cross position and the lateral distance are defined with respect to the counterweight guide rails' positions by means of the respective fixation bracket unit, especially use of said fixation bracket units in an elevator arrangement according to the present disclosure.

[0039] Abstract: The present invention relates to an elevator arrangement exhibiting at least one cabin for a lift shaft and at least one drive unit, wherein the at least one cabin is coupled with the drive unit by means of at least one traction means interacting with the drive unit, wherein the at least one cabin is guided by means of at least one cabin guide rail, wherein the elevator arrangement exhibits at least one guide rail for at least one counterweight, wherein the elevator arrangement exhibits a plurality of fixation bracket units coupling both the cabin guide rail and the at least one counterweight guide rail for fixation to at least one side of the lift shaft each in a specific/individual height position within the lift shaft in at least one fixing point, and preferably also for fixation to the ground within a/the pit of the lift shaft, wherein the respective fixation bracket unit is configured for predefining the cabin guide rail's cross position as well as the cabin guide rail's lateral distance respectively with respect to the counterweight guide rail's position(s). This configuration also facilitates handling and mounting procedure. Preferably, the fixation bracket units can be folded by folding second and third parts with respect to a/the first part of the respective fixation bracket units. Preferably, the elevator arrangement further exhibits a plurality of fixation units each configured for directly fixing a further cabin guide rail to at least one further side of the lift shaft, and preferably also to the ground within a/the pit of the lift shaft.

SHORT DESCRIPTION OF FIGURES

[0040] These and other aspects of the present invention will also be apparent from and elucidated with reference to the embodiments described hereinafter. Individ-

ual features disclosed in the embodiments can constitute alone or in combination an aspect of the present invention. Features of the different embodiments can be carried over from one embodiment to another embodiment.

In the drawings:

Figures 1A, 1B show a fixation bracket unit configured for coupling a cabin guide rail and two counterweight guide rails in an elevator arrangement according to one embodiment, respectively in a perspective view;

Figure 2 shows, in a top view, an elevator arrangement according to embodiments;

Figure 3 shows, in a perspective side view, a fixation bracket unit coupling a cabin guide rail and two counterweight guide rails in an elevator arrangement according to an embodiment;

Figures 4A, 4B, 4C show, in three different top views, a fixation bracket unit coupling a cabin guide rail and two counterweight guide rails in an elevator arrangement according to an embodiment;

Figure 5 shows a plurality of fixation bracket units configured for coupling guide rails in an elevator arrangement according to one embodiment, in a perspective view, wherein the fixation bracket units are arranged in folded configuration being partly pre-assembled;

Figures 6A, 6B, 6C show a fixation unit configured for directly fixing a cabin guide rail to at least one side of a lift shaft in an elevator arrangement according to embodiments exhibiting the above mentioned fixation bracket units, in a perspective side view and in a side view and in a sectional view;

Figures 7A, 7B show an implementation of the fixation bracket units coupling guide rails in an elevator arrangement according to one embodiment, respectively in a perspective view, wherein one of the fixation bracket units further provides for routing and supporting at least one cable or conduct;

Figures 8A, 8B, 8C show a plurality of fixation bracket units as well as a plurality of fixation units, each configured for coupling guide rails in an elevator arrangement according to embodiments described above, respectively in a perspective view, wherein the fixation (bracket) units further provide for fixation to the ground (floor) within the pit of the lift shaft;

DETAILED DESCRIPTION OF FIGURES

[0041] First, the reference signs are described in general terms; individual reference is made in connection with respective figures.

[0042] The present invention provides for an elevator arrangement 10 for arranging and supporting and guiding at least one cabin (car) 11 within a lift shaft 1 by means of a drive unit 12 interacting with traction means 15 (especially at least one belt, preferably at least two belts), wherein the cabin 11 is guided by means of a cabin guide

rail 16 (guide rail for cabin/car) and a further cabin guide rail 16a (vis-à-vis), and wherein the traction means 15 are coupled with at least one counterweight 5 which is guided by means of counterweight guide rails 17.

[0043] The present invention provides for favourable support of the guide rails. In particular, the present invention provides for a plurality of fixation bracket units 60 coupling both the respective cabin guide rail 16 and the counterweight guide rails 17 for fixation to at least one side 1.1, 1.2 of the lift shaft 1 each in a specific/individual height position within the lift shaft in at least one fixing point F1. The respective fixation bracket unit 60 is configured for predefining at least the cabin guide rail's cross position (y) with respect to the counterweight guide rail's position(s). Advantageously, the respective fixation bracket unit 60 is composed of three main supporting parts, namely a first bracket part 61, a second bracket part 62 (first arm), and a third bracket part 63 (second arm) which is preferably similar to the second bracket part. The first bracket part 61 mainly extends in a first horizontal direction (x-direction), and the second and third bracket parts 62, 63 mainly extend in a second horizontal direction (cross direction, y-direction) which is orthogonal to first horizontal direction.

[0044] A first coupling 64 for coupling the cabin guide rail is preferably provided at the first bracket part 61, and a second coupling 65 for coupling the respective counterweight guide rail is preferably provided at the second bracket part 62 and at the third bracket part 63, respectively.

[0045] Preferably, the fixation bracket unit 60 is configured for coupling with the cabin guide rail on a first side 60.1 of the fixation bracket unit (especially outer side), and for coupling with the respective counterweight guide rail on a second side 60.2 of the fixation bracket unit (especially inner side). Advantageously, the first bracket part 61 exhibits two counterweight guide rail receiving sections 61.1, especially provided by recesses (especially at the inner side) for accommodating the respective counterweight guide rail at least in a small section.

[0046] In particular, the fixation bracket unit 60 exhibits recesses (bores or the like) for applying first pretensioning means 64.1 comprising at least one pretensioning element 64.3 (especially force-fitting pretensioning element) at the first coupling 64 for coupling/pretensioning the cabin guide rail, and the fixation bracket unit 60 exhibits recesses (bores or the like) for applying second pretensioning means 65.1 comprising at least one pretensioning element 65.3 (especially force-fitting pretensioning element) at the second coupling 65 for coupling/pretensioning the respective counterweight guide rail. Fastening means 66 allow for fastening/attaching the bracket parts together. In particular, respective pretensioning means can be provided by a single clip or clamp being pre-stressed e.g. by means of screws. Advantageously, the at least one recess is arranged such that it provides also for positioning and accommodation of interconnecting means 68 (for interconnecting at least two

parts of the fixation bracket unit) defining a/the intended final relative position/alignment of the bracket parts (with respect to each other) and allowing for pre-assembling the first and second/third bracket parts of the fixation bracket unit 60. In such an arrangement, in particular, said at least one recess and said fastening means 66 preferably define a swivel axis 67 for a folding mechanism according to the present disclosure. Preferably, in such an arrangement, the fastening means 66 are arranged in vertical direction (z), and the interconnecting means 68 resp. the pretensioning means 65.1 are arranged in horizontal direction, wherein the respective alignment can be predefined by means of the fixation bracket unit. According to one advantageous embodiment, the pretensioning means 65.1 and the interconnecting means 68 can apply at the same recess and these means resp. these functions can even be provided by one single element or unit, e.g. a screw (preferably including a counter nut).

[0047] The present invention further provides for favourable fixation/arrangement/alignment of a/the further cabin guide rail 16a (especially vis-à-vis the first cabin guide rail 16 which is arranged in conjunction with the counterweight guide rails on the opposite side of the cabin) with respect to the lift shaft wall(s), especially also within a/the pit 4 of the lift shaft 1, namely by means of fixation units 70 coupling to/with the further cabin guide rail 16a. In particular, each fixation unit 70 exhibits a first part 71 and a second part 72, wherein a/the further coupling 74 (for coupling the further cabin guide rail 16a) preferably is provided at only one of the first and second parts, especially with said coupling 74 exhibiting similar features as the first and second couplings 64, 65 described above, especially comprising pretensioning means 74.1 exhibiting at least one pretensioning element 74.3 (especially force-fitting pretensioning element), and the first and second parts 71, 72 exhibit recesses for applying fastening means 76 interconnecting said first and second parts 71, 72, and at least one of the first and second parts 71, 72 (preferably the other one not including the further coupling 74) provides for recesses for applying fixation means 2 configured for interacting with a lift shaft wall.

[0048] The pretensioning means resp. the corresponding recesses provided within the structure of the respective fixation (bracket) unit also define a/the coupling point/position C1 (cf. Fig. 4B, 4C, 6A, especially referring to the guide rail's centre). Preferably, the fixation unit's pretensioning means are of similar type as the fixation bracket unit's pretensioning means.

[0049] Configuring the fixation unit 70 based on at least two parts (first part 71, second part 72) also allows for including/implementing assembly tolerance in at least one spatial direction in quite easy and practical manner, especially by designing the first and second parts 71, 72 in the form of L-profiles.

[0050] Each fixation bracket unit 60 and each fixation unit 70 is preferably fixed to the lift shaft wall by means

of at least one fixation means 2 (especially anchor bolts coupling with cracked or uncracked concrete of the lift shaft wall and/or with a support beam or any kind of support rail provided within the wall).

[0051] Within the pit 4 of the lift shaft 1, a buffer assembly 80 (especially one single buffer mounted on a support column) allows for providing security functionality in context with absorption of the cabin with respect to the ground.

[0052] In the following, it is referred to each of the figures more specifically.

[0053] Fig. 1A, 1B reveal an advantageous configuration of the fixation bracket units 60 exhibiting three bracket parts 61, 62, 63, wherein the fixation means 2 provide for fixation by pressing the respective face side of the second and third bracket parts 62, 63 to a/the first fixing plane E1 (fixation force applied in (only one) horizontal direction).

[0054] Fig. 2 shows positions and alignment of some of the components of a/the elevator arrangement 10 according to the present disclosure.

[0055] Referring to Fig. 2, it should be noted that the drive unit is arranged above the cabin guide rail, i.e., the (eccentric) position of the cabin guide rail(s) 16, 16a does directly not affect/influence the relative position of the drive unit resp. of a/the belt drive (since the cabin guide rail ends below the drive).

[0056] Fig. 3 illustrates coupling functionality of the fixation bracket units 60 with respect to three guide rails, wherein the respective fixation bracket unit 60 is fixed to a/the wall (not shown) only in one single fixing plane (especially by only two fixation means 2 applied in only two fixation points).

[0057] Fig. 4A, 4B, 4C show components of the fixation bracket unit 60 in more detail. The first coupling 64 is provided by the first bracket part 61, and the respective second coupling 65 is provided by the respective second or third bracket part 62, 63 in conjunction with the first bracket part 61, especially in conjunction with the respective receiving section 61.1.

[0058] Fig. 5 shows a plurality of fixation bracket units 60 being arranged in the form of a stack or bundle (e.g. comprising an appropriate number of fixation bracket units 60 for assembling/mounting the guide rails within the whole lift shaft), wherein each fixation bracket unit 60 is pre-assembled by means of fastening means 66 being fastened at a/the swivel axis 67.

[0059] Fig. 6A, 6B, 6C show components of the fixation units 70 in more detail; the respective fixation unit 70 is configured for fixing a further cabin guide rail (not shown) especially in an arrangement vis-à-vis the (first) cabin guide rail 16 which is fixed by means of the fixation bracket units 60. Preferably, the fixation units 70 exhibit coupling means 74 which are of same/similar configuration as the coupling means 64 provided at the respective fixation bracket unit 60. Fig. 6C reveals some of the constructive characteristics of the fixation units 70. Based on the configuration in two parts 71, 72, at least the fol-

lowing dimensions can be predefined within quite a great range, in order to allow for assembly tolerances:

predefinable distance x1 between the wall and the guide rail coupling interface;

first extension/position z1 in height, referring to the vertical distance between the guide rail coupling interface and an intermediate plane between the first and second parts;

second extension/position z2 in height, referring to the vertical distance between the guide rail coupling interface and the fixation point at the wall;

[0060] Fig. 7A, 7B show use of a fixation bracket unit coupling guide and also providing for routing and supporting at least one cable or conduct. Fig. 7B shows, in detail, retainer plates 69 providing for routing and supporting at least one cable or conduct by means of the fixation bracket unit. In particular, the retainer plates 69 can be fastened to the fixation bracket unit by means of screws or the like, and the cable or conduct can be attached to the retainer plates 69.

[0061] Fig. 8A, 8B, 8C show a plurality of fixation bracket units 60 as well as a plurality of fixation units 70, each coupling a cabin guide rail 16, 16a, wherein the fixation (bracket) units 60, 70 further provide for fixation of the guide rails to the ground (floor) within the pit 4 of the lift shaft 1. In particular, each fixation (bracket) unit 60, 70 provides for a second fixing plane E2 (which is a horizontal plane) resp. for a bearing/supporting surface coupling with the second fixing plane E2. Fig. 8A, 8B, 8C respectively also shows an oil collector 3 coupled to the respective guide rail and being arranged at a/the lower end of the respective guide rail. As can be seen in Fig. 8A, the fixation bracket units and the fixation units allow for fixing the guide rails both on a first side 1.1 (especially wall) of the lift shaft and on a further side (vis-à-vis) of the lift shaft. Fig. 8A, 8B, 8C also reveal that the fixation bracket units and the fixation units allow for fixing the guide rails both in/to a first fixing plane E1 (especially yz-plane) and in/to a second fixing plane E2 (especially xy-plane).

[0062] Advantageously, the buffer assembly 80 shown in Fig. 8A is provided in the form of one single buffer mounted on a support column made of a pipe of bended sheet metal (e.g. galvanized, 3mm). Any clips for mounting can be chosen in conformance with the mounting techniques described in context with the fixation (bracket) units according to the present disclosure.

List of reference signs

[0063]

- | | |
|-----|--|
| 1 | lift shaft |
| 1.1 | side (especially wall) of the lift shaft |
| 1.2 | further side (especially wall) of the lift shaft (vis-à-vis) |

2 fixation means, especially anchor bolt
 3 oil collector
 4 pit
 5 counterweight
 10 elevator arrangement
 11 cabin (car)
 12 drive unit
 15 traction means, especially at least one belt, preferably at least two belts
 16 cabin guide rail (guide rail for cabin/car)
 16a further cabin guide rail (vis-à-vis)
 17 guide rail(s) for counterweight
 60 fixation bracket unit
 60.1 first side of the fixation bracket unit (especially outer side)
 60.2 second side of the fixation bracket unit (especially inner side)
 61 first part of fixation bracket unit (first bracket part)
 61.1 receiving section for counterweight guide rail
 62 second part of fixation bracket unit (second bracket part)
 63 third part of fixation bracket unit (third bracket part), preferably similar to second part
 64 first coupling (for coupling the cabin guide rail)
 64.1 pretensioning means
 64.3 pretensioning element, especially force-fitting pretensioning element
 65 second coupling (for coupling the counterweight guide rail)
 65.1 pretensioning means
 65.3 pretensioning element, especially force-fitting pretensioning element
 66 fastening means
 67 swivel axis for folding mechanism
 68 interconnecting means for interconnecting parts of the fixation bracket unit
 69 retainer plate
 70 fixation unit
 71 first part of fixation unit
 72 second part of fixation unit
 74 further coupling (for coupling the further cabin guide rail)
 74.1 pretensioning means
 74.3 pretensioning element, especially force-fitting pretensioning element
 76 fastening means
 80 buffer assembly, especially one single buffer mounted on support column
 C1 coupling point/position especially referring to the guide rail's centre
 E1 first fixing plane (especially yz-plane)
 E2 second fixing plane (especially xy-plane)
 F1 fixing point
 x first horizontal direction
 x1 predefinable distance between wall and coupling interface
 y cross direction (second horizontal direction orthogonal to first horizontal direction)

z1 first extension/position in height
 z2 second extension/position in height

5 Claims

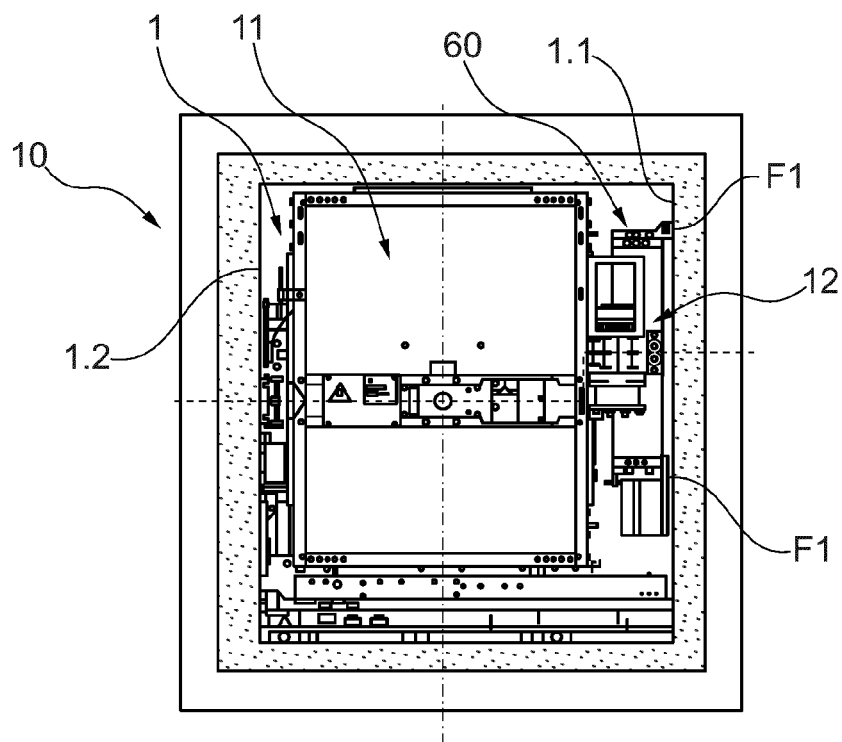
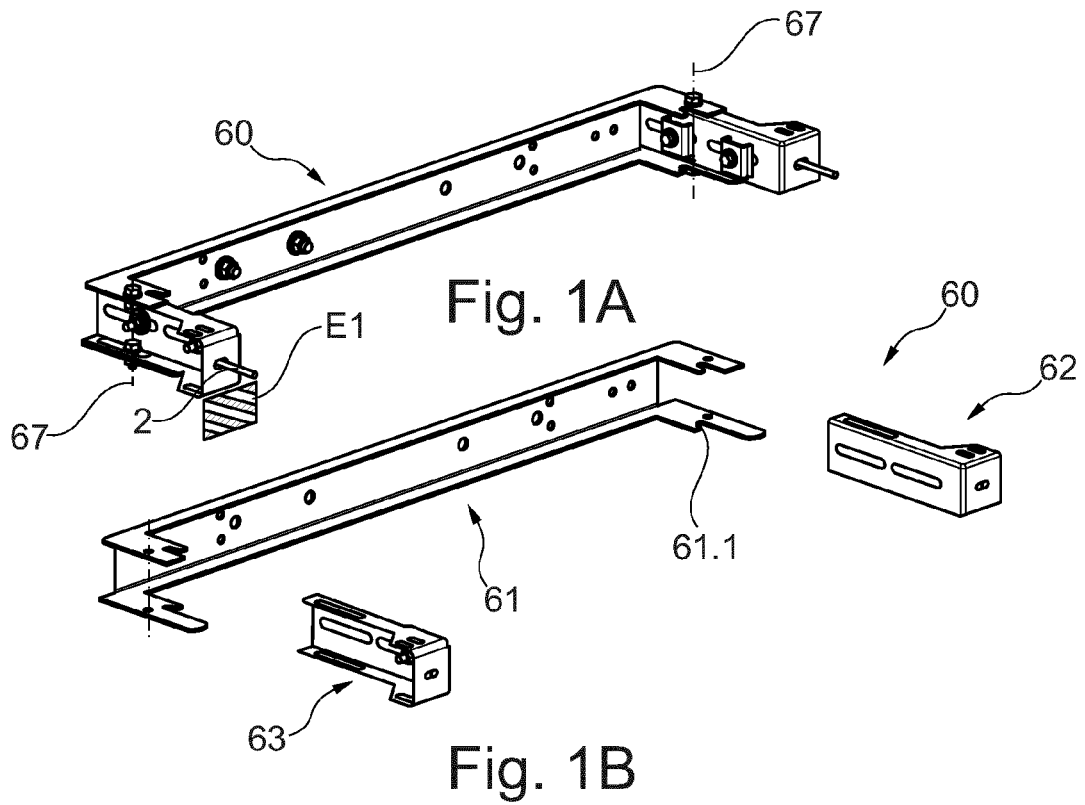
1. Elevator arrangement (10) exhibiting at least one cabin (11) for a lift shaft and at least one drive unit (12), wherein the at least one cabin (11) is coupled with the drive unit (12) by means of at least one traction means (15) interacting with the drive unit (12), wherein the at least one cabin is guided by means of at least one cabin guide rail (16), wherein the elevator arrangement (10) exhibits at least one guide rail (17) for at least one counterweight, wherein the elevator arrangement (10) exhibits a plurality of fixation bracket units (60) coupling both the cabin guide rail (16) and the at least one counterweight guide rail (17) for fixation to at least one side of the lift shaft (1) each in a specific/individual height position within the lift shaft in at least one fixing point (F1), wherein the respective fixation bracket unit (60) is configured for predefining the cabin guide rail's cross position with respect to the counterweight guide rail's position(s), wherein the respective fixation bracket unit (60) is configured for predefining the cabin guide rail's lateral distance with respect to the counterweight guide rail's position(s).
2. Elevator arrangement (10) according to claim 1, wherein the respective fixation bracket unit (60) exhibits at least one receiving section (61.1) for receiving and positioning the respective counterweight guide rail (17) in said predefined lateral distance, especially an undercut or an indentation, wherein the receiving section (61.1) preferably is configured for predefining said lateral distance of the cabin guide rail (16) by form-fit.
3. Elevator arrangement (10) according to any of the preceding claims, wherein the respective fixation bracket unit (60) consists of bending parts which can be folded into one another, especially in a preassembled state, especially from laterally outside to the inside.
4. Elevator arrangement (10) according to any of the preceding claims, wherein the respective fixation bracket unit (60) exhibits a U-shape provided by a first bracket part (61) and by two arms (62, 63) and consists of three parts which can be folded into one another.
5. Elevator arrangement (10) according to any of the preceding claims, wherein the respective fixation bracket unit (60) consists of parts which can be folded into one another, wherein the respective fixation bracket unit (60) exhibits fastening means (66) which

- are arranged and configured such that a/the swivel axis (67) for a/the folding mechanism of parts of the fixation bracket unit (60) is defined by the fastening means; and/or wherein the respective fixation bracket unit (60) consists of parts which can be folded into one another, wherein the respective fixation bracket unit (60) exhibits fastening means 66() which respectively interact with an elongated hole provided in arms (62, 63) of the respective fixation bracket unit (60); and/or wherein the respective fixation bracket unit (60) exhibits fastening means (66) which define a/the swivel axis (67) for a/the folding mechanism, wherein the fastening means remain mounted when pretensioning means (65.1) are to be mounted for coupling the respective counterweight guide rail (17); and/or wherein pretensioning means (65.1) provided for coupling the respective counterweight guide rail also provide for interconnecting means (68) for interconnecting parts of the fixation bracket unit (60).
6. Elevator arrangement (10) according to any of the preceding claims, wherein in a top view in vertical direction, in intended arrangement, the respective fixation bracket unit (60) exhibits a U-shape, wherein the respective fixation bracket unit (60) is configured for coupling the cabin guide rail (16) on a first side (60.1) of the fixation bracket unit (60) and for coupling the counterweight guide rail(s) on a second side (60.2) of the fixation bracket unit (60), wherein the respective fixing point preferably is arranged laterally outwards the counterweight guide rail(s).
 7. Elevator arrangement (10) according to the preceding claim, wherein the respective fixation bracket unit (60) is configured for providing/allowing assembly tolerance in at least one spatial direction, especially by at least 25% of distance variation preferably in a/the horizontal direction orthogonal to the cross direction, especially by means of elongated holes and/or oversized boreholes; and/or wherein the respective fixation bracket unit (60) is configured for being fixed to a/the wall of the lift shaft by only one single fixation means, on each side resp. at each fixing point, especially by absolutely two fixation means.
 8. Elevator arrangement (10) according to any of the preceding claims, wherein the respective fixation bracket unit (60) resp. its constituent components is/are made of sheet metal material, especially galvanized sheet metal e.g. having a thickness of 2mm; and/or wherein the respective fixation bracket unit (60) consists of bending parts, especially of only three bending parts, namely a U-shaped centre part (61), a first arm (62), a second arm (63) preferably being similar to the second part; and/or wherein the respective fixation bracket unit (60) is symmetric with respect to the cross direction and preferably also with respect to the vertical direction, especially with respect to the position of cut outs predefining the cabin guide rail's cross position with respect to the counterweight guide rail's position.
 9. Elevator arrangement (10) according to any of the preceding claims, wherein a/the first coupling (64) of the respective fixation bracket unit (60) for coupling the cabin guide rail (16) is defined by pretensioning means (64.1) defining the position of at least one pretensioning element pressing the cabin guide rail (16) to the fixation bracket unit (60), especially such that the coupling is twist-proof against twisting of the cabin guide rail (16) along its longitudinal axis; and/or wherein a/the second coupling (65) of the respective fixation bracket unit (60) for coupling the counterweight guide rail is defined by pretensioning means (65.1) defining the position of at least one pretensioning element (65.3) pressing the counterweight guide rail to the fixation bracket unit (60), especially such that the coupling is twist-proof against twisting of the cabin guide rail (16) along its longitudinal axis; and/or wherein the respective fixation bracket unit (60) is configured for preassembling at least one pretensioning means or pretensioning element of the second coupling, especially by providing at least one elongated hole or oversized borehole for a further pretensioning means or pretensioning element of the second coupling.
 10. Elevator arrangement (10) according to any of the preceding claims, wherein the elevator arrangement (10) exhibits two counterweight guide rails, wherein the respective fixation bracket unit (60) is configured for coupling the cabin guide rail (16) and both counterweight guide rails for fixation to the at least one side of the lift shaft, wherein the respective fixation bracket unit (60) is configured for predefining the cabin guide rail's cross position with respect to the positions of both counterweight guide rails, especially an eccentric cabin guide rail's cross position which is arranged eccentrically with respect to half the cross distance between the counterweight guide rails; and/or wherein the respective fixation bracket unit (60) exhibits at least one cut out predefining the cabin guide rail's cross position with respect to the counterweight guide rail's position.
 11. Elevator arrangement (10) according to any of the preceding claims, wherein the respective fixation bracket unit (60) defines at least two fixing points in two fixing planes which extend orthogonally with respect to each other, especially respectively at both free ends of the fixation bracket unit (60); and/or wherein the respective fixation bracket unit (60) provides for functionality of routing and supporting at least one cable or conduct, especially by means of

at least one retainer plate which is fastened at one part of the fixation bracket unit (60), especially at a/the first bracket part.

12. Elevator arrangement (10) according to any of the preceding claims, wherein the elevator arrangement (10) further exhibits a plurality of fixation units (70) each configured for directly fixing a further cabin guide rail (16a) to at least one further side of the lift shaft each in a specific/individual height position within the lift shaft in at least one fixing point (F1), especially comprising two parts respectively, namely a first L-angle profile and a second L-angle profile, wherein the respective fixation unit (70) preferably defines at least two fixing points in two fixing planes which extend orthogonally with respect to each other. 5 10 15
13. Elevator arrangement (10) according to any of the preceding claims, wherein one fixation bracket unit (60) of the plurality of fixation bracket units and optionally also one fixation unit (70) of a/the plurality of fixation units is/are arranged within a pit of the lift shaft, especially fixed at the bottom/ground of the lift shaft, thereby defining a/the starting position of the respective guide rail; and/or wherein an L-angle profile of one of the fixation units (70) of a/the plurality of fixation units is used for fixing a/the further cabin guide rail (16a) at the bottom/ground within the pit of the lift shaft. 20 25 30
14. Fixation bracket unit (60) for an elevator arrangement (10) according to any of the preceding claims, wherein the fixation bracket unit (60) is processed by providing a first bracket part (61) made of sheet metal material and second and third bracket parts (62, 63) made of sheet metal material, wherein the second and third bracket parts are similar or at least exhibit a mirror-inverted design, wherein the respective fixation bracket unit (60) is configured for predefining both the cabin guide rail's cross position and lateral distance respectively with respect to the counterweight guide rail's position(s), wherein these three bracket parts can be fastened together in pairs, especially such that fastening means (66) respectively provide for a swivel axis (67) for a folding mechanism ensuring a folded arrangement of at least two or three parts of the fixation bracket unit (60). 35 40 45
15. Use of a plurality of fixation bracket units (60) for fixing a cabin guide rail (16) and two counterweight guide rails to at least one side of a lift shaft of an elevator arrangement (10) in at least two fixing points by coupling both the cabin guide rail (16) and the counterweight guide rails respectively in a specific/individual height position within the lift shaft (1) by means of first and second couplings (64, 65), wherein both the cabin guide rail's cross position and the 50 55

lateral distance are defined with respect to the counterweight guide rails' positions by means of the respective fixation bracket unit (60), especially use of said fixation bracket units in an elevator arrangement (10) according to any of claims 1 to 13.



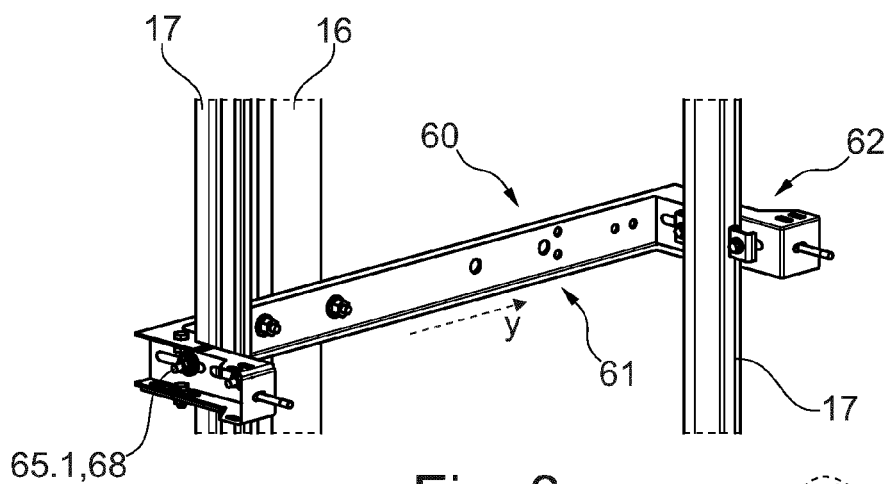


Fig. 3

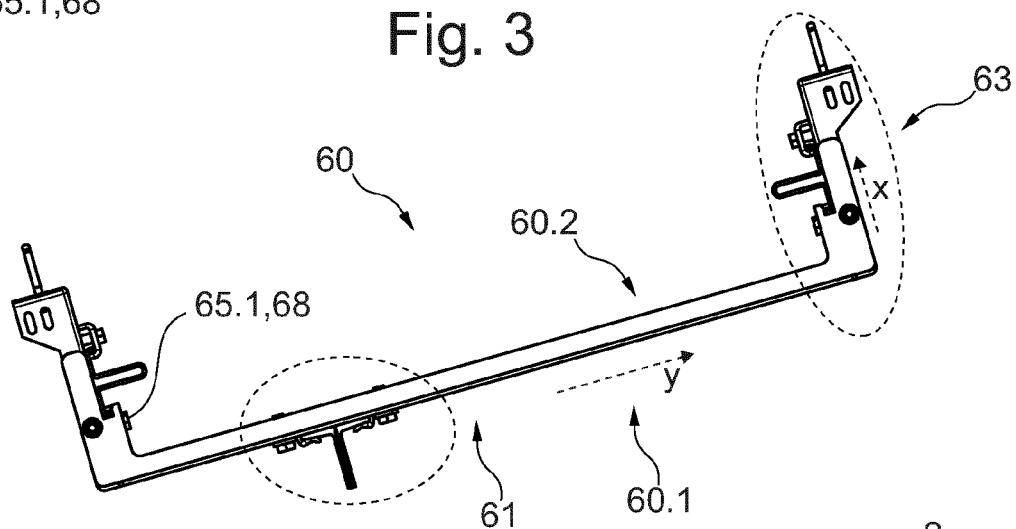


Fig. 4A

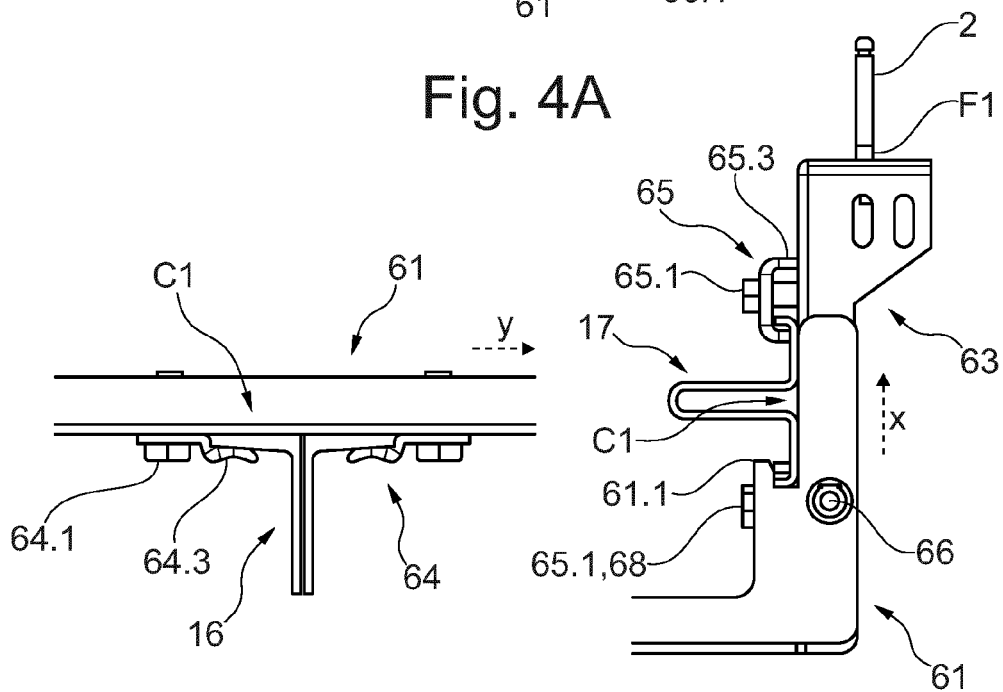
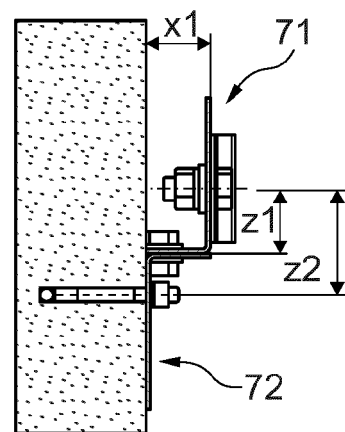
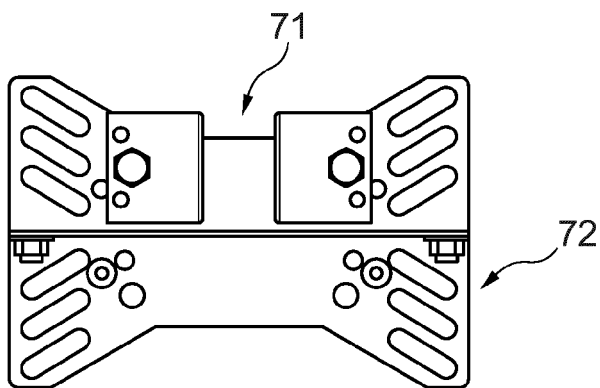
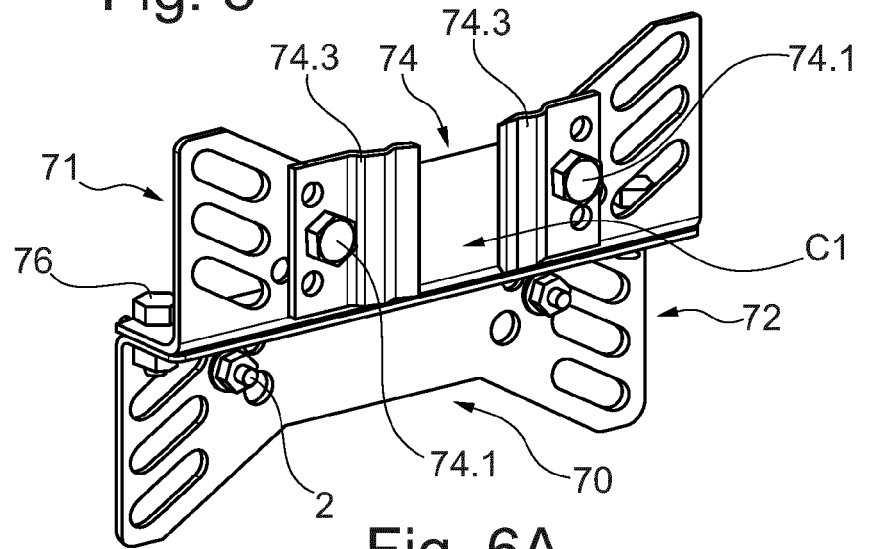
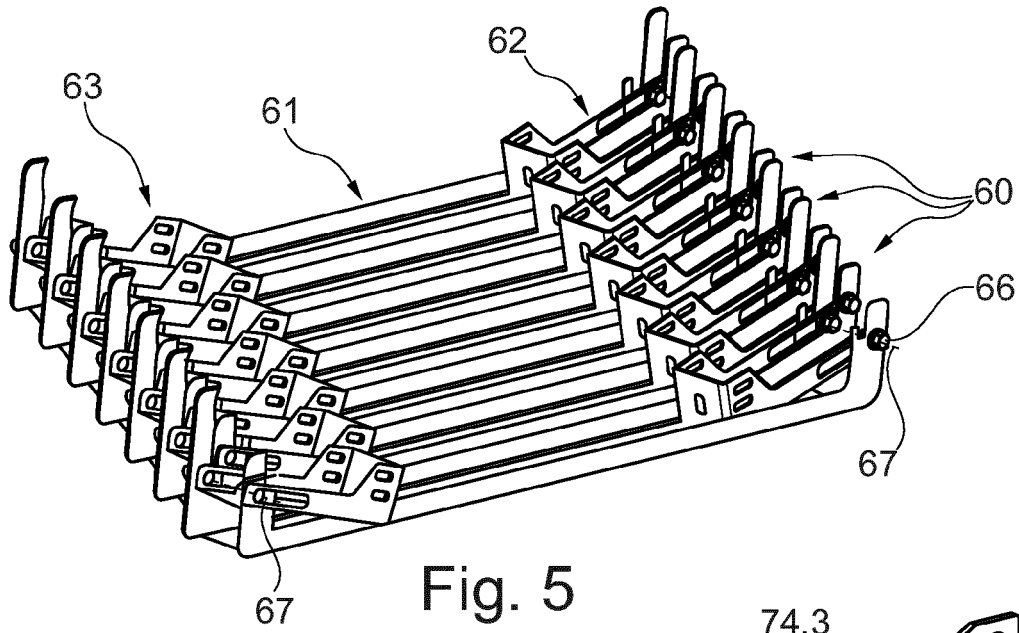


Fig. 4B

Fig. 4C



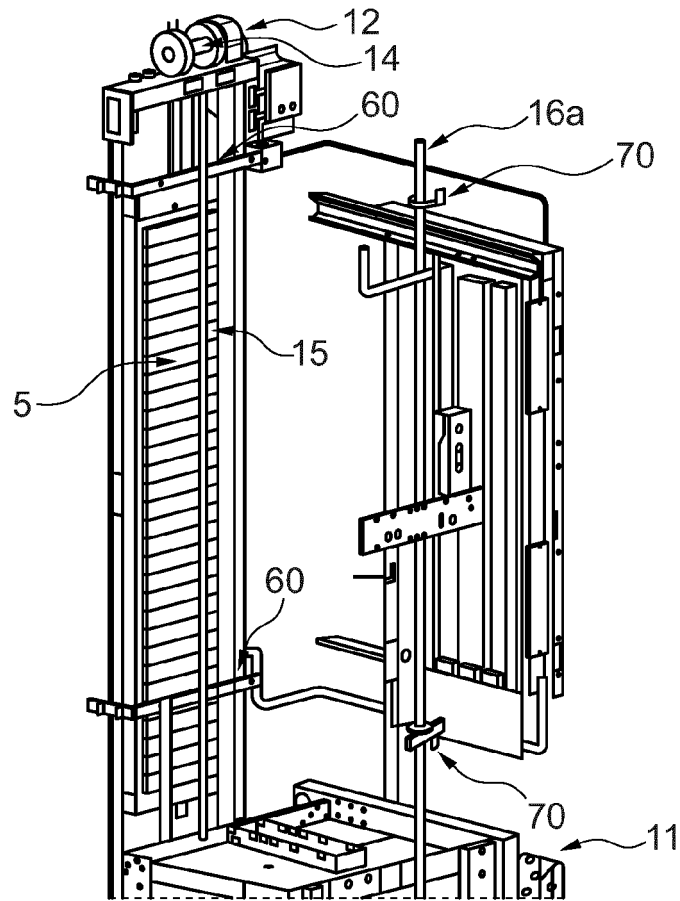


Fig. 7A

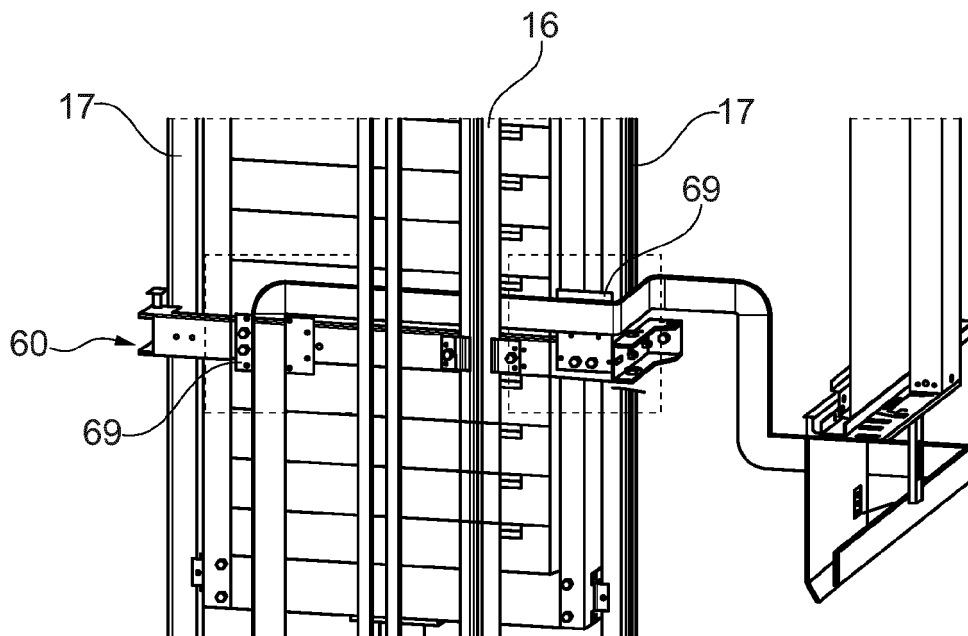


Fig. 7B

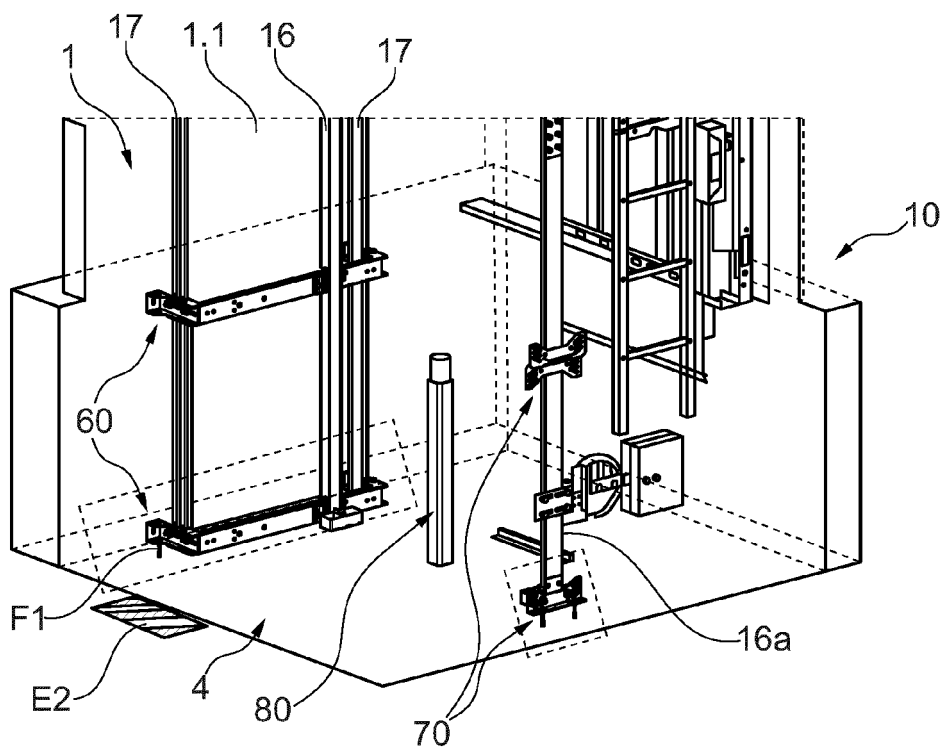


Fig. 8A

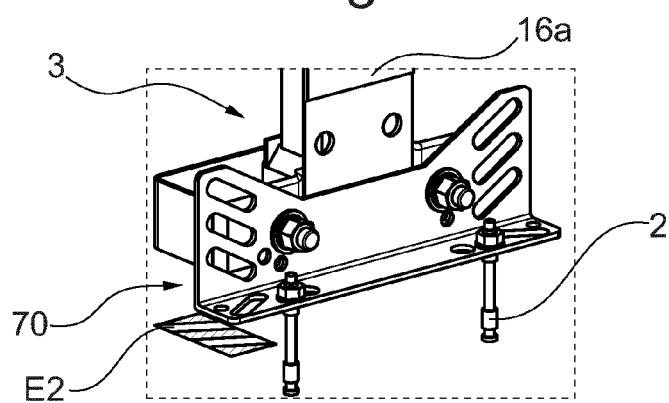


Fig. 8B

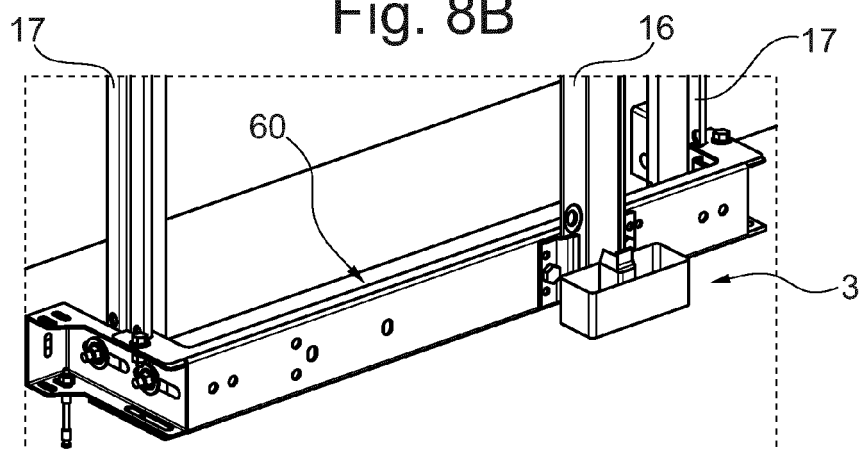


Fig. 8C



EUROPEAN SEARCH REPORT

Application Number

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Y	* column 2, lines 19 - 59 *	12	
A	* figures 1, 2 *	3-5	
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			B66B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 24 February 2023	Examiner Dogantan, Umut H.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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24-02-2023

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