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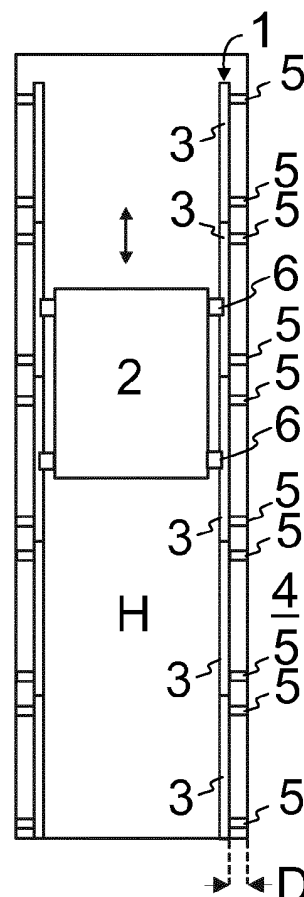
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(54) **An elevator guide rail arrangement and a bracket**

(57) The invention relates to an elevator guide rail arrangement having a vertical guide rail line (1) for guiding a vertically movable elevator unit (2) in a hoistway (H), the guide rail line (1) having one or more vertically oriented guide rail sections (3) mounted to take support at least in transverse direction from a vertical mounting base (4) with at least one bracket (5), the bracket (5) comprising a first fixing element fixed to the mounting base (4) and a second fixing element against which the guide rail section (3) is supported, said fixing elements being fixed to each other. The first fixing element comprises a vertically planar first plate portion with a vertically planar back face fixed against a vertically planar section of the mounting base (4), and a second plate portion forming a lateral edge of the first fixing element and protruding from the first plate portion towards the front side of the first plate portion, and the second fixing element comprises a vertically planar third plate portion parallel with and in front of the first plate portion, the third plate portion having a front face against which the vertically oriented guide rail section is supported. The second fixing element is fixed to the second plate portion of the first fixing element.

**Fig. 1**



## Description

### Field of the invention

[0001] The invention relates to an elevator and to mounting of the guide rails thereof. The elevator is particularly meant for transporting passengers and/or goods.

### Background of the invention

[0002] Elevators have an elevator car moving in a vertical hoistway. In addition, elevators usually have a counterweight connected to the elevator car and moving in the hoistway. These elevator units are each guided with at least one guide rail line located in the hoistway. Typically, each guide rail line has plurality of vertically oriented guide rail sections placed end-to-end on top of each other. The guide rail sections are mounted to take support in transverse direction from a mounting base, such as hoistway wall structures, with brackets. Each elevator unit is provided with a guide, such as a roller-guide or a sliding guide, which can move along the guide rail line and take support in transverse direction from one or more guide rail lines as specified above. In this way, each elevator units can take support in transverse direction from said mounting base via the guide rail line. The position of the guide rail line relative to its mounting base affects strongly the space efficiency of the elevator. If the elevator guide rail line can be placed close to its mounting base the running clearance between the elevator unit and said mounting base can be small. This will improve the space-efficiency of the elevator. A drawback of the known elevators has been that the guide rail lines have not been very close to the mounting base. Accordingly, their space efficiency has not been maximal. In cases where the guide rail line needs to be firmly supported in transverse direction, the brackets need to be dimensioned strong. The size and shape of the brackets has necessitated that the guide rail line is mounted at a distance from the mounting base. Also, the size of the fixing means, as well as the working space reserved for the fixing procedure have all required additional space. For this reason, space efficiency of the elevator has not been optimal.

### Brief description of the invention

[0003] The object of the invention is, inter alia, to solve previously described drawbacks of known solutions and problems discussed later in the description of the invention. The object of the invention is to introduce an elevator guide rail arrangement facilitating space-efficiency of the elevator and yet having a firmly mounted guide rail line. In particular the object is to facilitate mounting a guide rail line of an elevator firmly close to its mounting base. Embodiments are presented, inter alia, where a guide rail line of an elevator can be mounted firmly close to its

mounting base which is a vertical wall of the hoistway. Furthermore, embodiments are presented, which facilitate easy procedure for installing the bracket. Furthermore, embodiments are presented, which facilitate adjustability of the distance of the guide rail section from the mounting base.

[0004] It is brought forward a new elevator guide rail arrangement. In a preferred embodiment, the elevator guide rail arrangement comprises a vertical guide rail line for guiding a vertically movable elevator unit in a hoistway, the guide rail line having one or more vertically oriented guide rail sections mounted to take support at least in transverse direction from a vertical mounting base with at least one bracket, the bracket comprising a first fixing element fixed to the mounting base and a second fixing element against which the guide rail section is supported, said fixing elements being fixed to each other. The first fixing element comprises a vertically planar first plate portion with a vertically planar back face fixed against a vertically planar section of the mounting base, and a second plate portion forming a lateral edge of the first fixing element and protruding from the first plate portion towards the front side of the first plate portion, and the second fixing element comprises a vertically planar third plate portion parallel with and in front of the first plate portion, the third plate portion having a front face against which the vertically oriented guide rail section (e.g. the back face of it) is supported, and the second fixing element is fixed to the second plate portion of the first fixing element. In this way, it is facilitated mounting of a guide rail section of the guide rail line close to its mounting base. In a preferred embodiment, the relative position between the first fixing element and the second fixing element is adjustable in back-front direction. In this way the distance between the guide rail section and the mounting base can be adjusted to be optimal during installation. For this purpose, the second fixing element is fixed to the second plate portion of the first fixing element with adjustable fixing means providing plural possible fixing points between said second fixing element and the first fixing element, in particular between second and fourth plate portions thereof, which are displaced in back-front direction.

[0005] In a preferred embodiment, said movable elevator unit is an elevator car. Alternatively, said movable elevator unit could be a counterweight.

[0006] In a preferred embodiment, said mounting base is a vertically planar concrete wall surface of the hoistway. This type of wall can extend vertically planar a considerable portion of the hoistway height. The defined bracket structure can be easily mounted to this type of mounting base. With this configuration the movable elevator unit (e.g. car) can run very close to the hoistway wall without additional beams. Accordingly, the free space of the building can be efficiently used.

[0007] In a preferred embodiment, the second plate portion is also vertically planar. In this way, the second fixing element can be fixed to the planar side of it.

[0008] In a preferred embodiment, it comprises means

for fixing the guide rail section to the third plate portion which extend from the front side to the back side of the third plate portion. Preferably, the first fixing element, in particular the first plate portion comprises an opening for receiving parts of said fixing means. In this case said means can extend at least partially into an opening comprised in the first fixing element, in particular into an opening comprised in the first plate portion. In this way, the guide rail section can be fixed firmly to the third plate portion and yet the third plate portion can be placed very close to the first plate portion in spite of said fixing means. Preferably, said means comprise a nut-bolt -type fixing means, and a nut and/or a part of a bolt of the fixing means extends at least partially into an opening comprised in the first fixing element, in particular into an opening comprised in the first plate portion. Said opening preferably extends through the first fixing member. Thus, said opening can receive larger parts of the fixing means.

**[0009]** In a preferred embodiment, the arrangement comprises means for fixing the first plate portion to the mounting base which means extend from the back side to the front side of the first plate portion. Preferably, the second fixing element, in particular the third plate portion, comprises an opening for receiving parts of said fixing means. In this way, the first plate portion can be fixed firmly to the mounting base and yet the third plate portion can be placed very close to the first plate portion in spite of said fixing means. In this case, said means can extend at least partially into an opening comprised in the second fixing element, in particular into an opening comprised in the third plate portion. Preferably, said means comprise a nut-bolt -type fixing means, and a nut and/or a part of a bolt of the fixing means extends at least partially into an opening comprised in the second fixing element, in particular into an opening comprised in the third plate portion. The second fixing element may alternatively or additionally comprise such opening also elsewhere than in the third plate portion, such as in the fifth plate portion as will be illustrated later. In any case, said opening preferably extends through the first fixing member. The opening preferably is large enough to allow access through it to the fixing means which fix the first plate portion to the mounting base. In this way, the fixing means can be inspected or even tightened through the hole.

**[0010]** In a preferred embodiment, the second fixing element comprises a vertically planar fourth plate portion parallel to the vertically planar second plate portion, and the fourth plate portion is fixed against the second plate portion of the first fixing element. In this way, the fixing elements can be fixed to each other firmly and space efficiently. The vertically planar fourth plate portion protrudes from the vertically planar third plate portion towards the front side or the back side of the third planar plate portion. In the first case, the fixing elements can be fixed closer to each other.

**[0011]** In a preferred embodiment, vertically planar fourth plate portion and the vertically planar second plate portion each comprise an opening, and the vertically pla-

nar fourth plate portion and the vertically planar second plate portion are fixed against each other with a fixing element of a fixing means, such as a bolt, extending through said openings.

**[0012]** In a preferred embodiment, at least one of the openings of the fourth vertically planar plate portion and the second vertically planar plate portion is elongated in brackets back-front direction. In this way adjustability of relative position of the first and second fixing means can be provided because in this way plural possible fixing points between said second and fourth plate portions are provided, which plural possible fixing points are displaced in back-front direction.

**[0013]** In a preferred embodiment, the first fixing element comprises a vertical bend between the first plate portion and the second plate portion.

**[0014]** In a preferred embodiment, the second fixing element comprises a vertical bend between the third plate portion and the fourth plate portion.

**[0015]** In a preferred embodiment, the second fixing element comprises a vertical bend between the third plate portion and the fifth plate portion.

**[0016]** In a preferred embodiment, said first fixing element is a bent metal plate. Thus, a fixing element with the shape as defined, is easy to make. Also, plate-like material, especially when metallica, can provide a strong structure space-efficiently in cross-direction. Especially, plate can be formed to have a great vertical length without reducing its space efficiency in cross-direction.

**[0017]** In a preferred embodiment, said second fixing element is a bent metal plate.

**[0018]** In a preferred embodiment, the second plate portion is at a right angle relative to the first plate portion. Thus, it protrudes to the side of the guide rail section without consuming much space. It also increases rigidity of the fixing element. In a preferred embodiment, the second fixing element comprises a vertically planar fifth plate portion parallel with and in front of the first plate portion. Preferably, the third and fifth plate portion are parallel but displaced in front-to-back direction. The vertically planar fifth plate portion is closer to the first plate portion than the third plate portion. In this way, it can be supported against the first plate portion even though the third plate portion is at a distance from the first plate portion.

**[0019]** In a preferred embodiment, the vertically planar fifth plate portion is fixed against the first plate portion. This increases the rigidity of the bracket.

**[0020]** In a preferred embodiment, the first and third plate portions are at a distance from each other. An air gap may exist between them.

**[0021]** In a preferred embodiment, the first fixing element is formed U-shaped, i.e. to have a cross-section with shape of letter U, said second plate portion forming one flank of the U-shaped first fixing element and the first plate portion forming the bottom thereof. The guide rail section is at least partly between the opposite flanks of the U-shaped first fixing element. U-shape increases rigidity of the fixing element and provides an additional

fixing place for the second fixing element. The guide rail section can be placed at least partly between said flanks which makes the arrangement very space efficient with high rigidity.

**[0022]** In a preferred embodiment, the first fixing element comprises a sixth vertically planar plate portion forming another lateral edge of the first fixing element opposite the aforementioned lateral edge, and protruding from the first plate portion towards the front side of the first plate portion, and the second fixing element is fixed also to the sixth plate portion of the first fixing element. Thus, rigidity of the fixing element is increased and an additional fixing place for the second fixing element provided. The guide rail section can be placed at least partly between the second and sixth plate portion, which makes the arrangement very space efficient with high rigidity.

**[0023]** In a preferred embodiment, the second fixing element comprises a vertically planar seventh plate portion protruding from the fifth plate portion towards the front side of the third plate portion. The vertically planar seventh plate portion is parallel to the vertically planar sixth plate portion, and the seventh plate portion is fixed against the sixth plate portion.

**[0024]** It is also brought forward a new guide rail bracket for mounting a guide rail section to take support at least in transverse direction from a vertical mounting base. In a preferred embodiment of the invention, the elevator guide rail bracket, the bracket comprises a first fixing element for being fixed to the mounting base and a second fixing element against which the guide rail section is to be supported, and means for fixing said fixing elements to each other. The first fixing element comprises a vertically planar first plate portion with a vertically planar back face for being fixed against a vertically planar section of the mounting base, and a second plate portion forming a lateral edge of the first fixing element and protruding from the first plate portion towards the front side of the first plate portion, and the second fixing element comprises a planar third plate portion having a front face against which the vertically oriented guide rail section is to be supported, and in that said fixing elements are provided for being fixed to each other by fixing the second fixing element to the second plate portion of the first fixing element such that the a third plate portion is vertically planar and parallel with and in front of the first plate portion. The benefits of the bracket are specified in context of the guide rail arrangement elsewhere in the application. Also, additional preferred features of the bracket are specified in context of the guide rail arrangement elsewhere in the application.

**[0025]** In a preferred embodiment, the relative position between the first fixing element and the second fixing element is adjustable in brackets back-front direction. For this purpose, the bracket comprises adjustable fixing means providing plural possible fixing points between said second fixing element and the first fixing element which are displaced in brackets back-front direction.

**[0026]** In a preferred embodiment, the first fixing ele-

ment, in particular the first plate portion comprises an opening for receiving parts of means for fixing the guide rail section to the third plate portion which extend from the front side to the back side of the third plate portion.

**[0027]** In a preferred embodiment, the second fixing element, in particular the third plate portion comprises an opening for receiving parts of means for fixing the first plate portion to the mounting base which extend from the back side to the front side of the first plate portion.

**[0028]** In a preferred embodiment, the second fixing element comprises a planar fourth plate portion for being fixed against the second plate portion of the first fixing element the fourth plate portion being vertically planar, and parallel to said vertically planar second plate portion when said fixing elements are fixed to each other.

**[0029]** In a preferred embodiment, vertically planar fourth plate portion and the vertically planar second plate portion each comprise an opening, and the vertically planar fourth plate portion and the vertically planar second plate portion are provided for being fixed against each other with a fixing element, such as a bolt, of a fixing means, extending through said openings. At least one of the openings is preferably elongated in brackets back-front direction.

**[0030]** In a preferred embodiment, the first fixing element is U-shaped, said second plate portion forming one flank of the U-shaped first fixing element and the first plate portion forming the bottom thereof. The sixth plate portion forms another of the flanks. The third plate portion is preferably between the opposite flanks of the U-shaped first fixing element so the guide rail section can be positioned at least partly between said flanks as well.

**[0031]** It is also brought forward a new elevator. The elevator comprises a vertically movable elevator unit and an elevator hoistway and a guide rail arrangement. The guide rail arrangement is as defined above or elsewhere in the application. The elevator hoistway as described anywhere above is preferably, but not necessarily, inside a building. The car is preferably arranged to serve two or more landings. The car preferably responds to calls from landing and/or destination commands from inside the car so as to serve persons on the landing(s) and/or inside the elevator car. Preferably, the car has an interior space suitable for receiving a passenger or passengers, and the car can be provided with a door for forming a closed interior space.

## Brief description of the drawings

**[0032]** In the following, the present invention will be described in more detail by way of example and with reference to the attached drawings, in which

Figure 1 illustrates schematically an elevator with the elevator guide rail arrangement according to the invention.

Figure 2 illustrates a guide rail bracket and a guide rail arrangement according to an embodiment of the

invention as viewed in vertical direction.

Figure 3 illustrates three-dimensionally the guide rail bracket and the guide rail arrangement of Figure 2.

Figure 4 illustrates a front view of the guide rail bracket.

Figure 5 illustrates the guide rail bracket and the guide rail arrangement of

Figure 2 in more details.

Figure 6 illustrates an alternative configuration for the guide rail bracket and the guide rail arrangement of Figures 2 to 5.

## Detailed description

**[0033]** Figure 1 illustrates an elevator according to a preferred embodiment. The elevator comprises an elevator unit 2 movable in the hoistway H guided by a guide rail line 1 located in the hoistway H. The movable elevator unit 2 is in this embodiment an elevator car 1 arranged to travel vertically. The elevator unit 2, i.e. the elevator car is provided with a guide 6, which is preferably a roller-guide or a sliding guide, which guide 6 can move along the guide rail line 1 and take support in transverse (i.e. horizontal) direction from the guide rail line 1. Each guide rail line 1 has plurality of vertically oriented guide rail sections 3 placed end-to-end on top of each other. The guide rail sections 3 are mounted to take support in transverse direction from a mounting base 4, with brackets 5. In the preferred embodiment the hoistway wall structures form said mounting base 4.

**[0034]** Figures 2-5 illustrate a preferred embodiment of the bracket 5 and the elevator guide rail arrangement. The bracket 5 is comprises a first fixing element 10 fixed to the mounting base 4 and a second fixing element 20 against which the guide rail section 3 is supported, said fixing elements 10, 20 being fixed to each other. In this way the lateral support forces for the guide rail section 3 can be taken from the mounting base 4 via the fixing elements 10 and 20. For this purpose, the guide rail section 3 is fixed to the second fixing element immovably at least in the transverse direction relative to the vertical direction. The first fixing element 10 comprises a vertically planar first plate portion 11 with a vertically planar back face fixed against a vertically planar section of the mounting base 4, such as a vertically planar wall surface of the hoistway H. The mounting base 4 is preferably a vertically planar concrete wall surface of the hoistway H. The first fixing element 10 further comprises a second vertically planar plate portion 12 forming a lateral edge of the first fixing element 10 and protruding from the first plate portion 11 towards the front side of the first plate portion 11, and thus also towards the front side of the bracket 5. The first fixing element 10 is in the preferred embodiment a bent metal plate. So as to obtain efficiently the shape as described, the first fixing element 10 comprises a vertical bend between the first plate portion 11 and the second plate portion 12. The second fixing element 20 comprises a vertically planar third plate portion

21 parallel with and in front of the first plate portion 11, the third plate portion 21 having a planar front face against which the vertically oriented guide rail section 3 is supported. The third plate portion 21 as well as at least part of the guide rail section is located beside the second plate portion 12. In the embodiment as showed in the Figures, the back face of a guide rail section with T-shaped cross section is supported against the front face of the third plate portion 21. The second fixing element 20 is fixed to said second plate portion 12 of the first fixing element 10. In this way, the second fixing element 20 can be fixed to be positioned in front of the first fixing element space-efficiently. Especially, the first plate portion 21 can in this way be fixed close to the first plate portion 11. Consequently, also the guide rail section 3 can be supported to be close to the first plate portion 11. This makes it possible to arrange the movable elevator unit 2 to run close to the mounting base 4.

**[0035]** The relative position between the first fixing element 10 and the second fixing element 10 is adjustable in back-front direction. This adjustability is illustrated in Figure 5 with a two-headed arrow. In this way the distance D between the guide rail section and the mounting base 4 can be adjusted to be optimal during installation.

**[0036]** The guide rail arrangement comprises means 25,c for fixing the guide rail section 3 to the third plate portion 21 which means 25,c extend from the front side of the third plate portion 21 to the back side of the third plate portion 21. In this way they can for example take support from the back face of the third plate portion for enabling the function of fixing the guide rail section 3. The first fixing element 10, in particular the first plate portion 11 thereof, comprises an opening 15 (illustrated in Figures 5 and 6 only with a broken line) for receiving part(s) of said fixing means 25,c. In this way, the third plate portion 21 can be placed close to the first plate portion in spite of the fixing means 25,c. It is thus possible, that, as illustrated, said means 25,c extend at least partially into an opening comprised in the first fixing element 10, in particular into said opening 15 comprised in the first plate portion 11. In the preferred embodiment, said means 25,c for fixing are a nut-bolt -type fixing means, and a nut and/or a part of a bolt of the fixing means 25 extends at least partially into the opening 15 comprised in the first fixing element 10, in particular into said opening 15 comprised in the first plate portion 11. In the preferred embodiment, said means 25,c comprise a guide rail clip c for being compressed against a side flange of the guide rail section 3.

**[0037]** The guide rail arrangement comprises means 14 for fixing the first plate portion 11 to the mounting base 4, which means 14 extend from the back side of the first plate portion 11 to the front side of the first plate portion 11. In this way they can for example take support from the front face of the first plate portion 11 for enabling the function of fixing it against the mounting base 4. The second fixing element 20, in particular the third plate portion 21, comprises an opening 29 for receiving parts of said

fixing means 14. In this way, the third plate portion 21 can be placed close to the first plate portion in spite of the fixing means 14. It is thus possible, that, as illustrated, said means 14 extend at least partially into said opening 29 comprised in the second fixing element 20, in particular into said opening 29 comprised in the third plate portion 21. In the preferred embodiment, said means 14 are a nut-bolt -type fixing means, and a nut and/or a part of a bolt of the fixing means 14 extends at least partially into an opening 29 comprised in the second fixing element 20, in particular into an opening comprised in the third plate portion 21 thereof.

**[0038]** In the following the preferred structure for fixing the second fixing element 20 to the second plate portion 12 is described. In the preferred embodiment the second fixing element 20 comprises a vertically planar fourth plate portion 22 parallel to the second plate portion 12, which second plate portion 12 is also vertically planar, and the fourth plate portion 22 is fixed against a planar side of the second plate portion 12 of the first fixing element 10. In the embodiment as illustrated, the vertically planar fourth plate portion 22 protrudes from the vertically planar third plate portion 21 towards the front side of the third planar plate portion 11, but as will be later illustrated and described related to Figure 6, the fourth plate portion could in an alternative configuration protrude from the vertically planar third plate portion 21 towards the back side of the third planar plate portion 11. The second fixing element 20 is in the preferred embodiment a bent metal plate. So as to obtain efficiently the shape as described, the second fixing element 20 comprises a vertical bend between the third plate portion 21 and the fourth plate portion 22.

**[0039]** The vertically planar fourth plate portion 22 and the vertically planar second plate portion 12 each comprise an opening 27,28 (illustrated in Figures 5 and 6 only with a broken line), and the vertically planar fourth plate portion 22 and the vertically planar second plate portion 12 are fixed against each other with a fixing element 26, which in the illustrated embodiment is as a bolt, which fixing element 26 extends through said openings 27,28. The bolt is tightened with a nut placed on opposite side of the plate portions 12,22 than the head of the bolt 26. As earlier mentioned, the relative position between the first fixing element 10 and the second fixing element 10 is preferably adjustable in brackets back-front direction. Accordingly, the position of the first fixing element 10 can be adjusted forward or backwards relative to the second fixing element 10. For this purpose, the second fixing element 20 is fixed to the second plate portion 12 of the first fixing element 10 with adjustable fixing means 26,27,28 providing plural possible fixing points between said second fixing element 20 and the second plate portion 12, in particular between aforementioned fourth plate portion 22 and the second plate portion 12, which plural possible fixing points are displaced in brackets back-front direction. In the embodiment as showed, this is implemented such that one of the openings 27,28 (in this case

the opening 27) of the fourth vertically planar plate portion 22 and the vertically planar second plate portion 12 is elongated in brackets back-front direction. Alternatively, there could be plurality of holes instead of the elongated opening 27 which would provide fixing points according to hole positions. In this way, the relative position could be adjusted by choosing a hole corresponding to desired relative position between the fixing elements 10,20. The elongated hole is however a preferred solution as it enables stepless adjustment and sliding adjustment movement between fixing elements 10,20 so as to reach the optimal relative position.

**[0040]** The second fixing element 20 comprises at the side of the third plate portion 21 a vertically planar fifth plate portion 23 parallel with and in front of the first plate portion 11. The third 21 and fifth plate portion 23 are parallel but displaced in brackets front-to-back direction. In this way, it can be supported against the first plate portion 11 even though the third plate portion 21 is at a distance from the first plate portion 11. This will increase the rigidity of the bracket 5. In the embodiment as illustrated in Figures 1-5 the vertically planar fifth plate portion 23 is fixed against the first plate portion 11. An air gap A may exist between the first and third plate portions. In this way, a space for accommodating parts of the fixing means 14 is provided. Presence of the displaced fifth plate portion 23 is not necessary, because the left (referring to Figure 2) side of the second fixing element 20 could be fixed to the first fixing element 10 also without said displacement or even left unfixed. So as to obtain efficiently the displaced shape as described, the second fixing element 20 comprises a vertical bend between the third plate portion 21 and the fifth plate portion 23.

**[0041]** In addition to the previously described means 14 for fixing the first plate portion 11 to the mounting base 4 there are also another means 14' for fixing the first plate portion 11 to the mounting base 4, which means 14' extend from the back side of the first plate portion 11 to the front side of the first plate portion 11. In this way they can for example take support from the front face of the first plate portion 11 for enabling the function of fixing it against the mounting base 4. Said means 14' are at a horizontal distance from the aforementioned means 14. In this way, the first fixing element 10 is very firmly secured to the mounting base 4. The second fixing element 20, in particular the fifth plate portion 23, comprises an opening 29' for receiving parts of said fixing means 14'. In this way, the fifth plate portion 23 can be placed close to the first plate portion in spite of the fixing means 14'. It is thus possible, that, as illustrated, said means 14' extend at least partially into said opening 29' comprised in the second fixing element 20, in particular into said opening 29' comprised in the fifth plate portion 23. In the preferred embodiment, said means 14' are a nut-bolt -type fixing means, and a nut and/or a part of a bolt of the fixing means 14' extends into an opening 29' comprised in the second fixing element 20, in particular into an opening comprised in the third plate portion 23 thereof.

Said fixing means 14' extends actually even through said opening 29', which makes them operable even when the second fixing element 20 is at place. Said means 14 and 14' are each in the preferred embodiment a nut-bolt-type fixing means the bolt of which extends in an opening formed in the mounting base 4.

**[0042]** It is preferable, that the first fixing element 10 is formed to have a cross-section with shape of letter U, because in this way, the rigidity of the bracket is increased. Also, the guide rail section 3 can be placed between the opposite flanks of the U-shaped first fixing element 10 in a very compact way. As illustrated in Figures 1-6, is formed to have a cross-section with shape of letter U and the first fixing element 10 comprises a vertically planar sixth plate portion 13 forming another lateral edge of the first fixing element opposite the aforementioned lateral edge, and protruding from the first plate portion 11 towards the front side of the first plate portion 11. In the configuration of Figures 1,2,3 and 5 the guide rail section 3 is partly between the second and sixth plate portions 12,13 which form the opposite flanks of the U-shaped first fixing element 10. The second fixing element 20 is fixed also to the sixth plate portion 13 of the first fixing element 10. Thus, the first and second fixing elements are firmly fixed to each other. This configuration also provides an increased rigidity for the bracket 5. So as to enable the fixing, the second fixing element 21 comprises a vertically planar seventh plate portion 24 protruding from the fifth plate portion 23 towards the front side of the third plate portion 21. The vertically planar seventh plate portion 24 is parallel to the vertically planar sixth plate portion 13, and the seventh plate portion 24 is fixed against the sixth plate portion 13.

**[0043]** Preferably, the second plate portion 12 is at a right angle (90 deg) relative to the first plate portion 11 as illustrated in Figures. Correspondingly, it is preferable the fourth plate portion 22 is at a right angle relative to the third plate portion 21. In this way, the bracket 5 is compact and rigid. These angles could be, however, chosen differently. For instance, the angle could be chosen larger (e.g. up to 120 deg) if additional space is needed between plate portions 12,22 and the guide rail section 3.

**[0044]** Figure 6 illustrates another embodiment of the elevator guide rail arrangement. It is otherwise similar to that of Figure 5, but in contrast to Figure 5 the second fixing element 20 has been flipped around a back-front-directional axis and left-right-directional axis. The result in structure is that the vertically planar fourth plate portion 22 protrudes from the vertically planar third plate portion 21 towards the back side of the third planar plate portion 11. Also in this embodiment, the second fixing element 20 is fixed also to the sixth plate portion 13 of the first fixing element 10. Thus, the first and second fixing elements are firmly fixed to each other. This configuration also provides an increased rigidity for the bracket 5. So as to enable the fixing of the second fixing element 20 to the sixth plate portion 13, the second fixing element 21 comprises a vertically planar seventh plate portion 24

protruding from the fifth plate portion 23 towards the back side of the third plate portion 21. As a result of the different (flipped) attitude, the second fixing element 20 is located at a greater distance from the first fixing element 10 than in the embodiment of Figure 5. Accordingly, the air gap A is in this embodiment larger than the embodiment of Figure 5 and the fifth plate portion is not supported against the first plate portion 11 but at a distance from it. This embodiment enables positioning of the guide rail section 3 at a greater distance D from the mounting base than the embodiment as illustrated in Figure 5. The possibility to flip the second fixing element as described above provides another adjusting range for said distance D. When the bracket 5 is further provided with adjustability in the fixing position as enabled by the elongated opening 27, the bracket 5 is greatly variable to different needs. Adjustability further may facilitate easier installation as it makes possible to assemble the complete configuration with low level of accuracy and the position of the guide rail section 3 can be set to have the specific distance D only after all pieces are already connected together.

**[0045]** In the application the term vertically planar plate portion means a plate portion which is planar and the plane of the portion in question is vertical. In the application it is referred to the front side and back side of the bracket and to the front side and back side of the first and third plate portions. It is to be understood the back-front direction of these all is the same. It is preferable, that the second plate portion 12 is vertically planar. However, this is not necessary as it could also have additional bends to what is shown. It is preferable, but not necessary, that the plate portions 12 and 13 are similar to each other. Also, it is preferable, but not necessary, that the plate portions 22 and 23 are similar to each other. The guide rail bracket 5 and the arrangement could be used alternatively for mounting the guide rail sections of the counterweight of the elevator. It is to be understood that the above description and the accompanying figures are only intended to illustrate the present invention. It will be apparent to a person skilled in the art that the inventive concept can be implemented in various ways. The invention and its embodiments are not limited to the examples described above but may vary within the scope of the claims.

## Claims

1. Elevator guide rail arrangement having a vertical guide rail line (1) for guiding a vertically movable elevator unit (2) in a hoistway (H), the guide rail line (1) comprising one or more vertically oriented guide rail sections (3) mounted to take support at least in transverse direction from a vertical mounting base (4) with at least one bracket (5), the bracket (5) comprising a first fixing element (10) fixed to the mounting base (4) and a second fixing element (20) against

- which the guide rail section (3) is supported, said fixing elements (10, 20) being fixed to each other, **characterized in that** the first fixing element (10) comprises a vertically planar first plate portion (11) with a vertically planar back face fixed against a vertically planar section of the mounting base (4), and a second plate portion (12) forming a lateral edge of the first fixing element (10) and protruding from the first plate portion (11) towards the front side of the first plate portion (11), and the second fixing element (20) comprises a vertically planar third plate portion (21) parallel with and in front of the first plate portion (11), the third plate portion (21) having a front face against which the vertically oriented guide rail section (3) is supported, and **in that** the second fixing element (20) is fixed to the second plate portion (12) of the first fixing element (10).
2. An elevator guide rail arrangement according to the preceding claim, **characterized in that** the relative position between the first fixing element (10) and the second fixing element (20) is adjustable in back-front direction.
  3. An elevator guide rail arrangement according to any one of preceding claims, **characterized in that** the second plate portion (12) is also vertically planar.
  4. An elevator guide rail arrangement according to any one of preceding claims, **characterized in that** it comprises means (25,c) for fixing the guide rail section (3) to the third plate portion (21) which extend to the back side of the third plate portion (21), and the first fixing element (10), in particular the first plate portion (11) thereof, comprises an opening (15) for receiving parts of said fixing means (25,c).
  5. An elevator guide rail arrangement according to any one of the preceding claims, **characterized in that** it comprises means (14) for fixing the first plate portion (11) to the mounting base (4) which means (14) extend to the front side of the first plate portion (11), and the second fixing element (20), in particular the third plate portion (21), comprises an opening (29,29') for receiving parts of said fixing means (14).
  6. An elevator guide rail arrangement according to any one of preceding claims, **characterized in that** the second fixing element (20) comprises a vertically planar fourth plate portion (22) parallel to the vertically planar second plate portion (12), and the fourth plate portion (22) is fixed against the second plate portion (12).
  7. An elevator guide rail arrangement according to any one of preceding claims, **characterized in that** vertically planar fourth plate portion (22) and the vertically planar second plate portion (12) each comprise an opening (27,28), and the vertically planar fourth plate portion (22) and the vertically planar second plate portion (12) are fixed against each other with a fixing element (26) of a fixing means (26,27,28), such as a bolt (26), extending through said openings (27,28).
  8. An elevator guide rail arrangement according to the preceding claim 7, **characterized in that** at least one of the openings (27,28) of the fourth vertically planar plate portion (22) and the second vertically planar plate portion (12) is elongated in brackets back-front direction.
  9. An elevator guide rail arrangement according to any one of the preceding claims, **characterized in that** the first fixing element (10) is U-shaped, said second plate portion (12) forming one flank of the U-shaped first fixing element (10), and the first plate portion (11) forming the bottom thereof, and the guide rail section (3) is at least partly between the flanks of the U-shaped first fixing element (10).
  10. An elevator guide rail arrangement according to any one of the preceding claims, **characterized in that** the first fixing element (10) comprises a sixth vertically planar plate portion (13) forming another lateral edge of the first fixing element (10), and protruding from the first plate portion (11) towards the front side of the first plate portion (11), and the second fixing element (20) is fixed also to the sixth plate portion (13) of the first fixing element (10).
  11. An elevator guide rail bracket (5) for mounting a guide rail section (3) to take support at least in transverse direction from a vertical mounting base (4), the bracket (5) comprising a first fixing element (10) for being fixed to the mounting base (4) and a second fixing element (20) against which the guide rail section (3) is to be supported, and means (26,27,28) for fixing said fixing elements (10, 20) to each other, **characterized in that** the first fixing element (10) comprises a vertically planar first plate portion (11) with a vertically planar back face for being fixed against a vertically planar section of the mounting base (4), and a second plate portion (12) forming a lateral edge of the first fixing element (10) and protruding from the first plate portion (11) towards the front side of the first plate portion (11), and the second fixing element (20) comprises a planar third plate portion (21) having a front face against which a vertically oriented guide rail section (3) is to be supported, and **in that** said fixing elements (10, 20) are provided for being fixed to each other by fixing the second fixing element (20) to the second plate portion (12) of the first fixing element (10) such that the third plate portion (21) is vertically planar and parallel with and in front of the first plate portion (11).

12. An elevator guide rail bracket according to the preceding claim 11, **characterized in that** the relative position between the first fixing element (10) and the second fixing element (20) is adjustable in back-front direction. 5
13. An elevator guide rail bracket according to any one of preceding claims 11-12, **characterized in that** the first fixing element (10), in particular the first plate portion (11) thereof, comprises an opening (15) for receiving parts of means (25,c) for fixing the guide rail section (3) to the third plate portion (21) which extend to the back side of the third plate portion (21). 10
14. An elevator guide rail bracket according to any one of preceding claims 11-13, **characterized in that** the second fixing element (20), in particular the third plate portion (21), comprises an opening (29,29') for receiving parts of means (14) for fixing the first plate portion (11) to the mounting base (4) which extend to the front side of the first plate portion (11). 15 20
15. An elevator guide rail bracket according to any one of preceding claims 11-14, **characterized in that** the first fixing element (10) is U-shaped, said second plate portion (12) forming one flank of the U-shaped first fixing element (10) and the first plate (11) portion forming the bottom thereof. 25

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Fig. 1

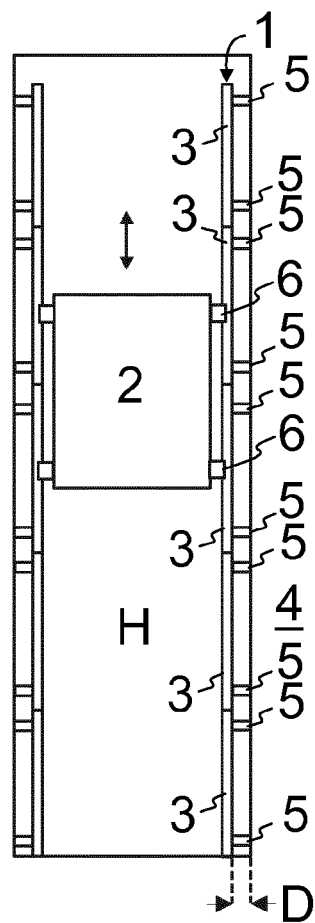


Fig. 2

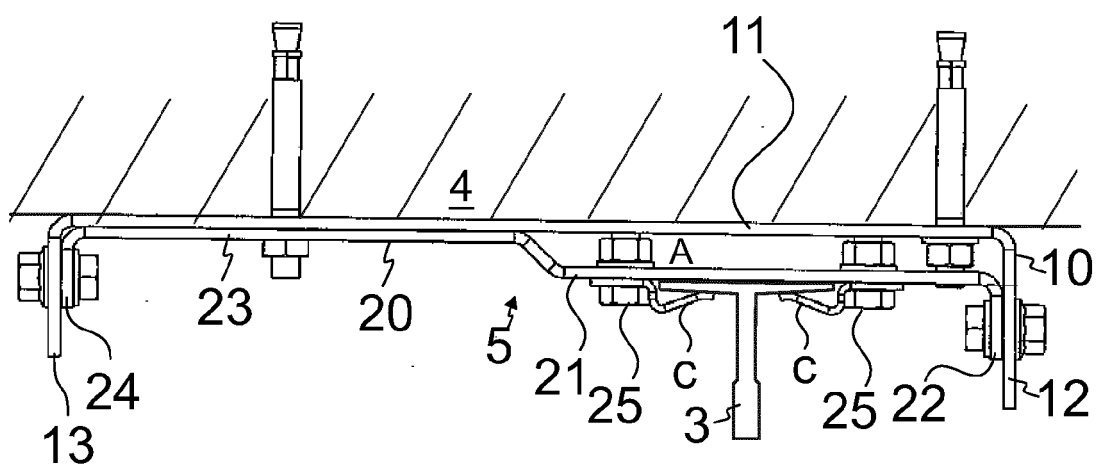


Fig. 3

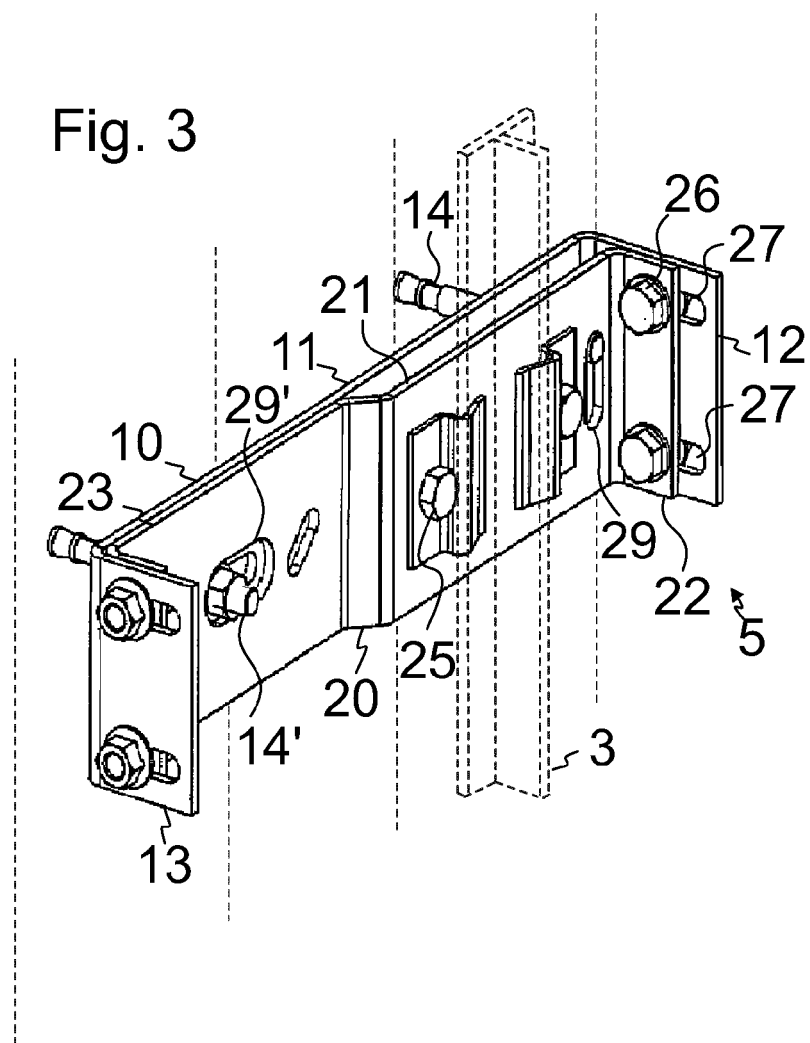


Fig. 4

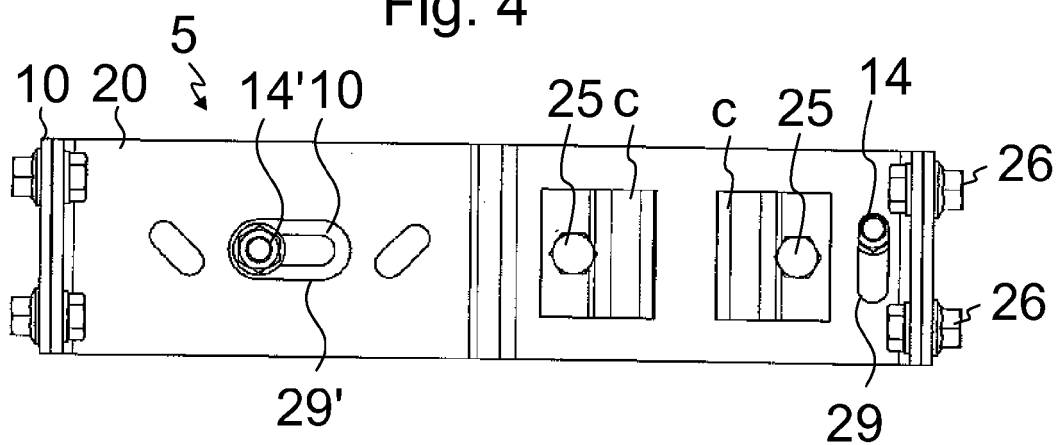


Fig. 5

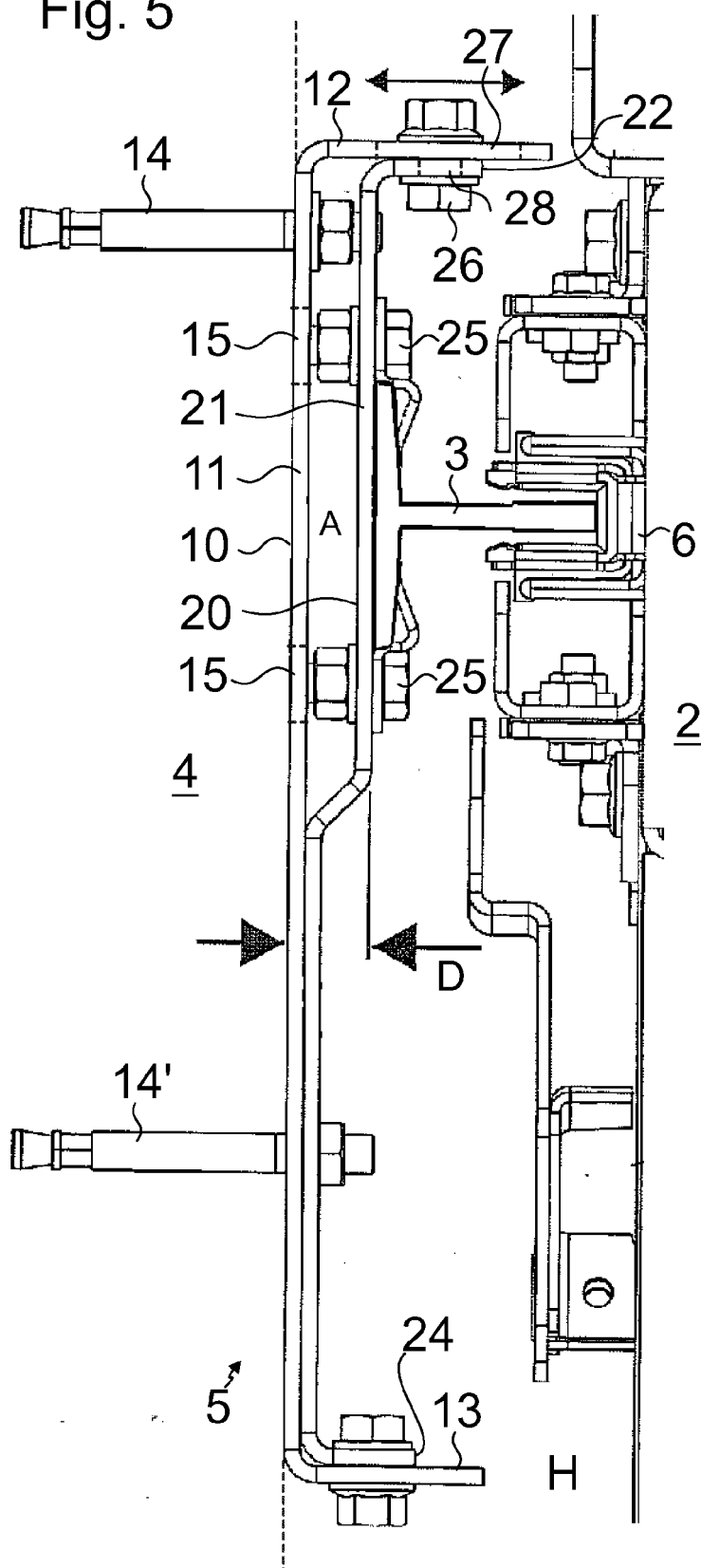
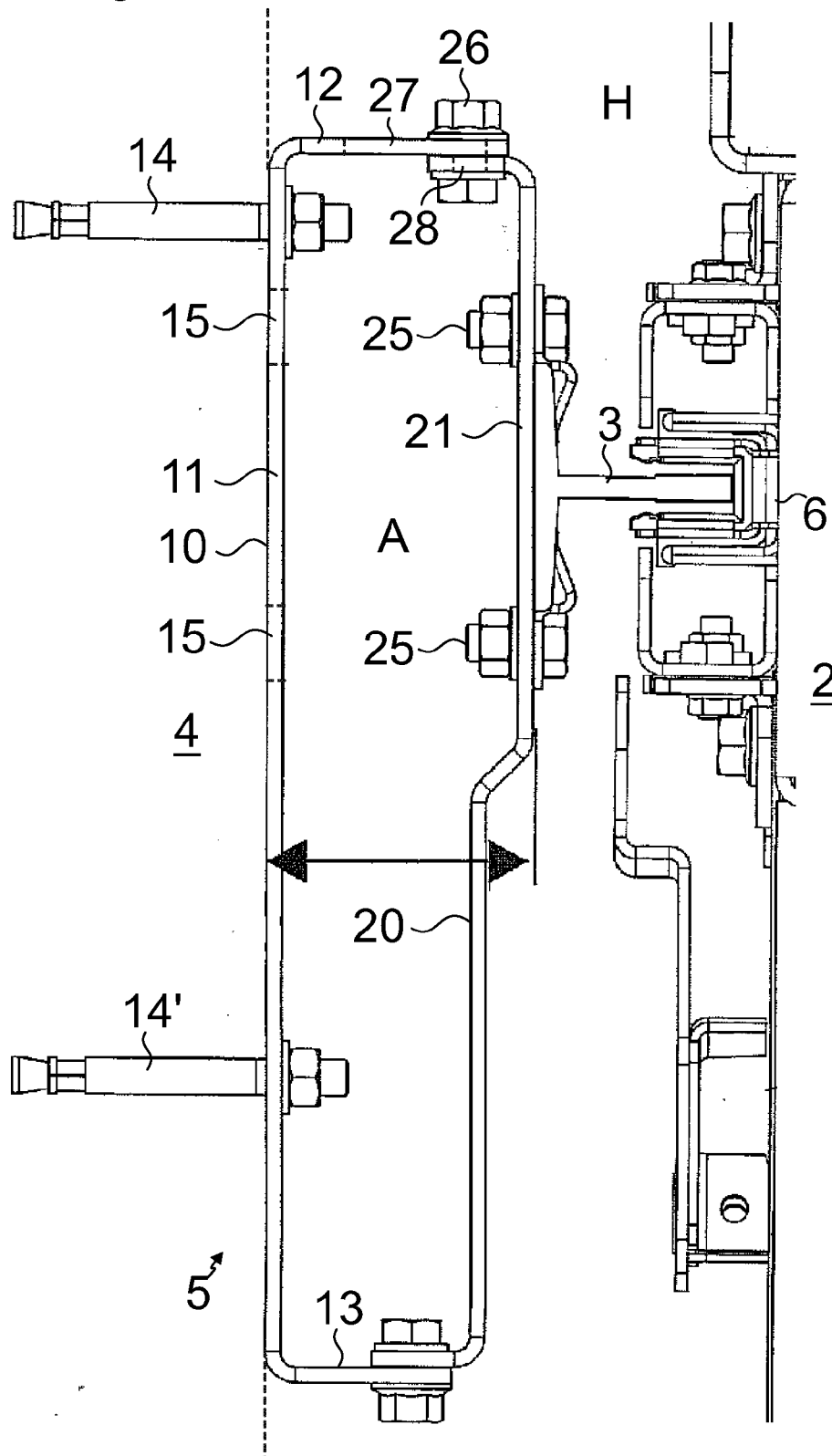


Fig. 6





## EUROPEAN SEARCH REPORT

Application Number  
EP 12 19 9450

| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                        |                                                  |                                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Citation of document with indication, where appropriate, of relevant passages          | Relevant to claim                                | CLASSIFICATION OF THE APPLICATION (IPC) |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | JP H01 127586 A (MITSUBISHI ELECTRIC CORP)<br>19 May 1989 (1989-05-19)<br>* abstract * | 1-15                                             | INV.<br>B66B7/02                        |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | JP S63 194886 U (UNKNOWN)<br>15 December 1988 (1988-12-15)<br>* figure 2 *             | 1-15                                             |                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                        |                                                  | TECHNICAL FIELDS SEARCHED (IPC)         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                        |                                                  | B66B                                    |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                        |                                                  |                                         |
| Place of search<br>The Hague                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                        | Date of completion of the search<br>20 June 2013 | Examiner<br>Janssens, Gerd              |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br>T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                                                                        |                                                  |                                         |

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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 12 19 9450

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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20-06-2013

| Patent document<br>cited in search report |   | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
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| JP H01127586                              | A | 19-05-1989          | NONE                       |                     |
| JP S63194886                              | U | 15-12-1988          | NONE                       |                     |

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82