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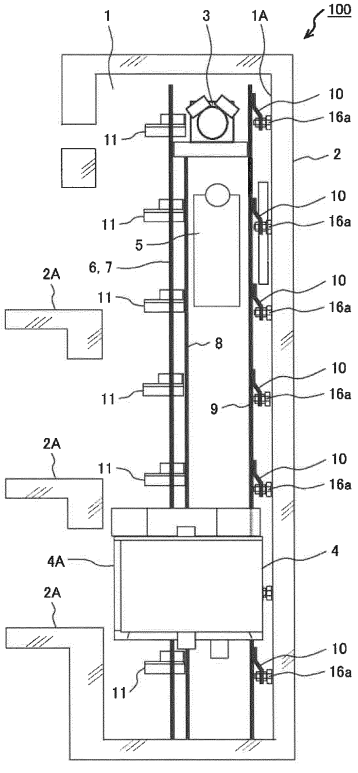
(54) **ELEVATOR GUIDE RAIL CONSTRUCTION METHOD AND CONSTRUCTION DEVICE**

(57) The present invention provides an elevator guide rail installation method in which, even if a wall-side rail bracket and a rail-side rail bracket are fixed using a drill screw, the drill screw can be driven without titling, there is no possibility that the drill screw interferes with the bracket, and the drill screw itself is not damaged. In the elevator guide rail installation method, a guide rail is fixed, via the rail-side rail bracket, to a wall-side rail bracket fixed to a wall surface in a hoistway in an elevator, and the wall-side rail bracket and the rail-side rail bracket are fastened by a drill screw. In the elevator guide rail installation method, a guide and a washer or a spacer having a diameter larger than that of a flange portion of the drill screw is installed between the drill screw and the rail-side rail bracket in a horizontal direction, and the guide is removed after the drill screw is installed, so that a gap is ensured between the rail-side rail bracket and the drill screw in the horizontal direction.

FIG. 1



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Description

Technical Field

[0001] The present invention relates to an elevator guide rail installation method and an elevator guide rail apparatus, and particularly to an elevator guide rail installation method and an elevator guide rail installation apparatus suitable for fixing a guide rail for guiding upward and downward movement of a car, a counterweight, and the like, to a predetermined position of a hoistway, via brackets, using drill screws.

Background Art

[0002] PTL 1 and PTL 2 disclose elevator guide rail fixture apparatuses for fixing a guide rail for guiding upward and downward movement of a car, a counterweight, and the like to a predetermined position of a hoistway, via brackets, using drill screws, and that are capable of reducing a burden of a worker in the installation of the guide rail, and that is also capable of bearing a horizontal load of an earthquake.

[0003] PTL 1 mentioned above discloses an elevator guide rail fixture apparatus including: a wall-side rail bracket that is fixed to a wall surface of a hoistway in an elevator; and a rail-side rail bracket that is disposed overlapping with the wall-side rail bracket and that is fixed to a guide rail. In a section where the wall-side rail bracket and the rail-side rail bracket overlap with each other, a first fastening portion and a second fastening portion are provided. The first fastening portion includes: a first long hole provided to the wall-side rail bracket and a second long hole provided on the rail-side rail bracket, via which the rail-side rail bracket and the wall-side rail bracket are fixed to each other; a bolt passed through the first long hole and the second long hole; and a nut screwed onto the bolt, with the wall-side rail bracket and the rail-side rail bracket interposed therebetween. The second fastening portion is provided as a pair of drill screws by which the rail-side rail bracket and the wall-side rail bracket are fastened to each other more firmly than the first fastening portion, and each of the drill screws is disposed outside of the first fastening portion in the width direction of the guide rail.

[0004] PTL 2 mentioned above discloses an elevator guide rail fixture apparatus including: a wall-side rail bracket that has a first long hole and that is fixed to a wall surface of a hoistway in an elevator; a rail-side rail bracket that has a second long hole in an overlapping section where the rail-side rail bracket overlaps with the wall-side rail bracket, and by which a car guide rail for guiding a car and a counterweight guide rail for guiding a counterweight are fixed; and a first fastening portion and a second fastening portion. The first fastening portion includes a bolt that is movably passed through the first long hole and the second long hole, and a nut screwed onto the bolt to hold the wall-side rail bracket and the rail-side rail bracket, the first fastening portion being provided in a section in which the wall-side rail bracket and the rail-side rail bracket overlap each other, and holding the rail-side rail bracket against the wall-side rail bracket at a position within a range across which the bolt is relatively movable with respect to the first long hole and the second long hole. The second fastening portion is a drill screw for fixing the rail-side rail bracket to the wall-side rail bracket, at a stronger force than that exerted by the first fastening portion, at a position not interfering with the first long hole, even when the rail-side rail bracket moves to any position within a movable range of the first fastening portion, with respect to the wall-side rail bracket.

Citation List

Patent Literature

[0005]

PTL 1: JP 2019-18928 A

PTL 2: JP 2019-142618 A

Summary of Invention

Technical Problem

[0006] The apparatuses disclosed in PTL 1 and PTL 2 improves the workability with the use of a drill screw. However, as a precondition for achieving the improvement, the drill screw needs to be installed straight.

[0007] With a drill screw, usually a gap is ensured between the drill screw and the bracket, so as to avoid repetitive applications of load. However, if a drill screw is installed without the use of any particular apparatus, the drill screw may be installed off the center, or the drill screw may be installed obliquely, so that the drill screw may become installed with no gap between the drill screw and the bracket, and end up interfering with the bracket. The drill screw itself may then eventually become damaged.

[0008] The present invention has been made in consideration of the points described above, and an object of the present invention is to provide an elevator guide rail installation method and an elevator guide rail installation apparatus capable of installing a drill screw without tilt, and of eliminating the risk of the drill screw interfering with the bracket, and damages of the drill screw itself, even when the drill screw is used in fixing a wall-side rail bracket to a rail-side rail bracket.

Solution to Problem

[0009] In order to achieve the above object, an elevator guide rail installation method according to the present invention is an elevator guide rail installation method in which a guide rail is fixed, via a rail-side rail bracket, to a wall-side rail bracket fixed to a wall surface of a hoistway

in an elevator, and in which the wall-side rail bracket and the rail-side rail bracket are fastened with a drill screw, the elevator guide rail installation method characterized in including: installing a guide and a washer or a spacer between the drill screw and the rail-side rail bracket in a horizontal direction, the guide and the washer or the spacer having a diameter larger than a flange portion of the drill screw; and removing the guide after the drill screw is installed so as to ensure a gap between the rail-side rail bracket and the drill screw in the horizontal direction.

[0010] In addition, in order to achieve the above object, an elevator guide rail installation apparatus according to the present invention is characterized in including: a drill screw that fixes a guide rail, via a rail-side rail bracket, to a wall-side rail bracket fixed to a wall surface of a hoistway in an elevator; a guide that is disposed between the drill screw and the rail-side rail bracket in a horizontal direction, that has a diameter larger than a flange portion of the drill screw, that is removed after the drill screw is installed, and that ensures a gap between the rail-side rail bracket and the drill screw in the horizontal direction; and a washer or a spacer that is disposed between the drill screw and the rail-side rail bracket in the horizontal direction, and that has a diameter larger than a flange portion of the drill screw.

Advantageous Effects of Invention

[0011] According to the present invention, even when the wall-side rail bracket and the rail-side rail bracket are fixed using a drill screw, it is possible to install the drill screw without tilt, and the risk of the drill screw interfering with the bracket can be eliminated. Therefore, damages of the drill screw itself can be avoided.

Brief Description of Drawings

[0012]

[FIG. 1] FIG. 1 is a diagram illustrating a schematic configuration of an elevator apparatus for which an elevator guide rail installation method according to a first embodiment of the present invention is to be used.

[FIG. 2] FIG. 2 is top view of the car, with the building illustrated in FIG. 1 sectioned horizontally at a position including a car doorway.

[FIG. 3] FIG. 3 is a plan view illustrating how the counterweight-side guide rail illustrated in FIG. 1 is fixed.

[FIG. 4] FIG. 4 is a partial perspective view illustrating how a rail-side rail bracket, having a counterweight-side guide rail fixed thereto, is fixed to a wall-side rail bracket, using drill screws.

[FIG. 5] FIG. 5 is a partial perspective view illustrating the configuration illustrated in FIG. 4 but viewed from the side of the counterweight-side guide rail.

[FIG. 6] FIG. 6 is a partial perspective view illustrating how the drill screws are inserted into the respective holes of washers or spacers, in an elevator guide rail installation method according to the present invention.

[FIG. 7] FIG. 7 is an enlarged exploded perspective view of the portion A in FIG. 6, illustrating how the guide and a washer or a spacer are installed in a pilot hole formed in the rail-side rail bracket.

[FIG. 8] FIG. 8 is a partial perspective view illustrating a fastened configuration resultant of the installation carried out in accordance with the elevator guide rail installation method according to the present invention.

[FIG. 9] FIG. 9 is a partial perspective view, viewed from a direction of the arrow B in FIG. 8.

[FIG. 10] FIG. 10 is a partial perspective view illustrating a cross section across the plane C illustrated in FIG. 9.

[FIG. 11] FIG. 11 is a partial perspective view illustrating a configuration with the guide removed from the state of FIG. 8.

[FIG. 12] FIG. 12 is a plan view illustrating an enlargement of the portion D indicated in FIG. 11.

[FIG. 13] FIG. 13 is a diagram for explaining the installation process of an elevator guide rail installation method according to the present invention.

Description of Embodiments

[0013] An elevator guide rail installation method and an elevator guide rail installation apparatus according to the present invention will now be explained based on an embodiment illustrated in the drawings. In the drawings, the same reference numerals will be used for the same components.

[First Embodiment]

[0014] FIG. 1 is a diagram illustrating a schematic configuration of an elevator apparatus 100 for which an elevator guide rail installation method according to a first embodiment of the present invention is to be used.

[0015] As illustrated in FIG. 1, the elevator apparatus 100 includes a hoistway 1 connecting stories of a building 2, a plurality of floors 2A provided in the respective stories of the building 2, and a car 4 that moves through the hoistway 1, and stops at each of the floors 2A. A car doorway 4A connects the floor 2A and the car 4.

[0016] The car 4 is connected to one end of a main rope (not illustrated), and suspended in the hoistway 1, and a counterweight 5 counterbalancing the weight of the car 4 is connected to the other end of the main rope. A hoisting machine 3 that winds up the main rope, and a control panel (not illustrated) for controlling the operation of the hoisting machine 3 are installed in the upper area of the hoistway 1.

[0017] When the hoisting machine 3 winds up or unwinds the main rope, the car 4 move along the car-side

guide rails 6, 7, and the counterweight 5 move along the counterweight-side guide rails 8, 9, the guide rails being fixed to the hoistway 1, like a pully bucket in a water well.

[0018] The counterweight-side guide rail 9 is fixed to the wall surface 1A of the hoistway 1 via first rail brackets 10, using fasteners 16a each of which includes a bolt and a nut. The counterweight-side guide rail 8 and the car-side guide rail 7 are fixed to the wall surface 1A of the hoistway 1 via the second rail brackets 11, with fasteners 16b (see FIG. 2). The car-side guide rail 6 is fixed to the wall surface 1A of the hoistway 1 via third rail brackets 12, using fasteners 16c (see FIG. 2).

[0019] FIG. 2 gives the details of how the car-side guide rails 6 and 7 and the counterweight-side guide rails 8 and 9 are fixed to the wall surface 1A of the hoistway 1. FIG. 2 is a horizontal sectional top view of the car 4, with the building 2 sectioned at a position including the car doorway 4A.

[0020] As illustrated in FIG. 2, the first rail bracket 10 includes a first wall-side rail bracket 10A and a first rail-side rail bracket 10B. The first rail-side rail bracket 10B holds the counterweight-side guide rail 9, and this first rail-side rail bracket 10B is fixed, via the first wall-side rail bracket 10A, to the wall surface lAd of the hoistway 1, using the fasteners 16a.

[0021] The second rail bracket 11 includes a second wall-side rail bracket 11A and a second rail-side rail bracket 11B. The second rail-side rail bracket 11B holds the counterweight-side guide rail 8 and the car-side guide rail 7, and the second rail-side rail bracket 11B is fixed, via the second wall-side rail bracket 11A, to the wall surface 1Ab of the hoistway 1, using fasteners 16b.

[0022] Further, the third rail bracket 12 includes a third wall-side rail bracket 12A and a third rail-side rail bracket 12B. The third rail-side rail bracket 12B holds the car-side guide rail 6, and the third rail-side rail bracket 12B is fixed, via the third wall-side rail bracket 12A, to the wall surface 1Ac of the hoistway 1, using the fasteners 16c.

[0023] In addition, as illustrated in FIG. 3, rail clip bolts 17a and 17b are passed through the first rail-side rail bracket 10B, and the counterweight-side guide rail 9 is fixed by nuts 18a and 18b passed through the rail clip bolts 17a and 17b, respectively, and by rail clips 19a and 19b that tighten from the opposite side of the nuts 18a and 18b, respectively.

[0024] The first wall-side rail bracket 10A has anchor bolt fixing holes (not illustrated). By selectively passing anchor bolts 10H1 and 10H2 through the anchor bolt fixing holes, the first wall-side rail bracket 10A is fixed to the wall surface 1A of the hoistway 1 (see FIG. 3).

[0025] An elevator guide rail installation method and an elevator guide installation apparatus according to the present embodiment used for the elevator apparatus 100 having such a structure will now be explained.

[0026] Note that, in the present embodiment, the counterweight-side guide rail 9 will be explained as an example of the four guide rails, and the explanations of the counterweight-side guide rail 8 and the car-side guide rails 6 and 7 will be omitted.

[0027] Usually, the counterweight-side guide rail 9 is fixed, via the first rail bracket 10, to the wall surface 1A of the hoistway 1 with the fasteners 16a, as described above, but the first wall-side rail bracket 10A and the first rail-side rail bracket 10B making up the first rail bracket 10 are fastened with the drill screws 19A and 19B, as well as with the friction fixing bolts 15A and 15B, as be described later.

[0028] As illustrated in FIGS. 4 and 5, each of the first wall-side rail bracket 10A and the first rail-side rail bracket 10B according to the present embodiment has an L-shaped cross section. By passing bolts through respective holes 10A5, 10A6, and 10A7 provided to short-side portion 10A' of the first wall-side rail bracket 10A having an L-shaped cross section, the first wall-side rail bracket 10A is fixed to the wall surface 1A in the hoistway 1. The counterweight-side guide rail 9 is fixed to the short-side portion 10B' of the first rail-side rail bracket 10B having an L-shaped cross section, and the long-side portion 10A" of the first wall-side rail bracket 10A and the long-side portion 10B" of the first rail-side rail bracket 10B are fastened to each other with drill screws 19A and 19B and friction fixing bolts 15A and 15B.

[0029] In other words, in the present embodiment, during an ordinary operation of the car 4, the first wall-side rail bracket 10A and the first rail-side rail bracket 10B serve to fasten with the frictional force of the friction fixing bolts 15A and 15B. If the friction fixing bolts 15A and 15B slip at the time of some unordinary event such as an earthquake, the load is received by the drill screws 19A and 19B.

[0030] In addition, each of the long-side portion 10A" of the first wall-side rail bracket 10A and the long-side portion 10B" of the first rail-side rail bracket 10B according to the present embodiment are provided with a pair of through holes at a predetermined interval. By inserting the drill screws 19A and 19B into the through holes, respectively, with washers interposed therebetween, respectively, the first wall-side rail bracket 10A and the first rail-side rail bracket 10B are fastened to each other.

[0031] Furthermore, in the present embodiment, as illustrated in FIGS. 4 and 5, in each of the long-side portions 10A" of the first wall-side rail bracket 10A and the long-side portion 10B" of the first rail-side rail bracket 10B, a plurality of oblong holes (four oblong holes 10A1, 10A2, 10A3, and 10A4 provided to the long-side portion 10A" of the first wall-side rail bracket 10A (the oblong holes 10A3 and 10A4 not visible in FIGS. 4 and 5), and two oblong holes 10B1 and 10B2 provided to the long-side portion 10B" of the first rail-side rail bracket 10B) are disposed between the through-holes described above. In the present embodiment, the friction fixing bolts 15A and 15B are inserted into the respective oblong holes 10A3 and 10A4 provided to the long-side portion 10A" of the first wall-side rail bracket 10A, and also into the respective oblong holes 10B1 and 10B2 provided to the long-side portion 10B" of the first rail-side rail bracket

10B, with washers 17A and 17B interposed between the respective friction fixing bolts 15A and 15B and the first rail-side rail bracket 10B. In this manner, the first wall-side rail bracket 10A and the first rail-side rail bracket 10B are fastened to each other, while enabling an adjustment of the position at which the first wall-side rail bracket 10A and the first rail-side rail bracket 10B are fastened to each other, by moving the friction fixing bolts 15A and 15B inside the oblong holes 10B1 and 10B2, respectively.

[0032] Meanwhile, as described above, with the drill screws 19A and 19B, a gap is ensured between each of the drill screws 19A and 19B and the first rail-side rail bracket 10B in the horizontal direction, so as to avoid repetitive applications of load. However, if the drill screws 19A and 19B are installed without the use of any particular apparatus, the drill screws 19A and 19B may be installed off the center, or the drill screws 19A and 19B may be installed obliquely, so that each of the drill screws 19A and 19B may become installed with no gap between the drill screw 19A or 19B and the first rail-side rail bracket 10B in the horizontal direction, and the drill screw 19A or 19B may end up interfering with the first rail-side rail bracket 10B. The drill screw 19A or 19B themselves may then eventually become damaged.

[0033] Therefore, in the present embodiment, as illustrated in FIGS. 6 to 13, the counterweight-side guide rail 9 is fixed, via the first rail-side rail bracket 10B, to the first wall-side rail bracket 10A, and before fastening the first wall-side rail bracket 10A and the first rail-side rail bracket 10B to each other using the drill screws 19A and 19B, guides 20A and 20B and washers or spacers 21A and 21B having diameters larger than those of flange portions 19A1 and 19B1 of the respective drill screws 19A and 19B (see FIG. 10) are installed between the drill screws 19A and 19B and the first rail-side rail bracket 10B, respectively, in the horizontal direction, and, after the drill screws 19A and 19B are installed, the guides 20 A and 20B are then removed. A gap G (see (d) in FIG. 13) is thus ensured between the first rail-side rail bracket 10B and each of the drill screws 19A and 19B in the horizontal direction.

[0034] A method for installing the elevator guide rail described above will now be explained in detail.

[0035] In the present embodiment, in implementing the elevator guide rail installation method, an elevator guide rail installation apparatus is used, and the elevator guide rail installation apparatus includes: the drill screws 19A and 19B by which the counterweight-side guide rail 9 is fixed to the first wall-side rail bracket 10A with the first rail-side rail bracket 10B therebetween; the guide 20A and the guide 20B that are disposed between the drill screw 19A and the first rail-side rail bracket 10B and between the drill screw 19B and the first rail-side rail bracket 10B, respectively, in the horizontal direction, that have diameter larger than the diameters of the flange portions 19A1 and 19B1 (see FIG. 10) of the drill screws 19A and 19B, respectively, that are removed after the drill screws 19A and 19B are installed, and that ensures the gaps G between the first rail-side rail bracket 10B and the drill screws 19A and 19B, respectively, in the horizontal direction; and washers or spacers 21A and 21B that are disposed between the drill screw 19A and the first rail-side rail bracket 10B and between the drill screw 19B and the first rail-side rail bracket 10B, respectively, in the horizontal direction, and that have diameters larger than the diameters of the flange portions 19A1 and 19B1 of the drill screws 19A and 19B, respectively, in which each of the guides 20A and 20B has a cylindrical shape an upper portion of which is provided with a collar 20A1 or 20B1, in which each of the washers or the spacers 21A and 21B has a doughnut-like shape, and in which the doughnut-shaped washers or spacers 21A and 21B are installed inside cylindrical portions of the collars 20A1 and 20B1 of the guides 20A and 20B, respectively.

[0036] Using the above-described elevator guide rail installation apparatus, the guide 20A and the washer or the spacer 21A are installed between the drill screw 19A and the first rail-side rail bracket 10B, and the guide 20B and the washer or the spacer 21B are installed between the drill screw 19B and the first rail-side rail bracket 10B, in the horizontal direction (see (a) of FIG. 13). The guides 20A and 20B and the washer or the spacers 21A and 21B have diameters larger than the flange portions 19A1 and 19B1 (see FIG. 10) of the drill screws 19A and 19B. After the drill screws 19A and 19B are installed, the guides 20A and 20B are removed (see (d) of FIG. 13), and form a gap G (see (d) of FIG. 13) between each of the drill screws 19A and 19B and the first rail-side rail bracket 10B in the horizontal direction.

[0037] Pilot holes 10B3 are formed at predetermined positions of the first rail-side rail bracket 10B as illustrated in FIG. 7. The cylindrical guides 20A and 20B, each having the corresponding flange portion 20A1 or 20B1 on the upper part thereof, are then inserted into the respective pilot holes 10B3. The donut-shaped washers and spacers 21A and 21B are then installed, respectively, inside the cylindrical portions of the collars 20A1 and 20B1 of the respective guides 20A and 20B, and then the drill screws 19A and 19B are inserted, respectively, into the central holes of the donut-shaped washers or spacers 21A and 21B (see (a) of FIG. 13) .

[0038] After the drill screws 19A and 19B are inserted into the central holes of the respective donut-shaped washers or spacers 21A and 21B, holes are drilled into the first wall-side rail bracket 10A, using the drill screws 19A and 19B, respectively, and the drill screws 19A and 19B are then inserted into the respective holes, and fasten the first wall-side rail bracket 10A and the first rail-side rail bracket 10B (see (b) and (c) of FIG. 13) . After the first wall-side rail bracket 10A and the first rail-side rail bracket 10B are fastened with each other with the drill screws 19A and 19B, the guides 20A and 20B are pulled out using some predetermined means (e.g., a tool) so as to ensure the gap G (see (d) of FIG. 13) between the first rail-side rail bracket 10B and each of the drill

screws 19A and 19B in the horizontal direction.

[0039] According to the present embodiment described above, the gap G can be always ensured between each of the drill screws 19A and 19B and the first rail-side rail bracket 10B, and the guides 20A and 20B and the washers or the spacers 21A and 21B enable the drill screws 19A and 19B to be driven straightly. Therefore, even if the drill screws 19A and 19B are driven off the center, it is possible to ensure a gap G by pulling out each of the guides 20A and 20B. Hence, a long-term load, such as during that during the normal operation of the elevator apparatus 100, does not affect the drill screws 19A and 19B. Therefore, it is possible to eliminate the possibility of the drill screws 19A and 19B themselves becoming damaged.

[0040] Note that the present invention is not limited to the above-explained embodiment, and includes various modifications thereof.

[0041] For example, the embodiment has been explained above in detail to facilitate understanding of the present invention, and the present invention is not necessarily limited to the configuration including all of the elements explained above. Furthermore, a part of the configuration according to one of the embodiments may be replaced with a configuration according to another embodiment, and a configuration according to the other embodiment may be added to the configuration of the one embodiment. In addition, a part of the configuration according to each of the embodiments may be added to, deleted from, or replaced with the configuration according to the other embodiments.

Reference Signs List

[0042]

1 hoistway
1A, 1Ab, 1Ac, 1Ad wall surface of hoistway
2 building
2A floor
3 hoisting machine
4 car
4A car doorway
5 counterweight
6, 7 car-side guide rail
8, 9 counterweight-side guide rail
10 first rail bracket
10A first wall-side rail bracket
10A1, 10A2, 10A3, 10A4 oblong hole formed in long-side portion of first wall-side rail bracket
10A5, 10A6, 10A7 hole formed in short-side portion of first wall-side rail bracket
10A' short-side portion of first wall-side rail bracket
10A" long-side portion of first wall-side rail bracket
10B first rail-side rail bracket
10B1, 10B2 Oblong hole formed on long-side portion of first rail-side rail bracket
10B3 pilot hole formed in first rail-side rail bracket
10B' short-side portion of first rail-side rail bracket
10B" long-side portion of first rail-side rail bracket
10H1, 10H2 anchor bolt
11 second rail bracket
11A second wall-side rail bracket
11B second rail-side rail bracket
12 third rail bracket
12A third wall-side rail bracket
12B third rail-side rail bracket
15A, 15B friction fixing bolt
16a, 16b, 16c fastener
17A, 17B washer
17a, 17b rail clip bolt
18a, 18b nut for rail clip bolt
19A, 19B drill screw
19A1, 19B1 flange portion of drill screw
19a, 19b rail clip
20A, 20B guide
20A1, 20B1 collar of guide
21A, 21B washer or spacer
100 elevator apparatus

Claims

1. An elevator guide rail installation method in which a guide rail is fixed to a wall-side rail bracket fixed, via a rail-side rail bracket, to a wall surface of a hoistway in an elevator, and in which the wall-side rail bracket and the rail-side rail bracket are fastened with a drill screw, the elevator guide rail installation method comprising:

   installing a guide and a washer or a spacer between the drill screw and the rail-side rail bracket in a horizontal direction, the guide and the washer or the spacer having a diameter larger than a flange portion of the drill screw; and
   removing the guide after the drill screw is installed so as to ensure a gap between the rail-side rail bracket and the drill screw in the horizontal direction.

2. The elevator guide rail installation method according to claim 1, further comprising:

   forming a pilot hole at a predetermined position of the rail-side rail bracket;
   inserting the guide that is cylindrical and an upper portion of which is provided with a collar, into the pilot hole;
   installing the washer or the spacer having a donut-like shape in a cylindrical portion of the collar of the guide; and then
   inserting the drill screw into a central hole of the washer or the spacer having the donut-like shape.

3. The elevator guide rail installation method according to claim 2, further comprising:

after the inserting of the drill screw into the central hole portion of the washer or the spacer having the donut-like shape, drilling a hole in the wall-side rail bracket with the drill screw; and
inserting the drill screw into the hole to fasten the wall-side rail bracket and the rail-side rail bracket.

4. The elevator guide rail installation method according to claim 3, further comprising, after the fastening the wall-side rail bracket and the rail-side rail bracket using the drill screw, removing the guide using a predetermined means.

5. An elevator guide rail installation apparatus comprising:

a drill screw that fixes a guide rail, via a rail-side rail bracket, to a wall-side rail bracket fixed to a wall surface of a hoistway in an elevator;
a guide that is disposed between the drill screw and the rail-side rail bracket in a horizontal direction, that has a diameter larger than a flange portion of the drill screw, that is removed after the drill screw is installed, and that ensures a gap between the rail-side rail bracket and the drill screw in the horizontal direction; and
a washer or a spacer that is disposed between the drill screw and the rail-side rail bracket in the horizontal direction, and that has a diameter larger than a flange portion of the drill screw.

6. The elevator guide rail installation apparatus according to claim 5, wherein

the guide has a cylindrical shape an upper portion of which is provided with a collar,
the washer or the spacer has a doughnut-like shape, and
the washer or the spacer having the doughnut-shape is installed inside a cylindrical portion of the collar of the guide.

FIG. 1

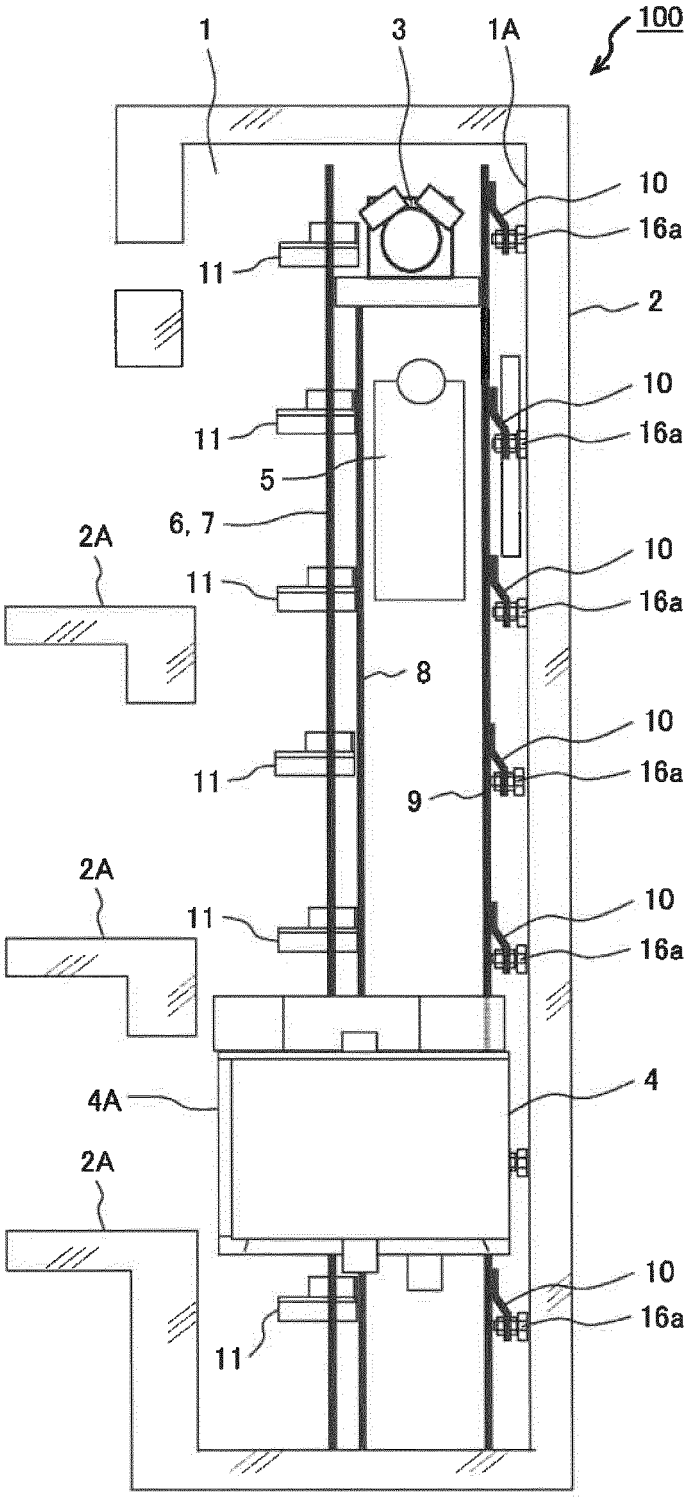
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FIG. 2

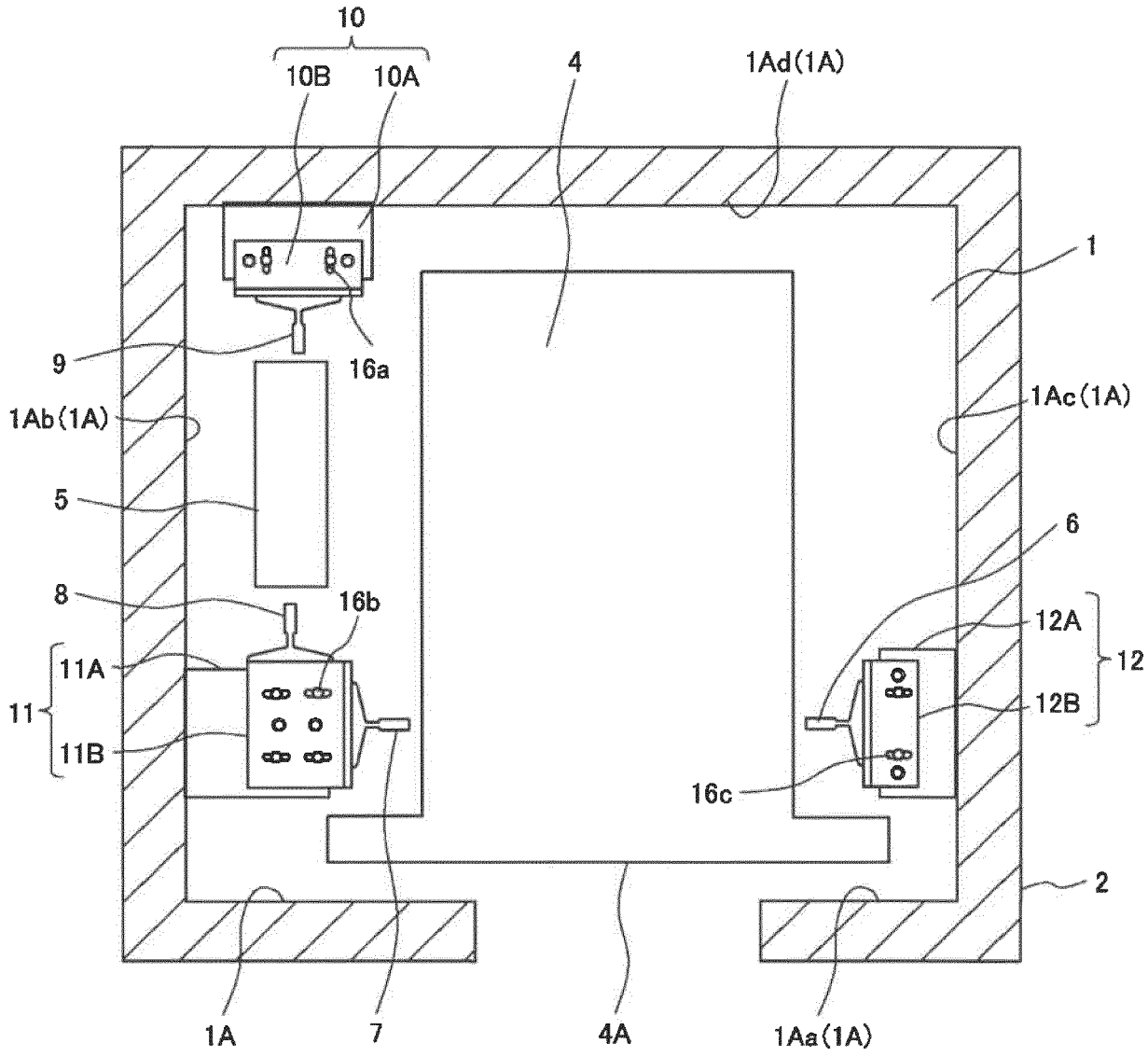

10
10B
10A
4
1Ad(1A)
1
9
16a
1Ab(1A)
1Ac(1A)
5
6
8
16b
12A
12
11A
11
12B
11B
16c
2
1A
7
4A
1Aa(1A)

FIG. 3

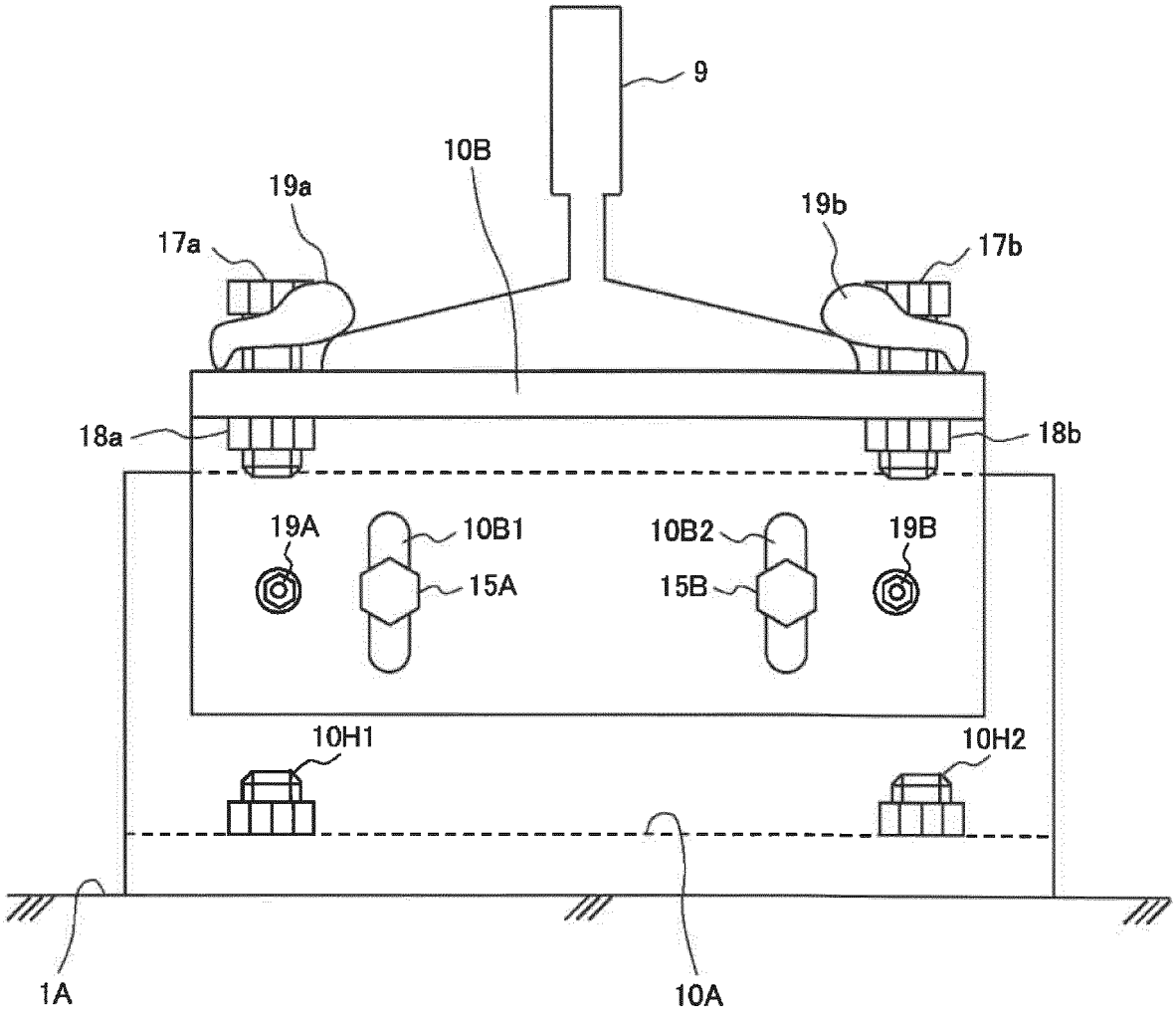

9
10B
19a
17a
19b
17b
18a
18b
19A
10B1
15A
10B2
15B
19B
10H1
10H2
1A
10A

FIG. 4

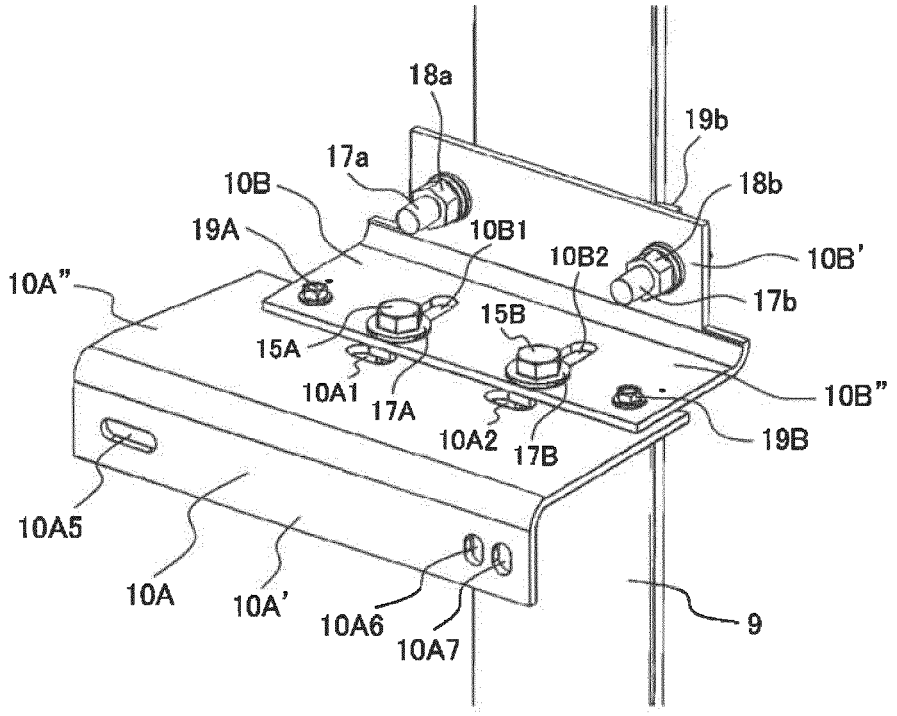

18a
19b
17a
10B
18b
19A
10B1
10B2
10B'
10A"
17b
15B
15A
10B"
10A1
17A
19B
10A2
17B
10A5
10A
10A'
10A6
9
10A7

FIG. 5

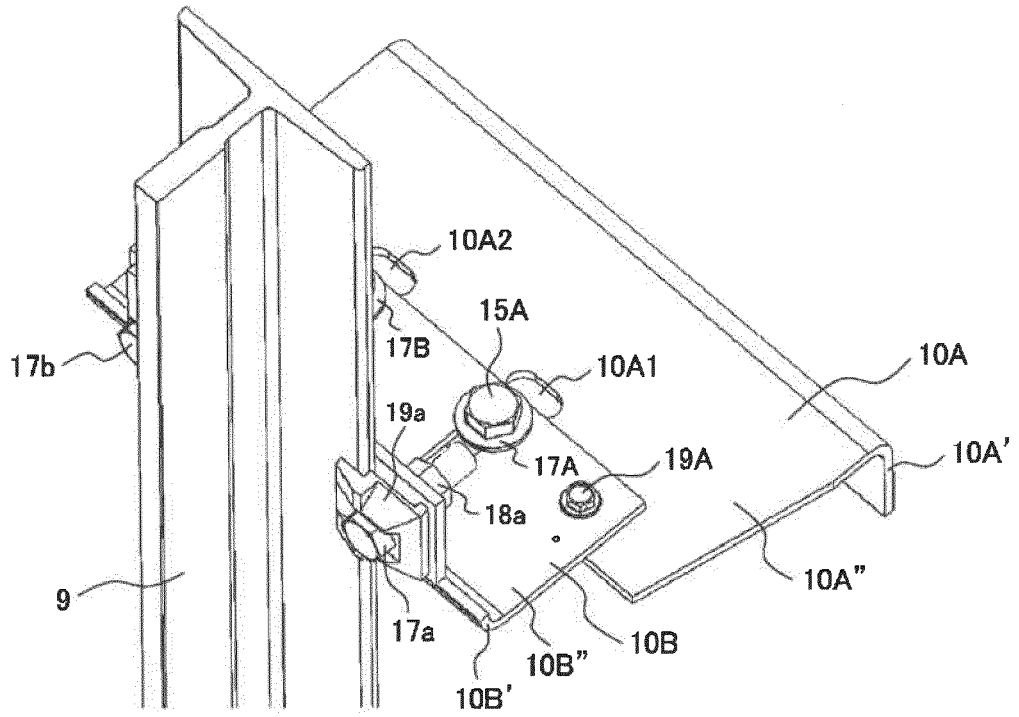

10A2
15A
17b
17B
10A1
10A
19a
17A
19A
10A'
18a
10A"
9
17a
10B
10B"
10B'

FIG. 6

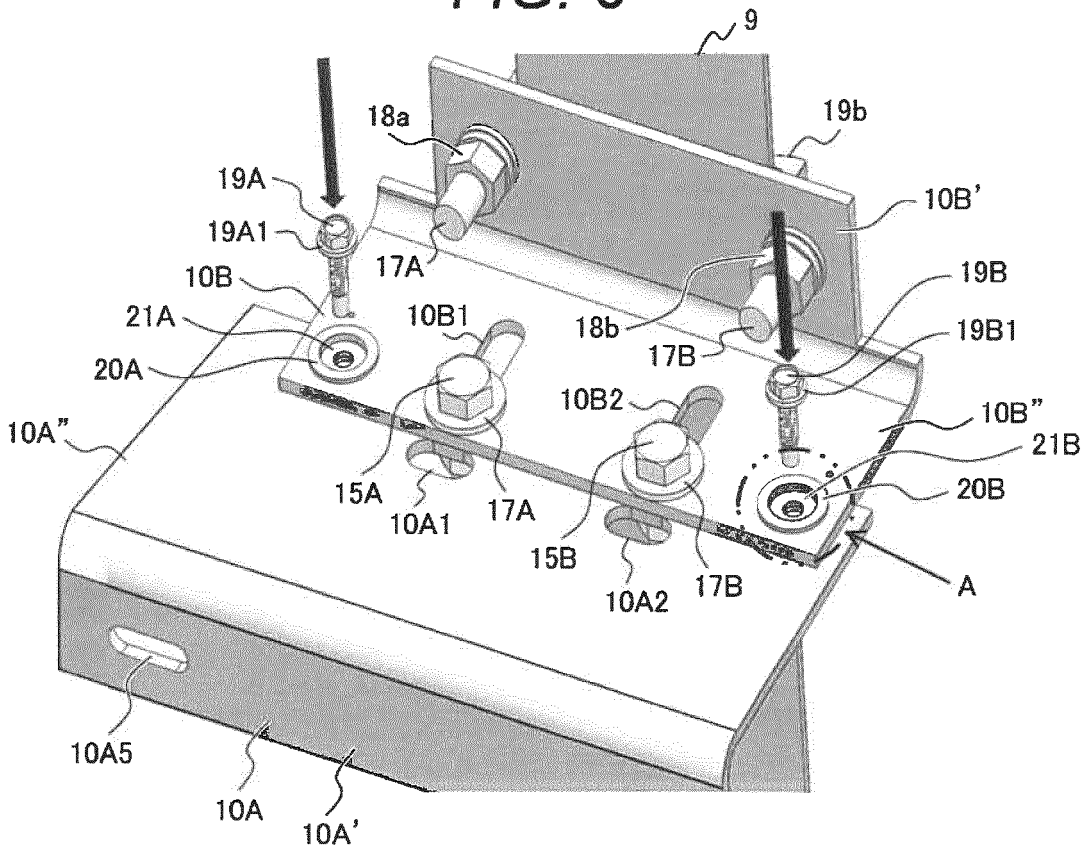

9
18a
19b
19A
19A1
10B'
17A
10B
19B
21A
10B1
18b
19B1
17B
20A
10B2
10B"
10A"
21B
15A
20B
10A1
17A
15B
17B
A
10A2
10A5
10A
10A'

FIG. 7

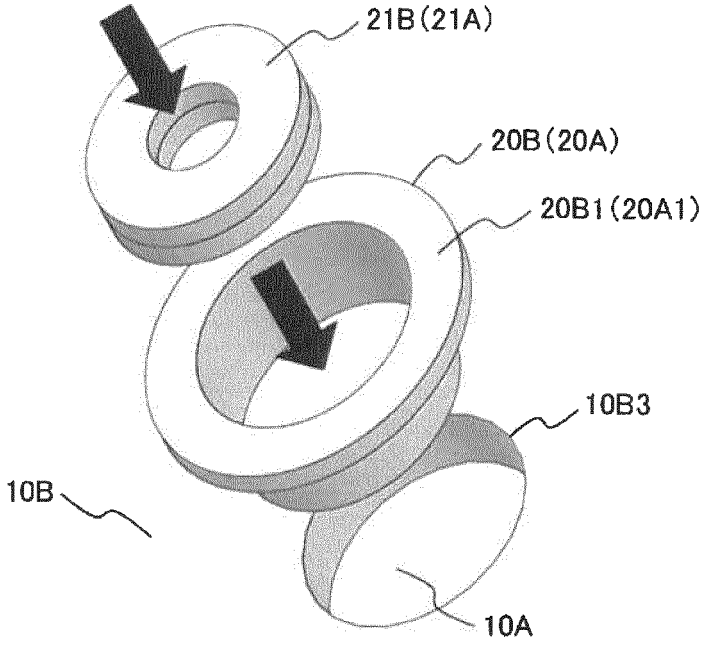

21B(21A)
20B(20A)
20B1(20A1)
10B3
10B
10A

FIG. 8

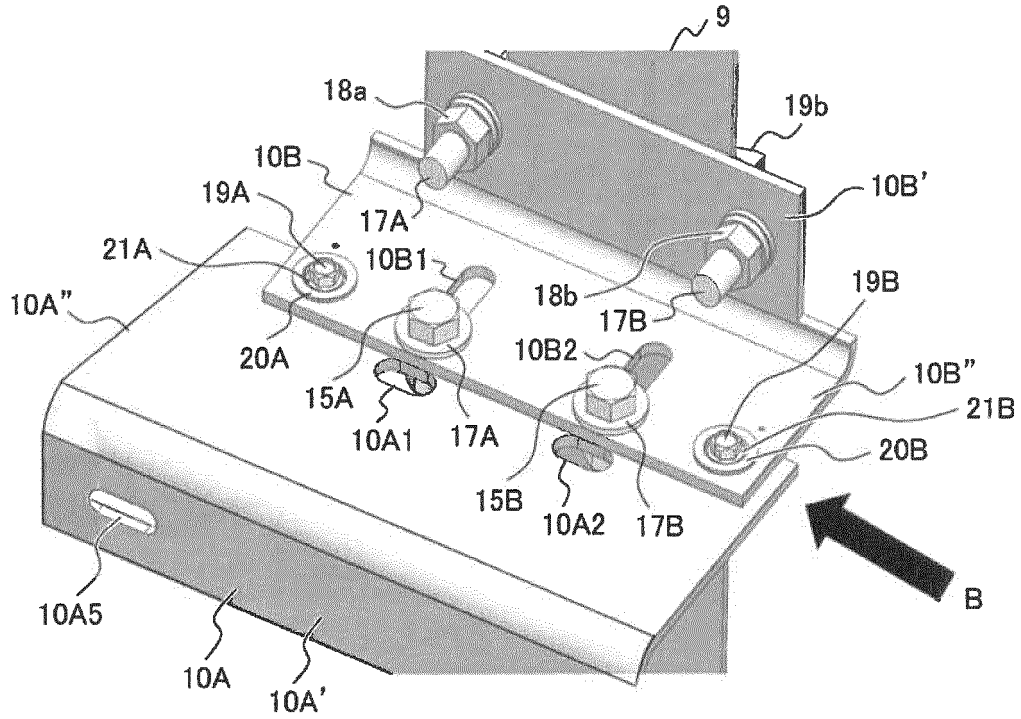

9
18a
19b
10B
10B'
19A
17A
21A
10B1
18b
19B
10A"
17B
20A
10B2
10B"
15A
21B
10A1
17A
20B
15B
10A2
17B
B
10A5
10A
10A'

FIG. 9

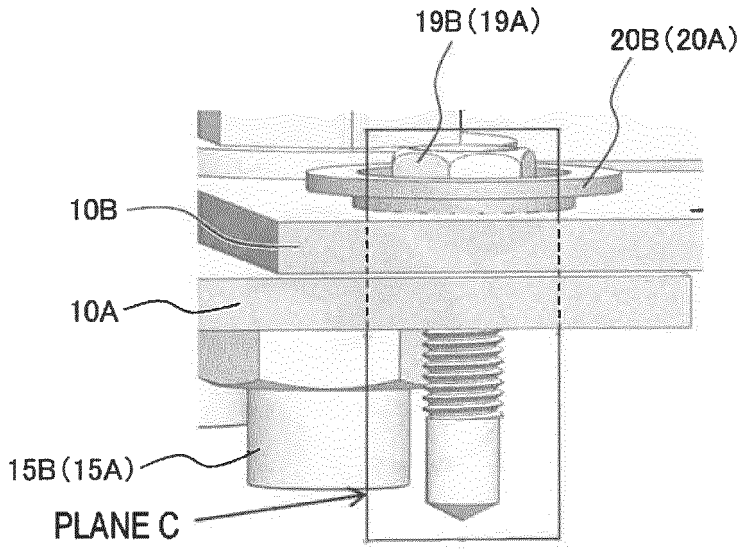

19B(19A)
20B(20A)
10B
10A
15B(15A)
PLANE C

FIG. 10

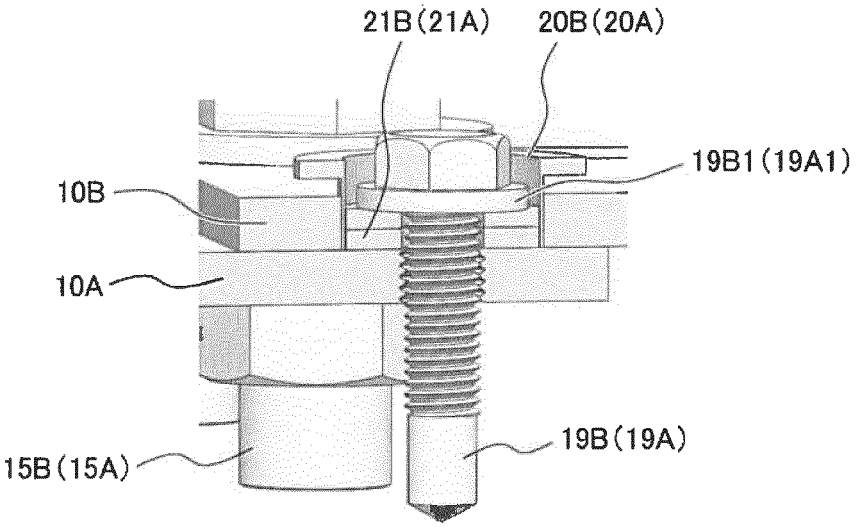

21B(21A)
20B(20A)
19B1(19A1)
10B
10A
19B(19A)
15B(15A)

FIG. 11

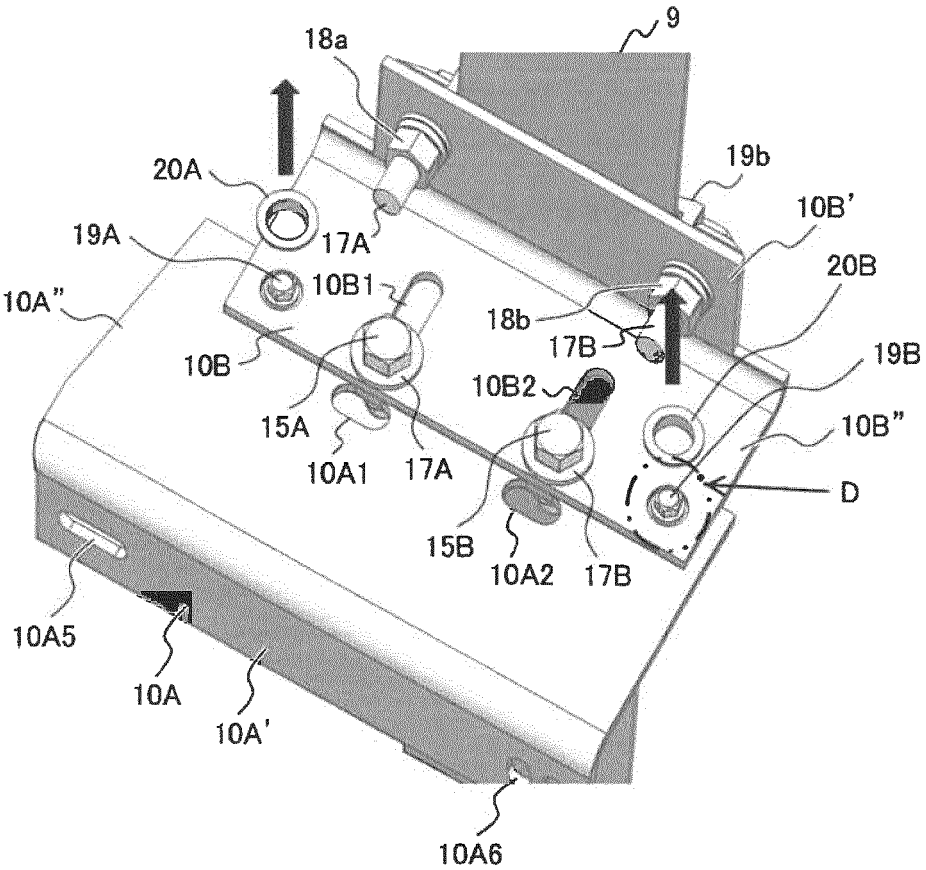

9
18a
19b
20A
10B'
19A
17A
20B
10A"
10B1
18b
17B
19B
10B
10B2
10B"
15A
10A1
17A
D
15B
10A2
17B
10A5
10A
10A'
10A6

FIG. 12

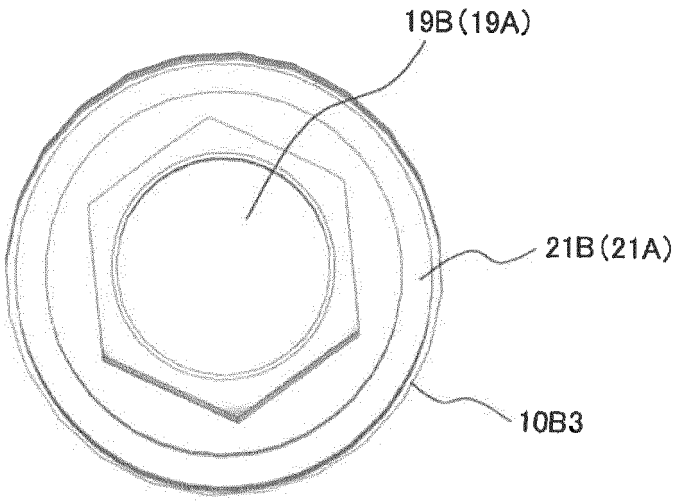
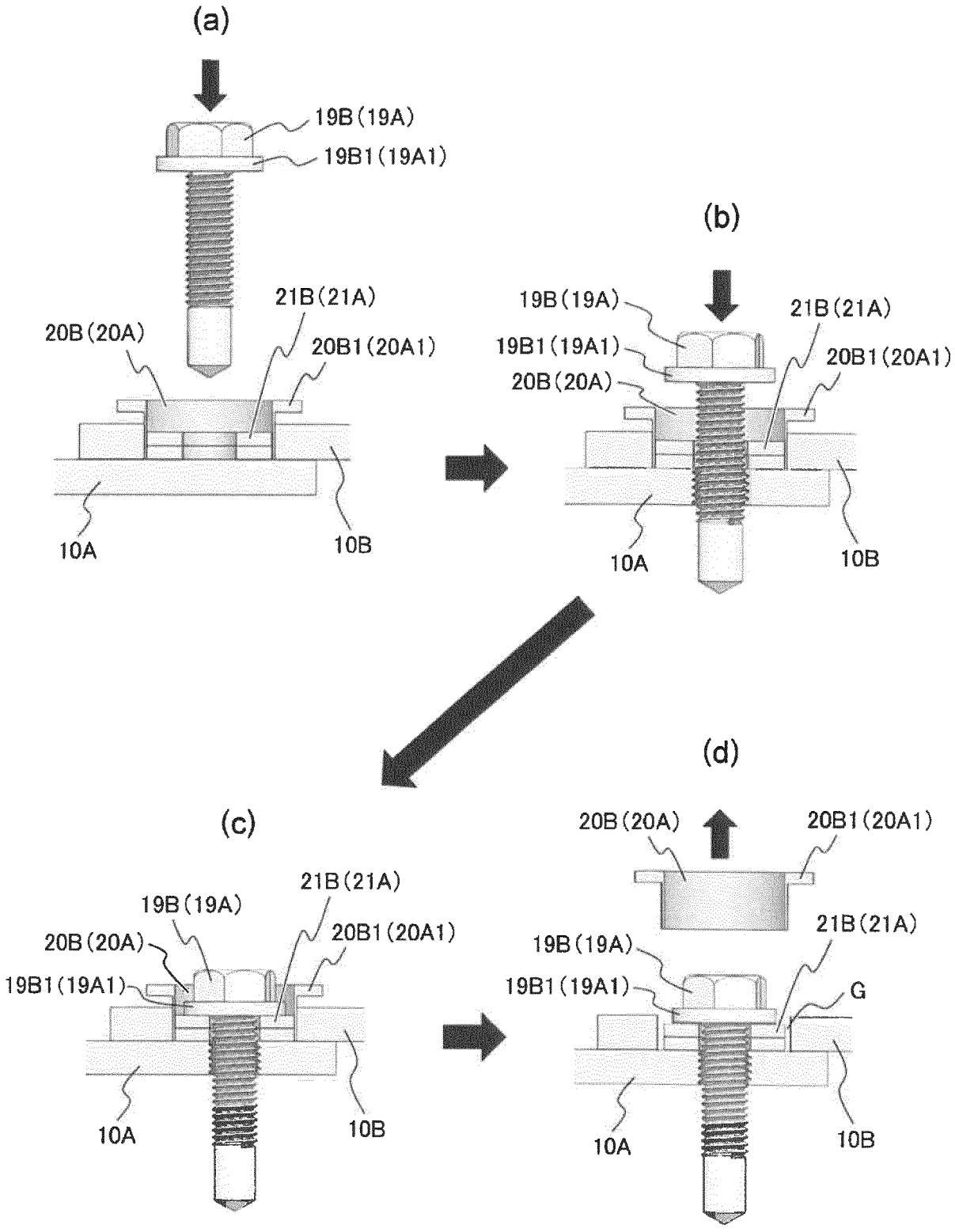


FIG. 13


(a)
19B(19A)
19B1(19A1)
21B(21A)
20B(20A)
20B1(20A1)
10A
10B
(b)
19B(19A)
19B1(19A1)
20B(20A)
21B(21A)
20B1(20A1)
10A
10B
(c)
21B(21A)
19B(19A)
20B(20A)
20B1(20A1)
19B1(19A1)
10A
10B
(d)
20B(20A)
20B1(20A1)
21B(21A)
19B(19A)
19B1(19A1)
G
10A
10B

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2020/038439

A. CLASSIFICATION OF SUBJECT MATTER
Int. Cl. B66B7/02(2006.01)i
FI: @@@B66B7JO2 E@@@

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int. Cl. B66B7/02

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan	1922-1996
Published unexamined utility model applications of Japan	1971-2020
Registered utility model specifications of Japan	1996-2020
Published registered utility model applications of Japan	1994-2020

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 2019-018928 A (TOSHIBA ELEVATOR AND BUILDING SYSTEMS CORP.) 07 February 2019 (2019-02-07)	1-6
A	JP 2019-142618 A (TOSHIBA ELEVATOR AND BUILDING SYSTEMS CORP.) 29 August 2019 (2019-08-29)	1-6
A	JP 2011-058548 A (RICOH CO., LTD.) 24 March 2011 (2011-03-24)	1-6
A	CD-ROM of the specification and drawings annexed to the request of Japanese Utility Model Application No. 040304/1993 (Laid-open No. 006505/1995) (TSUBAKIMOTO CHAIN CO.) 31 January 1995 (1995-01-31)	1-6

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
26.11.2020	08.12.2020
Name and mailing address of the ISA/ Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan	Authorized officer Telephone No.

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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/JP2020/038439

Patent Documents referred to in the Report	Publication Date	Patent Family	Publication Date
JP 2019-018928 A	07.02.2019	(Family: none)	
JP 2019-142618 A	29.08.2019	CN 209601875 U	
JP 2011-058548 A	24.03.2011	(Family: none)	
JP 7-006505 U1	31.01.1995	(Family: none)	

Form PCT/ISA/210 (patent family annex) (January 2015)

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Patent documents cited in the description

- JP 2019018928 A **[0005]**
- JP 2019142618 A **[0005]**