

DESCRIPTION

Title of Invention

DEVICE FOR ATTACHING ELEVATOR GUIDE RAIL

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Technical Field

[0001]

The present invention relates to a device for
attaching a guide rail which reduces propagation of
10 vibration or noise of the guide rail generated during
running of an elevator, to a building.

Background Art

[0002]

15 In an ordinary elevator, as shown in Figure 6, a cage
25 and a counter-weight 26 are driven by a traction machine
27 in an elevator shaft of a building to move up and down.
In order to facilitate upward and downward movements of the
cage 25 and counter-weight 26, they are guided by guide
20 rails 5. In addition, as shown in Figures 7 and 8, a guide
bracket 9 is provided to fix the guide rail 5 to the
building.

[0003]

The guide rail bracket 9 is comprised of a building
25 side bracket 2 with an L-shaped cross section to be fixed to

an elevator shaft wall 1 by anchor bolts 12 and a rail side bracket 6 with an L-shaped cross section for fixing, by rail clips 10, a guide rail 6 to guide the cage or counter-weight to move up and down.

5 [0004]

The rail clips 10 nip and hold both ends of the guide rail 5 and are fixed to the rail side bracket 6 by bolts 11. Elongated holes for adjusting the fastening position of the guide rail 5 are made in a horizontal piece 3 of the
10 building side bracket 2 and elongated holes 14 for adjusting the fastening position in the rail gage direction are made in a horizontal piece 7 of the rail side bracket 6, and the building side bracket 2 and rail side bracket 6 are fixed by bolts 15 through the elongated holes 13 and 14. Furthermore,
15 in order to prevent slippage, the horizontal piece 3 of the building side bracket 2 and the horizontal piece 7 of the rail side bracket 6 are fixed at welding parts 16 (see PTL 1).

[0005]

20 The above rail brackets have a problem that vibration of the guide rail 5 which is generated during running of the elevator is propagated to the building and vibration and noise adversely affect the residential environment. As a countermeasure against it, in the conventional techniques, a
25 bracket structure with an elastic member between both

brackets has been proposed (see PTL 2 and PTL 3). In these conventional techniques, it is described that vibration absorbing means such as elastic members are provided between all brackets and fasteners to prevent propagation of vibration to the elevator shaft wall even when the guide rail vibrates. It is also described that abnormal sound caused by an interference such as friction or collision between the guide rail and rail bracket upon expansion/shrinkage of the guide rail is reduced to offer a comfortable elevator to the residents of the building and elevator users.

Citation List

Patent Literature

15 [0006]

PTL 1: Japanese Patent Application Laid-Open No. H1-127586

PTL 2: Japanese Patent Application Laid-Open No. 2000-86112

20 PTL 3: Japanese Patent Application Laid-Open No. H10-77172

Summary of Invention

Technical Problem

25 [0007]

In the conventional techniques, an elastic member is held between the guide rail and bracket and fixing is performed uniformly at the torque of fastening the guide rail and rail clips, so there is concern about the possibility that an excessive pressure applied to the elastic member may hasten deterioration in the vibration absorption performance or aging degradation of the elastic member. Also, measures related to fixing of brackets by welding are insufficient.

10 [0008]

An object of the present invention is to provide a device for attaching a guide rail, which holds an elastic member between a building side bracket and a rail side bracket so that torque control can be performed with a torque value highly effective in vibration absorption without depending on the torque of fastening the guide rail and rail clips and also aging degradation of the elastic member can be delayed.

[0009]

20 Another object of the present invention is to provide a device for attaching a guide rail, which combines a flat plate bracket between the building side bracket and rail side bracket to enable fixing by welding even when an elastic member with a low thermal tolerance is used and
25 further make it easy to make a distance adjustment in the

rail gage direction according to variation in the distance from the elevator shaft wall to the guide rail by changing the welding margin for the flat plate bracket and the building side bracket.

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Solution to Problem

[0010]

The present invention is characterized in that in a device for attaching an elevator guide rail which is fixed
10 to an elevator shaft wall of an elevator, in which a cage and a counter-weight are moved up and down along a guide rail in an elevator shaft, and has a guide rail bracket for fixing the guide rail,

the guide rail bracket includes a flat plate bracket
15 to be fixed to the elevator shaft wall, an elastic member held between the flat plate bracket and the rail side racket, and a fastener for fastening and fixing the elastic member through the flat plate bracket and the rail side bracket.

[0011]

20 The device for attaching a guide rail is characterized in that the guide rail bracket further includes a building side bracket to be fixed to the elevator shaft wall and the flat plate bracket is fixed to the building side bracket.

[0012]

Furthermore, the device for attaching a guide rail is characterized in that a second elastic member is held between the flat plate bracket and the fastener.

[0013]

5 The device for attaching a guide rail is characterized in that the flat plate bracket and the elevator shaft wall or the building side bracket are fixed at a welding part.

[0014]

10 Furthermore, the device for attaching a guide rail is characterized in that a screw hole for screw-fitting with the fastener is made in the rail side bracket.

[0015]

15 Furthermore, the device for attaching a guide rail is characterized in that a fixing margin for the building side bracket and the flat plate bracket is adjusted to between a maximum fixing margin in which an overlap between the building side bracket and the flat plate bracket is maximized to an extent that the building side bracket and the fastener do not contact each other and a minimum fixing
20 margin in which the overlap between the building side bracket and the flat plate bracket is minimized to an extent allowable to bonding strength between the building side bracket and the flat plate bracket.

[0016]

The device for attaching a guide rail is characterized in that the rail side bracket, the elastic member, and the flat plate bracket are fixed using a vice device to control the compressive force of the elastic member.

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Advantageous Effects of Invention

[0017]

According to the present invention, in a device for attaching an elevator guide rail which is fixed to an elevator shaft wall of an elevator, in which a cage and a counter-weight are moved up and down along the guide rail in the elevator shaft, and has a guide rail bracket for fixing the guide rail, the guide rail bracket includes a flat plate bracket to be fixed to the elevator shaft wall, an elastic member held between the flat plate bracket and the rail side racket, and a fastener for fastening and fixing the elastic member through the flat plate bracket and the rail side bracket, so that torque control can be performed with a torque value highly effective in vibration absorption

without depending on the torque of fastening the guide rail and rail clips and aging degradation of the elastic member can be delayed. Furthermore, in the present invention, fixing by welding can be done even when an elastic member with a low thermal tolerance is used and it is easy to make an appropriate distance adjustment in the rail gage

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direction according to variation in the distance from the elevator shaft wall to the guide rail.

Brief Description of Drawings

5 [0018]

Figure 1 is a side view showing a guide rail bracket in Example 1 of the present invention.

Figure 2 is a plan view showing the guide rail bracket in Example 1 of the present invention.

10 Figure 3 is a side view showing a variation of the guide rail bracket in Example 1 of the present invention.

Figure 4 is a side view showing a guide rail bracket in Example 2 of the present invention.

15 Figure 5 is a side view showing a guide rail bracket in Example 3 of the present invention.

Figure 6 is a schematic view showing an ordinary elevator.

Figure 7 is a plan view showing a conventional guide rail bracket.

20 Figure 8 is a front view showing the conventional guide rail bracket.

Description of Embodiments

[0019]

Next, the present invention will be described referring to examples and drawings.

<Example 1>

[0020]

5 Figure 1 is a side view showing Example 1 of the present invention and Figure 2 is a plan view thereof. As shown in Figures 1 and 2, Example 1 includes a rail side bracket 6 for fixing a guide rail 5, a building side bracket 2, and a flat plate bracket 17 located between both the
10 brackets.

[0021]

 The rail side bracket 6 has an L-shaped cross section and includes a horizontal piece 7 and a vertical piece 8. The vertical piece 8 has through holes in which bolts 11 are
15 inserted. Two rail clips 10 for fixing both ends of the guide rail 5 are fixed to the vertical piece 8 by the bolts 11 as fasteners. The horizontal piece 7 has screw holes 23 which are used with bolts 15 as fasteners for screw fitting.

[0022]

20 The building side bracket 2 has an L-shaped cross section and includes a horizontal piece 3 and a vertical piece 4. The building side bracket 2 has round holes in the vertical piece 4 for anchor bolts 12 for fixing to the elevator shaft wall 1 and the horizontal piece 3 is fixed to
25 the flat plate bracket 17 at a welding part W by welding.

The building side bracket 2 is fixed to the elevator shaft wall 1 by the anchor bolts 12.

[0023]

One end of the flat plate bracket 17 is fixed to the horizontal piece 3 of the building side bracket 2 at the welding part W by welding as mentioned above and the other end has through holes 24 in which the bolts 15 for fixing the rail side bracket 6, elastic member 18 and flat plate bracket 17 are inserted.

10 [0024]

After the flat plate bracket 17 is positioned at a prescribed position of the building side bracket 2 and fixed by welding in advance, the building side bracket 2 is fixed to the elevator shaft wall 1 by the anchor bolts 12. Then, the rail side bracket 6 is fixed to the flat plate bracket 17 through the elastic member 18 by the bolts 15. 20 denotes a washer.

[0025]

Example 1 further includes a second elastic member 19

20 between the flat plate bracket 17 and bolts 15. The elastic members 18 and 19 are made from ring plate of highly durable industrial rubber material such as chloroprene rubber or butylene rubber. In the area from the rail side bracket 6 to the bolts 15, vibration generated by the guide rail 5 is easily propagated because metal components are in direct

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contact, but in the area from the bolts 15 to the flat plate bracket 17, due to the existence of the elastic members 18 and 19 the metal components are not in direct contact, so a sufficient vibration absorption effect is produced.

5 [0026]

The rail side bracket 6 has screw holes 23 to be engaged with the bolts 15 and nuts 21 for the bolts 15 are lock nuts, so the bolts 15 are locked by the thread-taps of the screw holes 23 of the rail side bracket 6 and the lock
10 nuts 21 to prevent the bolts 15 from loosening. The above structure is effective in preventing the bolts 15 from falling off due to loosening or rattling of the rail side bracket 6 and the flat plate bracket 17 which occurs when the elastic member 18 loses elasticity because of aging
15 degradation. In addition, a pin 22 for preventing the nut from falling off is provided at an end of the bolt 15 to increase safety.

[0027]

Regarding the size of the fixing margin for fixing the
20 building side bracket 2 and the flat plate bracket 17 by welding, the fixing margin in the case that the overlap between the building side bracket 2 and the flat plate bracket 17 is maximized to the extent that the building side bracket 2 and bolt 15 do not contact each other is taken as
25 the maximum fixing margin (see Figure 1) and the fixing

margin in the case that the overlap is minimized to the extent allowable to welding strength is taken as the minimum fixing margin (see Figure 3) and the margin is set between them.

5 [0028]

In other words, the horizontal piece 3 of the building side bracket 2 and the flat plate bracket 17 have a certain degree of margin in terms of size so as to absorb variation in the distance from the elevator shaft wall 1 to the guide
10 rail 5 according to dimensional variation with individual elevator shafts and make it easy to adjust the guide rail bracket.

[0029]

By fixing the building side bracket 2 and flat plate
15 bracket 17 by welding before fixing the flat plate bracket 17, elastic member 18 and rail side bracket 6 by the bolts 15, even if the elastic member is low in thermal tolerance, it can be used since the thermal influence can be avoided. Alternatively, after the rail side bracket 6 and flat plate

20 bracket 17 are fixed, the building side bracket 2 may be welded.

[0030]

Among the components in Figures 1 to 3, some components that have the same functions and are designated

by the same reference signs as those already described and shown in Figures 6 to 8 are not described again.

<Example 2>

[0031]

5 As shown in Figure 4, Example 2 uses an intermediate beam or a fastener plate located on the elevator shaft wall of the building as an elevator shaft strength member 28 instead of the building side bracket 2 in which the flat plate bracket 17 is directly fixed to the strength member 28.

10 In the present invention, even when the intermediate beam or fastener plate is used instead of the building side bracket 2 as mentioned above, the need for new members is eliminated and the installation cost is reduced though the freedom in installation work is slightly decreased.

15 <Example 3>

[0032]

 In Example 3, as shown in Figure 5, the rail side bracket 6, elastic member 18 and flat plate bracket 17 are fixed and instead of the bolts 15 for torque control of the

20 compressive force to the elastic member 18, a vice device 29 such as a vice is used for fixing and torque control. Since the vice device 29 itself can indicate a fastening torque, torque control is easier. The present invention brings about the same advantageous effects even when the vice

25 device 29 is used instead of the bolts 15.

Reference Signs List

[0033]

- 1...elevator shaft wall,
- 2...building side bracket,
- 5 3, 7...horizontal piece,
- 4, 8...vertical piece,
- 5...guide rail,
- 6...rail side bracket,
- 9...guide rail bracket,
- 10 10...rail clip,
- 11...bolt,
- 12...anchor bolt,
- 15...bolt,
- 17...flat plate bracket,
- 15 18...elastic member,
- 19...second elastic member,
- 21...nut,
- 25...cage,
- 26...counter-weight,
- 20 27...traction machine,
- 28...strength member,
- 29...vice device,
- W...welding part

Claims

1. A device for attaching an elevator guide rail which is fixed to a building side bracket or a strength member fixed to an elevator shaft wall of an elevator, in which a cage and a counter-weight are moved up and down along a guide rail in an elevator shaft, and has a guide rail bracket for fixing the guide rail,

wherein the guide rail bracket includes a flat plate bracket as a flat plate to be fixed to the building side bracket or the strength member fixed to the elevator shaft wall, a rail side bracket for fixing the guide rail, an elastic member held between the flat plate bracket and the rail side bracket, and a fastener for fastening and fixing the elastic member through the flat plate bracket and the rail side bracket and a screw hole for screw-fitting with the fastener is made in the rail side bracket.

2. The device for attaching a guide rail according to Claims 1, wherein a second elastic member is held between the flat plate bracket and the fastener.

3. The device for attaching a guide rail according to Claim 1 or 3, wherein the flat plate bracket and the building side bracket or the strength member are fixed at a welding part.

4. The device for attaching a guide rail according to any one of Claims 1, 2 and 3, wherein a fixing margin for the building side bracket and the flat plate bracket is adjusted to between a maximum fixing margin in which an overlap between the building side bracket and the flat plate bracket is maximized to an extent that the building side bracket and the fastener do not contact each other and a minimum fixing margin in which the overlap between the

building side bracket and the flat plate bracket is minimized to an extent allowable to bonding strength between the building side bracket and the flat plate bracket.

5. The device for attaching a guide rail according to any one of Claims 1, 2, 3 and 4 wherein the rail side bracket, the elastic member, and the flat plate bracket are fixed using a vice device to control a compressive force of the elastic member.