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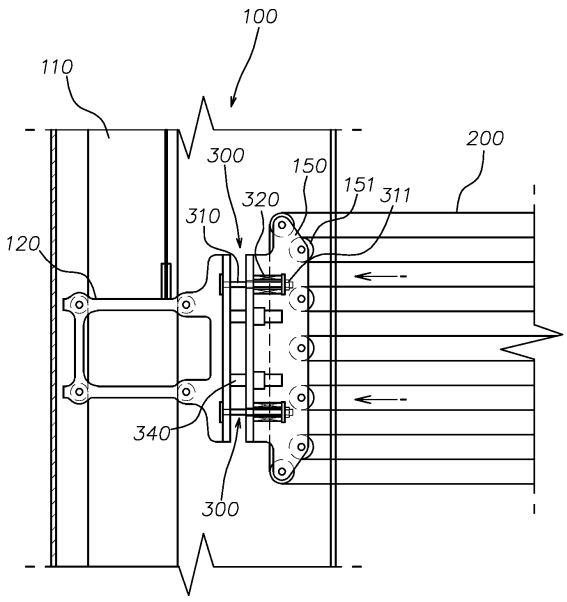
(54) **SAFETY EQUIPMENT FOR TRAIN PLATFORM, EQUIPPED WITH ROPE TENSION ADJUSTMENT MEANS**

(57) The present invention provides safety equipment for a train platform, in which sub-blocks (150) are disposed inside blocks (120) and connected by rope (200) that circulates and rope tension adjustment unit each have a tension adjustment unit (300) disposed between the block (120) and the sub-block (150) to adjust tension of the rope (200) by moving outward the sub-block (150). Accordingly, it is possible to uniformly adjust tension of the rope, to prevent a safety accident of passengers entering and exiting by easily opening the rope by uniformly maintaining the tension of the rope, and to be efficiently used through a simple structure and easy maintenance.

FIG. 4



EP 3 202 632 A1

Description

Technical Field

[0001] The present invention relates to safety equipment for a train platform and, more particularly, to safety equipment for a train platform, equipped with a rope tension adjustment unit that can uniformly adjust tension of ropes for allowing and preventing movement of passengers.

Background Art

[0002] In general, safety equipment for a train platform is installed on a platform by which trains pass to allow and prevent entrance and exit of passengers. Safety equipment, as shown in FIG. 1, includes: a plurality of rope lifters 100 each having a body 110 that is installed at a predetermined position from the entrance to the exit of a platform by which a train passes and having a block 120 vertically moved by a driving unit disposed at a side inside or outside the body 110; and a rope 200 horizontally connecting the blocks 120.

[0003] However, as shown in FIG. 2, tension of the rope 200 was adjusted by using a plurality of bolts 130 vertically arranged in the blocks 120 in the related art, but it was troublesome and inconvenient to adjust the tension in this way. In particular, it was difficult to uniformly adjust and maintain the tension of the rope, so passengers could easily open the rope and go in and out. Further, large numbers of bolts 130 and much rope 200 were used, so the efficiency of maintenance was low.

[0004] Further, as shown in FIG. 3, in the related art, a plurality of rollers 140 was vertically arranged in a block 120, a rope 200 was provided to circulate around the rollers 140, and a spring 141 was disposed inside the rope 200 to adjust tension. However, it was difficult to appropriately adjust the tension in accordance with extension and contraction of the rope 200 due to changes in season and temperature. In particular, since the rope 200 has a length of tens to hundreds of meters, it was difficult to adjust the tension of the rope 200 with only the spring 141 and there were constraints in function.

[0005] The background of the present invention has been disclosed in the following Patent Documents.

(Patent Document 1) Korean Patent No. 10-0601112 (2006. 07. 19.)
(Patent Document 2) Korean Patent No. 10-1306648 (2013. 09. 26.)
(Patent Document 3) Korean Patent No. 10-1344995 (2013. 12. 24.)
(Patent Document 4) Korean Patent Application Publication No. 10-2014-0029950 (2014. 03. 11.)
(Patent Document 5) Korean Patent No. 10-1391453 (2014. 05. 07.)

Disclosure

Technical Problem

[0006] An object of the present invention is to provide safety equipment for a train platform, the safety equipment equipped with a rope tension adjustment unit disposed between blocks that vertically move and sub-blocks connected by a rope that circulates to uniformly adjust tension of the rope having a length of tens to hundreds of meters by moving outward the sub-blocks.

Technical Solution

[0007] Safety equipment for a train platform, equipped with a rope tension adjustment unit of the present invention includes: a plurality of rope lifters 100 each having a body 110 that is installed at a predetermined position from the entrance to the exit of a platform by which a train passes and having a block 120 vertically moved by a driving unit disposed at a side inside or outside the body 110; a rope 200 horizontally connecting the blocks 120; and tension adjustment units 300 disposed between the blocks 120 and sub-blocks 150, which are disposed inside the blocks 120 and connected by the rope 200 that circulates, to adjust tension of the rope 200 by moving outward the sub-blocks 150.

[0008] The tension adjustment unit 300 may include: support shafts 310 each coupled to a first side of the block 120 and inserted in a first side of the sub-block 150; and elastic members 320 each fitted on a second portion of the support shaft 310 to move outward the sub-block 150.

[0009] The tension adjustment unit 300 may include: support shafts 310 each coupled to the first side of the sub-block 150 and inserted in the first side of the block 120; and elastic members 320 each fitted on the second portion of the support shaft 310 to move outward the sub-block 150.

[0010] The tension adjustment unit 300 may include moving members 311 thread-fastened to ends of the second portions of the support shafts 310 to push the elastic members 320.

[0011] The tension adjustment unit 300 may include elastic members 330 disposed between the blocks 120 and sub-blocks 150 to push the sub-blocks 150.

[0012] Guide shafts 340 may be provided between the block 120 and the sub-block 150.

Advantageous Effects

[0013] According to the safety equipment according to an embodiment of the present invention, it is possible to uniformly adjust tension of a rope having a length of tens to hundreds of meters. In particular, it is possible to prevent a safety accident where passengers walk on train tracks by easily opening the rope by uniformly adjusting and maintaining tension of the rope.

[0014] Further, since the structure is simple and maintenance is easy, the efficiency in use can be improved.

Description of Drawings

[0015]

FIG. 1 is a schematic view showing the structure of common safety equipment for a train platform.

FIGS. 2 and 3 are views showing the configuration of a rope tension adjustment unit for safety equipment for a train platform according to the related art.

FIG. 4 is a view showing the configuration of a first embodiment of safety equipment for a train platform, equipped with a rope tension adjustment unit of the present invention.

FIG. 5 is a view showing the configuration of a second embodiment of safety equipment for a train platform, equipped with a rope tension adjustment unit of the present invention.

FIG. 6 is a view showing the configuration of a third embodiment of safety equipment for a train platform, equipped with a rope tension adjustment unit of the present invention.

Best Mode

[0016] Hereinafter, preferred embodiments of the present invention will be described with reference to accompanying drawings.

[0017] Safety equipment for a train platform, equipped with a rope tension adjustment unit according to the present invention is shown in FIGS. 4 to 6. FIG. 4 shows a first embodiment, FIG. 5 shows a second embodiment, and FIG. 6 shows a third embodiment.

[0018] Safety equipment for a train platform, equipped with a rope tension adjustment unit of the present invention includes: a plurality of rope lifters 100 each having a body 110 that is installed at a predetermined position from the entrance to the exit of a platform by which a train passes and having a block 120 vertically moved by a driving unit disposed at a side inside or outside the body 110; a rope 200 horizontally connecting the blocks 120; and tension adjustment units 300 disposed between the blocks 120 and sub-blocks 150, which are disposed inside the blocks 120 and connected by the rope 200 that circulates, to adjust tension of the rope 200 by moving outward the sub-blocks 150.

[0019] The operation principle and structure of the rope lifters 100 and the rope 200 are well known in the art, so they are not described in detail.

[0020] Since the sub-block 150 is disposed inside the block 120, it is possible to adjust the tension of the rope 200 by moving the entire sub-block 150 outside.

[0021] A plurality of rollers 151 are vertically arranged inside the sub-block 150 and one rope 200 can connect the rollers while circulating in the entire equipment.

[0022] Accordingly, the block 120 can be vertically moved and the sub-block 150 can be moved outside by operating the tension adjustment unit 300 with the rope 200 connected, so it is possible to uniformly adjustment and maintain the tension of the rope 200 that has a length of tens to hundreds of meters in accordance with the movement distance of the sub-block 150.

[0023] A first embodiment of the tension adjustment unit 300, as shown in FIG. 4, includes: support shafts 310 each coupled to a first side of the block 120 and inserted in a first side of the sub-block 150; and elastic members 320 each fitted on a second portion of the support shaft 310 to move outward the sub-block 150.

[0024] The support shafts 310 smoothly guide the sub-block 150 that is moved left and right by elasticity of the elastic members 320.

[0025] That is, first ends of the support shafts 310 are fixed to the first side of the block 120 and second ends of the support shafts 310 are inserted in the first side of the sub-block 150, so it is possible to uniformly adjust and maintain the tension of the rope 200 by pushing the sub-block 150 outward using the elastic members 320.

[0026] With the second portions of the support shafts 310 in contact with the elastic members 320, it is possible to push outward the sub-block 150 using elasticity of the elastic members 320.

[0027] A second embodiment of the tension adjustment unit 300, as shown in FIG. 5, includes: support shafts 310 each coupled to a first side of the sub-block 150 and inserted in a first side of the block 120; and elastic members 320 each fitted on a second portion of the support shaft 310 to move outward the sub-block 150.

[0028] Accordingly, first ends of the support shafts 310 are fixed to the first side of the sub-block 150 and second ends of the support shafts 310 are inserted in the first side of the block 120, so it is possible to uniformly adjust and maintain the tension of the rope 200 by pushing the sub-block 150 outward using the elastic members 320.

[0029] With the second portions of the support shafts 310 in contact with the elastic members 320, it is possible to moving the sub-block 150 can by pulling outward the support shafts 310 using elasticity of the elastic members 320.

[0030] In the present invention, it is possible to uniformly adjust and maintain the tension of the rope 200 by moving outward the sub-block 150 by using compression springs as the elastic members 320.

[0031] The tension adjustment unit may further include moving members 311 thread-fastened to the ends of the second portions of the support shafts 310 to increase compressive force of the elastic members 320 by pushing the elastic members 320.

[0032] The moving members 311 may be nuts or other machined members to be thread-fastened to the ends of the second portions of the support shafts 310.

[0033] Meanwhile, a third embodiment of the tension adjustment unit 300, as shown in FIG. 6, includes elastic members 330 disposed between the block 120 and the sub-block 150 to move outward the sub-block 150.

[0034] In this embodiment, it is possible to uniformly adjust and maintain the tension of the rope 200 by moving outward the sub-block 150 by using extension springs as the elastic members 330.

[0035] In the present invention, guide shafts 340 may be provided between the block 120 and the sub-block 150 not only to guide the sub-block 150 outward or inward by connecting the block 120 vertically moving and the sub-block 150 moving outward for tension adjustment, but to smoothly guide the block 120 and the sub-block 150 so that the block 120 and the sub-block 150 are simultaneously vertically moved while the block 120 is vertically moved.

[0036] The guide shafts 340 may be fixed to the first side of the block 120 and inserted in the sub-block 150 or may be fixed to the first side of the sub-block 150 and inserted in the block 120.

[0037] Although embodiments of the present invention were described in detail above, the present invention is not limited thereto and modifications substantially equivalent to the embodiments of the present invention are also included in the present invention.

Claims

1. Safety equipment for a train platform, equipped with a rope tension adjustment unit, comprising:

   a plurality of rope lifters (100) each having a body (110) that is installed at a predetermined position from an entrance to an exit of a platform by which a train passes and having a block (120) vertically moved by a driving unit disposed at a side inside or outside the body (110);
   a rope (200) horizontally connecting the blocks (120); and
   tension adjustment units (300) disposed between the blocks (120) and sub-blocks (150), which are disposed inside the blocks (120) and connected by the rope (200) that circulates, to adjust tension of the rope (200) by moving outward the sub-blocks (150).

2. The safety equipment of claim 1, wherein the tension adjustment unit (300) includes:

   support shafts (310) each coupled to a first side of the block (120) and inserted in a first side of the sub-block (150); and
   elastic members (320) each fitted on a second portion of the support shaft (310) to move outward the sub-block (150).

3. The safety equipment of claim 1, wherein the tension adjustment unit (300) includes:

   support shafts (310) each coupled to the first side of the sub-block (150) and inserted in the first side of the block (120); and
   elastic members (320) each fitted on the second portion of the support shaft (310) to move outward the sub-block (150).

4. The safety equipment of claim 2 or 3, further comprising:

   moving members (311) thread-fastened to ends of the second portions of the support shafts (310) to push the elastic members (320).

5. The safety equipment of claim 1, wherein guide shafts (340) are provided between the block (120) and the sub-block (150).

FIG. 1

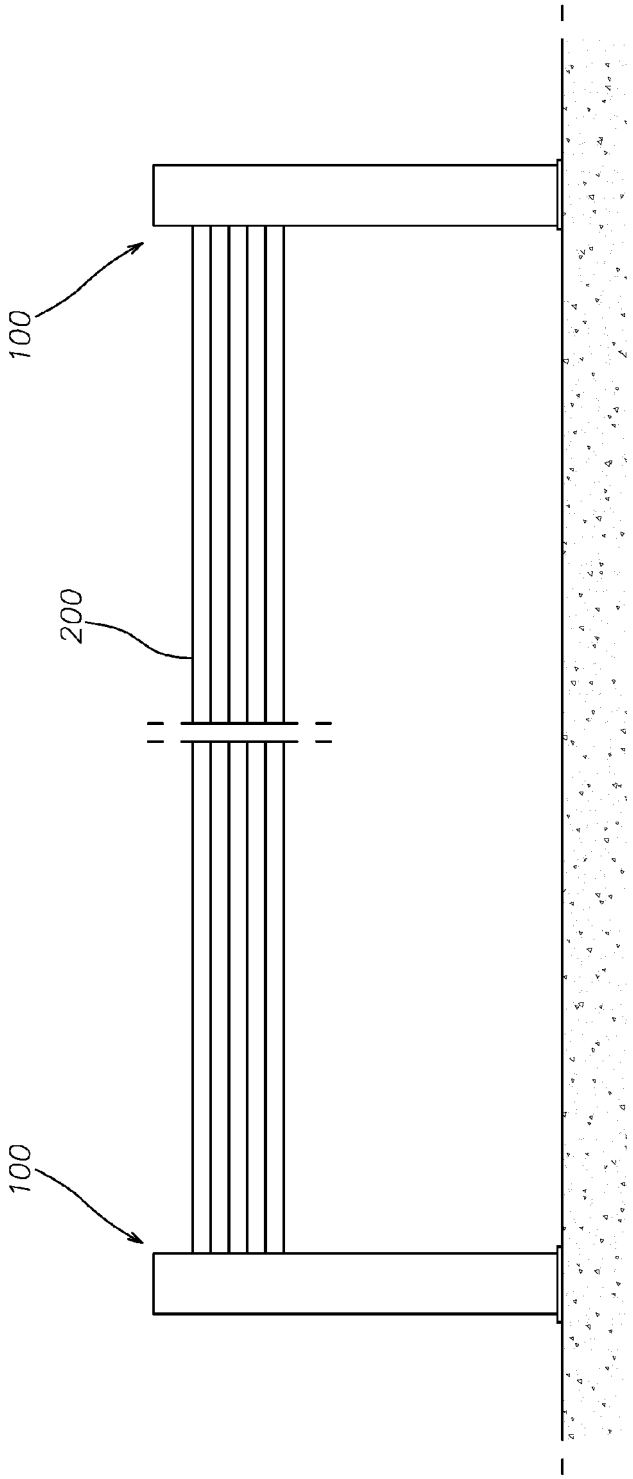


FIG. 2

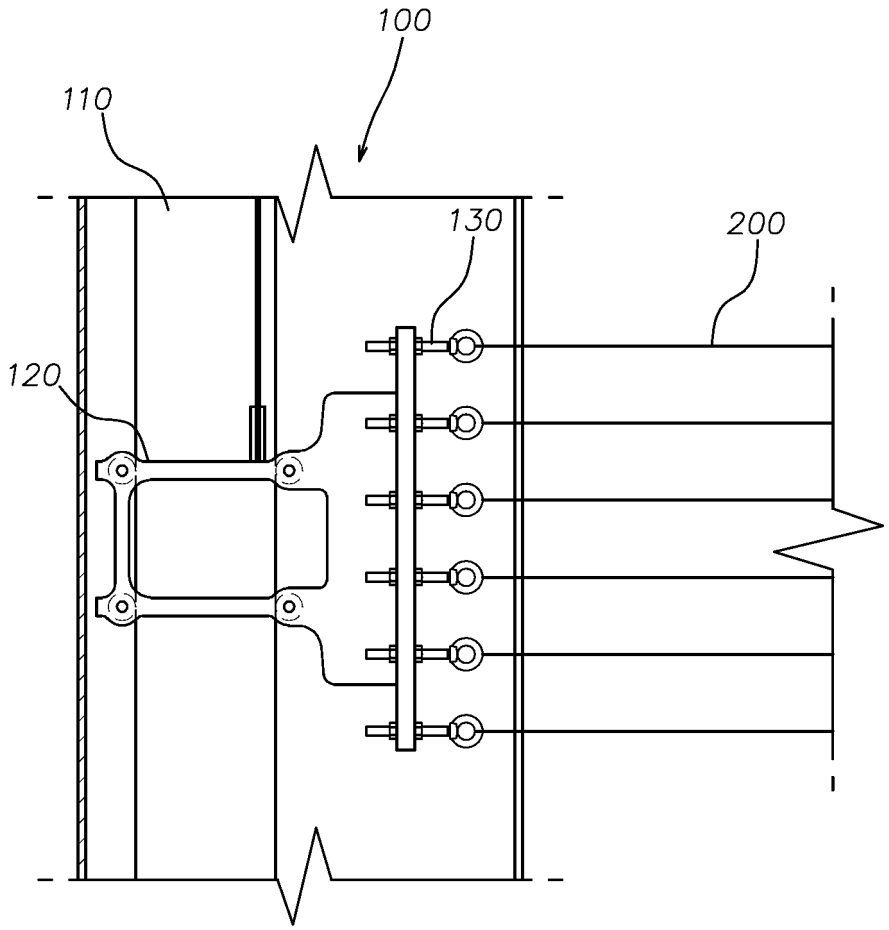


FIG. 3

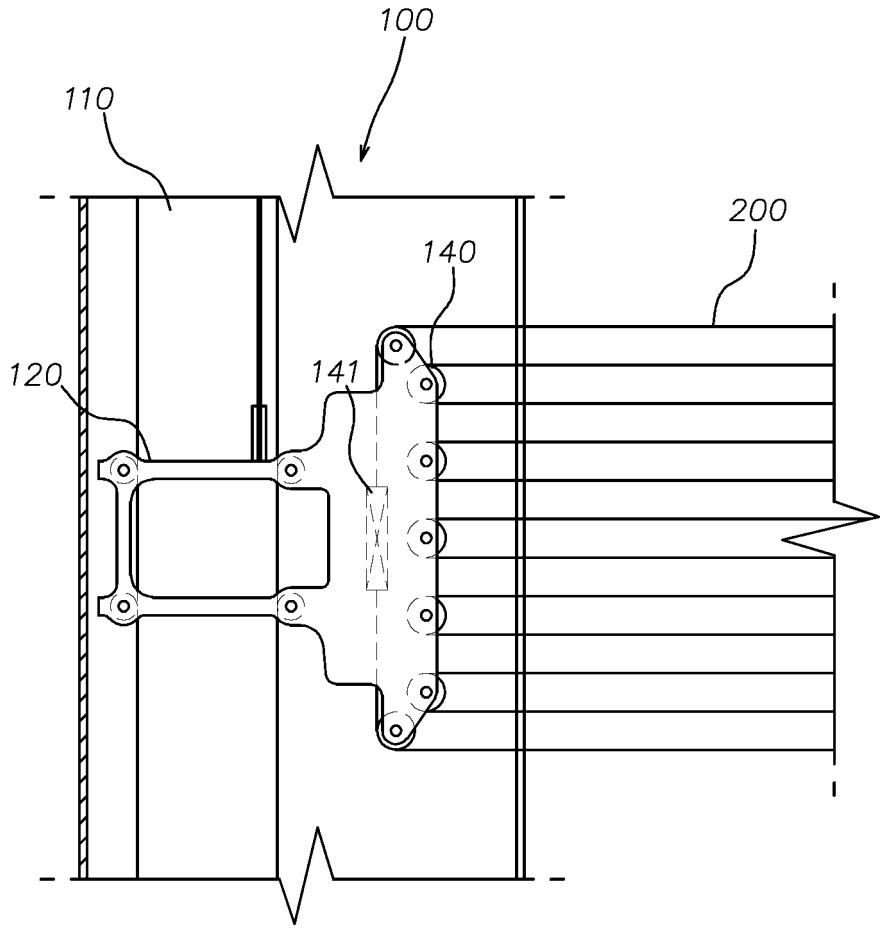


FIG. 4

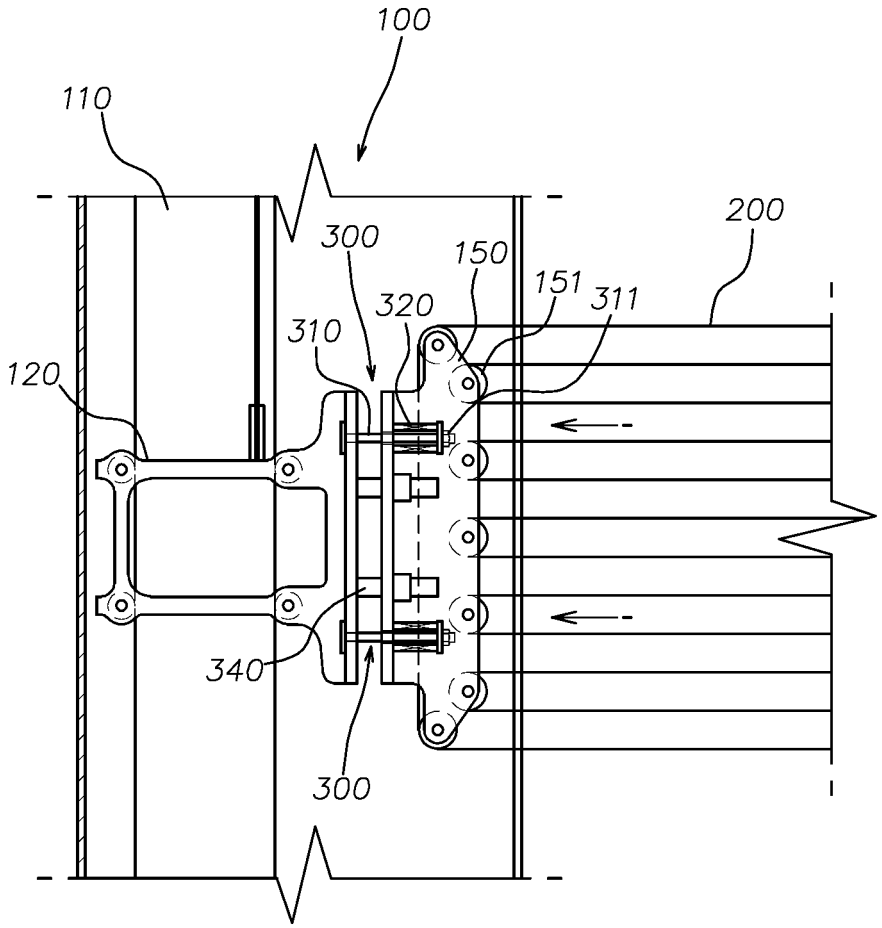


FIG. 5

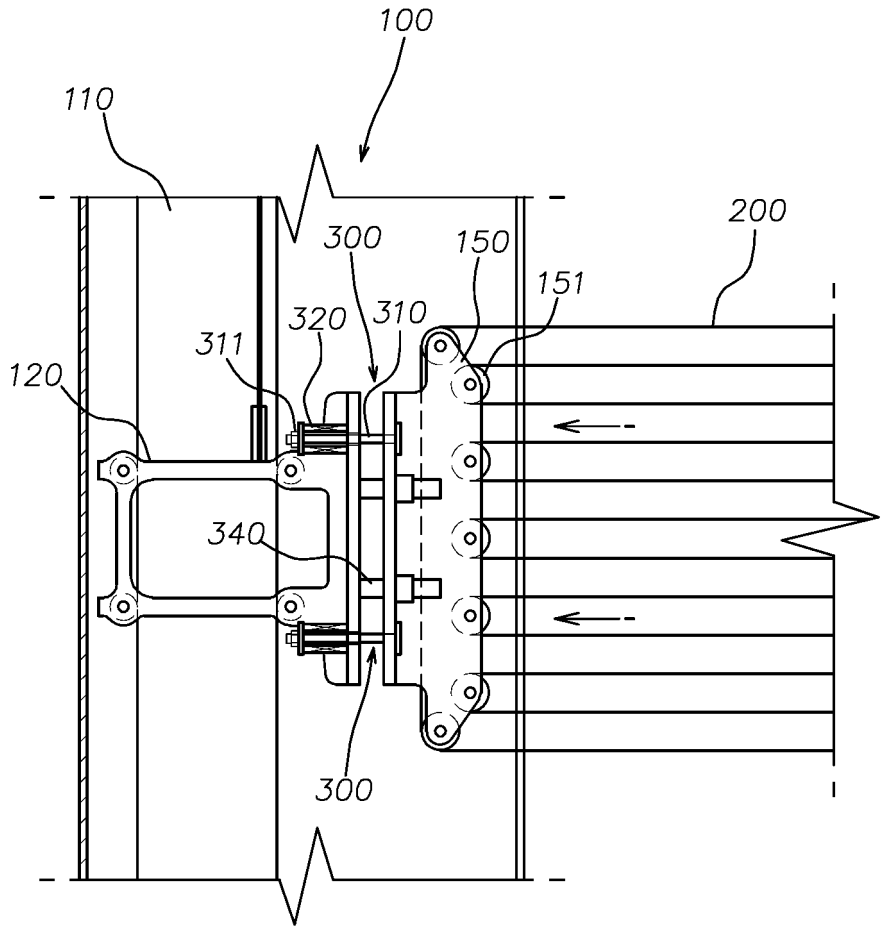
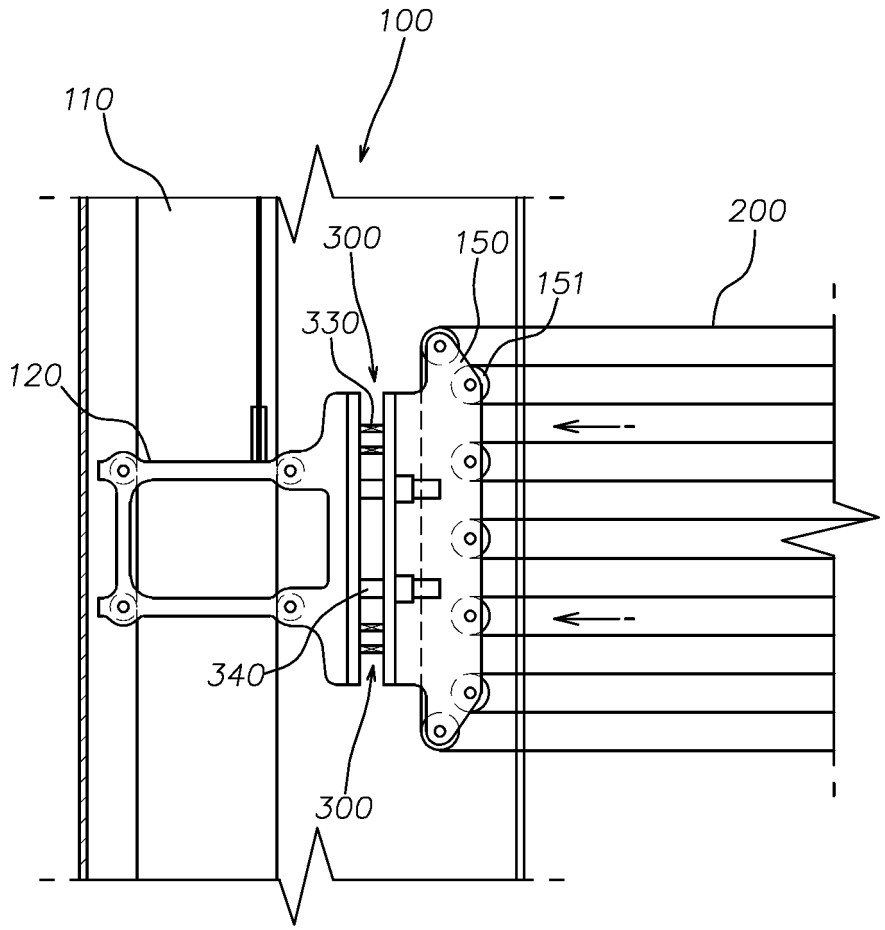


FIG. 6



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR2015/010421

A. CLASSIFICATION OF SUBJECT MATTER

B61B 1/02(2006.01)i, E01F 1/00(2006.01)i, E01F 13/00(2006.01)i

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)

B61B 1/02; E01F 13/00; B66B 7/10; E01F 13/04; E04G 21/00; E01F 1/00; E04H 17/14

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
Korean Utility models and applications for Utility models: IPC as above
Japanese Utility models and applications for Utility models: IPC as above

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

eKOMPASS (KIPO internal) & Keywords: electric rail car, platform, tension, safety, rope and block

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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Y	US 2006-0140718 A1 (LAMORE, Michael J.) 29 June 2006 See paragraphs [0034]-[0036], [0041] and figure 1.	1-5
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A	US 2010-0219390 A1 (O'BANION et al.) 02 September 2010 See paragraphs [0115]-[0123] and figure 1.	1-5

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

* Special categories of cited documents:
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Date of the actual completion of the international search	Date of mailing of the international search report
16 DECEMBER 2015 (16.12.2015)	**16 DECEMBER 2015 (16.12.2015)**
Name and mailing address of the ISA/KR Korean Intellectual Property Office Government Complex-Daejeon, 189 Seonsa-ro, Daejeon 302-701, Republic of Korea Facsimile No. 82-42-472-7140	Authorized officer Telephone No.

Form PCT/ISA/210 (second sheet) (July 2009)

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Information on patent family members

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- KR 101306648 **[0005]**
- KR 101344995 **[0005]**
- KR 1020140029950 **[0005]**
- KR 101391453 **[0005]**