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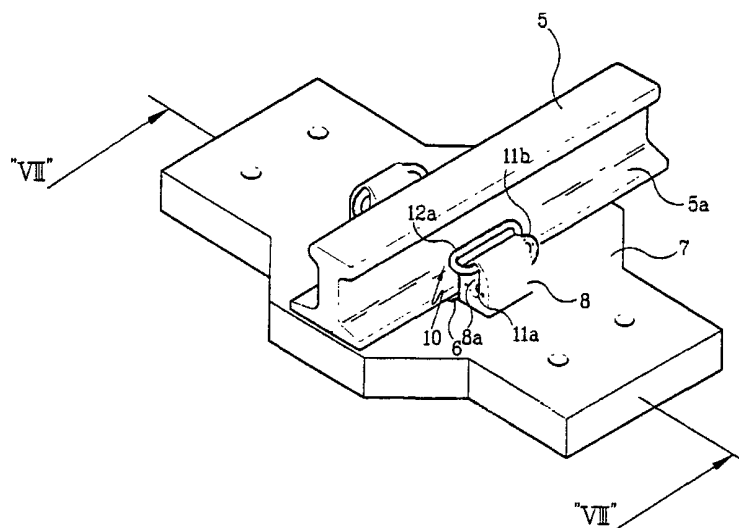
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(54) Title: RAIL FIXING CLIP



(57) Abstract: The present invention relates to a rail fixing clip of a railway for directly pressurizing a lower flange portion of a rail of a railway installed in a rail tie or in a concrete railway and tightly fixing to a tie or a rail support for thereby preventing an escape of a rail of a railway, and in particular to a rail fixing clip of a railway having a durability significantly enhanced in a state that more than two separated points are supported. The rail fixing clip of a railway includes an insertion portion including a couple-of-force portion of a straight line-shaped rod and a hinge portion extended from one end of the couple-of-force portion and arranged in parallel with respect to the couple-of-force portion above the couple-of-force portion, and a support portion including a co-working portion extended from the hinge portion at a certain horizontal distance in parallel with respect to the hinge portion and a pressing portion extended from the co-working portion and arranged in parallel with respect to the co-working portion below the co-working portion for pressing the upper surface of the flange portion of the rail of the railway.

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RAIL FIXING CLIP

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a rail fixing clip of a railway for directly
5 pressurizing a lower flange portion of a rail of a railway installed in a rail tie or in a
concrete railway and tightly fixing to a tie or a rail support for thereby preventing an
escape of a rail of a railway, and in particular to a rail fixing clip of a railway having a
durability significantly enhanced in a state that more than two separated points are
supported.

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2. Description of the Background Art

A rail fixing clip of a railway is a formed of a curved steel used for fixing a rail
of a railway. One end of the rail fixing clip is fixed to a tie or a rail support which
supports the lower portion of the rail of the railway, and the other end of the same is
15 arranged on an upper surface of the flange portion of the rail of the railway at a
certain horizontal distance with respect to the one end of the same, so that a flange
portion of a rail which receives a couple of force which is generated at a portion of a
tie is supported by a reaction force generated in a tie(in the case of a railway which is
constructed without a tie) based on an elastic transform by a weight of a train which
20 moves along a rail between the rail supports of the railway for thereby fixing the rail to
the tie.

Figure 1 is a perspective view illustrating a rail fixing clip of a conventional railway, Figure 2 is a cut-away disassembled perspective view of a railway having a rail fixed by a rail fixing clip, Figures 3A and 3B are front and side views illustrating a rail fixing clip of a conventional railway, and Figure 4 is a cross-sectional view taken
5 along line IV-IV of Figure 1.

As shown in Figure 1, the conventional rail fixing clip is formed in an e-shape formed by curving a single rod and includes a straight line shape hinge portion 1a at an one end of the same, a couple-of-force portion 1b arranged in parallel at one side of the hinge portion 1a, and a pressing portion 1c extended from the couple-of-force
10 portion 1b, detouring the hinge portion 1a and arranged in parallel with respect to the hinge portion 1a at a portion opposite to the couple-of-force portion 1b.

As shown in Figure 2, in the conventional rail fixing clip 1 of the railway, the hinge portion 1a is inserted into a fixing hole 3a of the clip fixing plate 3(herein after called as a plate) embedded in the tie 2 and is fixed to the plate 3 in such a manner
15 that the pressing portion 1c is mounted on the flange portion 5a of the rail 5, and the opposite couple-of-force portion 1b is formed on the plate 3.

In the conventional rail fixing clip 1 of the railway, the plate 3 offsets the couple of force based on a reaction force R1 of a vertical direction applied with respect to the upper portion of the hinge portion 1a on an upper portion of the fixing
20 hole 3a and a reaction force R2 of the vertical upper portion applied with respect to the lower portion of the couple of force 1b through the pressing portion 1c of Figure 2 with respect to the flange portion 5a of the rail 5 which receives a couple of force

based on the vertical weight of the train between two ties 2 for thereby maintaining a parallel state of the force and moment, so that the rail 5 is fixed to the tie 1 or the rail support. Namely, the couple of force which is generated in a tie due to a vertical weight of the train which moves between two ties(or rail supports) in a direction that the rail is separated is applied in a vertical upper direction with respect to the lower portion of the pressing portion 1c of the pressing clip 1, and a moment MF1 about a connection portion(portion A of Figure 1) between the pressing portion 1c and the couple-of-force portion 1b as shown in Figure 3a and a moment MF2 about the hinge portion 1a as shown in Figure 3B are generated. As shown in Figures 3A and 3B, the conventional rail fixing clip 1 has a reaction force R1 of the plate 3 applied in a vertical direction in the portion above the hinge portion 1a, and the tie 1 has a vertical upper direction reaction R2 applied with respect to the couple of force 1b through the plate 3. A resistance moment MR1 is applied about the connection portion A between the couple-of-force portion 1b and the pressing portion 1c based on the reaction force R1, and a resistance moment MR2 is applied about the connection portion A between the couple-of-force portion 1b and the pressing portion 1c, and a resistance moment MR3 is applied about the hinge portion 1a for thereby maintaining a parallel state between the force and moment, so that the rail 5 is not separated. The forces applied to each portion of the fixing clip are actually applied as a distribution weight. In the above operation, it is assumed that the forces are a concentration weight applied to the centers of each portion.

The parallel states of the force and moment between the conventional rail

fixing clip and the rail flange may be expressed as follows.

$$F = R1 + R2$$

$$MF1 = MR1 + MR2$$

5 $MF2 = MR3$

However, in the conventional rail fixing clip, since a torsion stress is concentrated at a connection portion A between the pressing portion 1c and the couple-of-force portion 1b to which an axial moment MF1 and a horizontal direction moment MF2 are applied in maximum by the couple of force F in an axial direction from an applying point of the couple of force F or in a horizontal direction, the durability of the connection portion A is weak. Therefore, in the case that the conventional rail fixing clip is used, the fatigue stress of the connection portion of the rail fixing clip is accumulated due to a repeatedly applied impact weight of the train, and the connection portion may be damaged, so that the maintenance cost is increased. In addition, the elements of the train may be damaged due to the particles of the fixing clip which is cut and flies, so that a worker or train passenger may be damaged by the particles of the fixing clip.

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SUMMARY OF THE INVENTION

20 Accordingly, it is an object of the present invention to provide a rail fixing clip of a railway capable of supporting more than two separated points with respect to a fixing implement fixed to a tie or a concrete railway for thereby decreasing a torsion

stress concentration phenomenon at a certain portion and significantly enhancing a durability.

To achieve the above objects, there is provided a rail fixing clip of a railway for fixing a rail of a railway with respect to a rail support of a railway according to the present invention which includes an insertion portion including a couple-of-force portion of a straight line-shaped rod and a hinge portion extended from one end of the couple-of-force portion and arranged in parallel with respect to the couple-of-force portion above the couple-of-force portion, and a support portion including a co-working portion extended from the hinge portion at a certain horizontal distance in parallel with respect to the hinge portion and a pressing portion extended from the co-working portion and arranged in parallel with respect to the co-working portion below the co-working portion for pressing the upper surface of the flange portion of the rail of the railway.

A mounting portion is further mounted in the elongated hole in such a manner that a part of the hinge portion is sunk in the direction of the couple-of-force portion in the hinge portion.

The support portion and insertion portion are symmetric.

The support portion and insertion portion are arranged in the vertical direction.

The support portion and insertion portion has a certain slant angle in the opposite direction.

The slant angle of the support portion and the insertion portion is 45°.

The lengths of the couple-of-force portion and hinge portion are longer than

the lengths of the co-working portion and the pressing portion.

To achieve the above object, there is provided a rail fixing clip of a railway for fixing a rail of a railway with respect to a rail support of a railway which includes an insertion portion including a hinge portion of a straight line rod shape and a couple-
5 of-force portion extended from one end of the hinge portion and arranged in parallel with respect to the hinge portion above the hinge portion and inserted into an elongated hole of the fixing implement of the rail support of the railway, and a support portion including a second co-working portion extended from the other end of the couple-of-force portion and arranged in parallel with respect to the couple-of-force
10 portion above the couple-of-force portion, a first co-working portion extended from the second co-working portion and arranged in parallel with respect to the second co-working portion at a certain horizontal distance with the second co-working portion, and a pressing portion extended from the second co-working portion and arranged in parallel with respect to the co-working portion below the co-working portion for
15 thereby pressing the upper surface of the flange portion of the rail of the railway.

To achieve the above object, there is provided a rail fixing clip of a railway for fixing a rail of a railway with respect to a rail support of a railway which includes an insertion portion including a hinge portion of a straight line rod shape and a couple-
of-force portion extended from one end of the hinge portion and arranged in parallel
20 with respect to the hinge portion above the hinge portion and inserted into an elongated hole of a fixing implement of the rail support of the railway, and a support portion including a co-working portion extended from the other end of the couple-of-

force portion and arranged in parallel with respect to the couple-of-force portion above the couple-of-force portion and a pressing portion extended from the co-working portion and arranged in parallel with respect to the insertion portion at a certain horizontal distance below the co-working portion for thereby pressing the upper surface of the flange portion of the rail of the railway.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The embodiments of the present invention will be explained with reference to the accompanying drawings.

Figure 5 is a perspective view illustrating a rail fixing clip of a railway according to a first embodiment of the present invention, Figure 6 is a view illustrating a using state of a rail fixing clip of a railway, Figures 7A and 7B are side views illustrating a rail fixing clip of a railway, and Figure 8 is a cross-sectional view taken along line VIII-VIII of Figure 6.

As shown in Figure 5, a rail fixing clip 10 of a railway is a curved steel and includes U-shaped insertion and support portions 11 and 12 which are parallel each other. The insertion portion 11 includes a couple-of-force portion 11a of a straight line rod shape, and a hinge portion 11b extended from the couple-of-force portion 11a and arranged in parallel with respect to the couple-of-force portion 11a on the couple-of-force portion 11a. The support portion 12 includes a co-working portion 12a extended from the hinge portion 11b and arranged in parallel with respect to the hinge portion 11b at one side of the hinge portion 11b, and a

pressing portion 12b extended from the co-working portion 12a and arranged in parallel below the co-working portion 12a.

As shown in Figures 6 through 8, in the rail fixing clip 10 of the railway according to the first embodiment of the present invention, a buffering plate 9 is installed on a concrete railway, and the pressing portion 12b of the support portion 12 is inserted into an elongated hole 8a of the fixing implement 8 of the rail support 7 in a state that the pressing portion 12b of the support portion 12 is placed on a flange portion 5a of the rail with respect to the rail support 7 fixed by an embedded bolt.

In the rail fixing clip of the railway according to the first embodiment of the present invention, the rail 5 of the rail support portion has a couple of force by a vertical weight of the train between two rail supports 8 and a repulsive force R_v as shown in figures 7A and 7B in a vertical lower direction that the upper surface of the elongated hole 8a of the fixing implement 8 presses the hinge portion 11b through the pressing portion 12b with respect to the flange portion 5a, and resistance moments M_{H1} and M_{H2} are applied as horizontal repulsive forces R_{H1} and R_{H2} as shown in figure 7 with respect to an inner side of the hinge portion 11b and an outer portion of the couple-of-force portion 11a for thereby maintaining a parallel state between the force and moment, so that the rail 5 is tightly engaged with the rail support 7.

As shown in Figures 7A and 7B, when the couple of force by a vertical weight of a train which moves between the rail supports 8 is applied to the flange portion

5a of Figure 6 of the rail, the couple of force is transferred to the pressing portion 12b of the rail fixing clip 10 and generates a force F in a vertical upward direction for thereby lifting the fixing clip 10, and the force F is applied as a moment MW based on a horizontal distance between the pressing portion 12b and the insertion portion 11 and a moment ML about the connection portion 13 between the hinge portion 11b and the co-working portion 12a. The fixing clip 10 according to the first embodiment of the present invention is elastically transformed in an elastic transformation limit and accumulates an elastic energy and receives a part of the force F and the moments MW and ML . The remaining force and moments are offset by a repulsive force RV that the fixing implement 8 having the fixing clip 10 applies with respect to the upper portion of the hinge portion 11b, the resistance moment MV based on the repulsive force RV , the repulsive forces $RH1$ and $RH2$ that the fixing implement 8 applies to the inner and outer sides of the couple-of-force portion 11a, and the resistance moments $MH1$ and $MH2$ based on the repulsive forces $RH1$ and $RH2$ for thereby maintaining a parallel state of the force. Therefore, it is possible to prevent the rail 5 which receives a couple of force F based on the weight of the train from being separated from the rail support 7(or tie). In the railway, the rail 5 receives a couple of force F due to the weight of the train and a torsion weight when the train moves along the rail. In the present invention, since the torsion weight is weak, the effects of the same is not assumed.

The rail fixing clip 10 according to the first embodiment of the present invention stores the rising force F from the flange portion 5a of the rail 5 as an

elastic transform energy and consumes the energy, and the fixing implement 8 offsets the forces as repulsive forces RV, RH1 and RH2 applied with respect to the fixing clip 10 for thereby supporting the rail 5. In particular, since the length from the end portion of the pressing portion 12b to the point in which the hinge portion 11b starts) is long, and the limit of the elastic transform is large, the size of the force which is stored as an elastic transform energy and consumed is large, and the moments MV, MH1 and MH2 generated in accordance with the rising force F of the rail is distributed to at least three portions with respect to the fixing implement 8, namely, the upper portion of the hinge portion 11b, the inner side surface of the couple-of-force portion 11a and the outer side surface of the hinge portion 11b, it is possible to prevent the torsion stress due to the moment from being concentrated at a certain portion.

Since the rail fixing clip of the railway according to the first embodiment of the present invention has a structure having a large allowable strength and fatigue strength, the rail fixing clip of the rail has an excellent durability with respect to the conventional rail fixing clip of the railway assuming that the amount of the material used is the same. In addition, since the structure is symmetric, the rail fixing clip according to the first embodiment of the present invention is well adapted to the left and right sides of the rail and is fixed to the fixing implement 8 by simply inserting the support portion 12, so that the assembling performance is excellent, and the working efficiency of the railway construction and maintenance are significantly enhanced.

As shown in a first example of Figure 9, in the case that the rail fixing clip 10 of the railway according to the first embodiment of the present invention includes mounting portions 110 and 120 having a step "t" in the vertical lower direction in the hinge portion 11b and the co-working portion 12a, when inserting into the elongated hole 8a of the fixing implement 8 of the rail support 7, the mounting portions 110 and 120 are received in the elongated hole 8a for thereby stably fixing to the fixing implement 8. Figure 10 is a view illustrating a second example of the rail fixing clip of the railway according to the first embodiment of the present invention. The insertion portion 21 of the rail fixing clip 20 and the support portion 22 are slanted in the opposite direction. The slant angle is determined for implementing an easier assembling operation and adjusting a distance between the flange portion 5a and the fixing implement 8. The angle between the insertion portion 21 and the support portion 22 is in a range of 0° to 90°, preferably 45°.

Figure 12 is a view illustrating a rail fixing clip of a railway according to a second embodiment of the present invention which includes an insertion portion 31 which includes a hinge portion 31b of a straight line rod shape and a couple-of-force portion 31a extended from one end of the hinge portion 31b and arranged in parallel with respect to the hinge portion 31b on the hinge portion 31b, and a support portion 32 which includes a second co-working portion 32a extended from the other end of the hinge portion 31b by detouring the couple-of-force portion 31a and arranged in parallel with respect to the couple-of-force portion 31a on the

couple-of-force portion 31a, a first co-working portion 32b arranged in parallel with respect to the second co-working portion 32a at a certain distance with respect to the second co-working portion 32a in the horizontal direction, and a pressing portion 32c extended from the second co-working portion 32b and arranged in parallel with respect to the co-working portion 32b below the co-working portion 32b.

As shown in Figures 13 and 14, in the rail fixing clip 30 of a railway according to a second embodiment of the present invention, an insertion portion 31 having a hinge portion 31b and a couple-of-force portion 31a is inserted into an elongated hole 8a of the fixing implement 8 of the rail support 7 of the railway and presses the flange portion 5a of the rail 5 to which a couple of force is applied in a vertical upward direction based on a vertical weight of the train applied between the rail supports 8. Namely, the resistance moment MH1 and MH2 of Figure 7A are generated based on the repulsive force Rv of figures 7A and 7B a that the upper surface of the elongated hole 8a of the fixing implement 8 is applied to the couple-of-force portion 31a in the vertical downward direction and to horizontal repulsive forces RH1 and RH2 of Figure 7A applied with respect to an outer side of the couple-of-force portion 31b and an inner side of the hinge portion 31a for thereby maintaining a parallel state between the force and moment, so that the rail 5 is tightly fixed to the rail support 7.

In the rail fixing clip 30 of the railway, the first and second co-working portions 32b and 32a between the pressing portion 32c which directly presses the flange

portion 5a of the rail 5 and the hinge portion 31b are elastically transformed and adsorb a couple of force from the rail at a larger ratio and consume as the elastic transform energy. Therefore, the stress concentration is largely decreased at the hinge portion 31b, and the allowable strength is increased.

5 Figure 15 is a view illustrating a first example of the rail fixing clip 40 according a second embodiment of the present invention. In the case of the pressing clip 40, the second co-working portion 32b of Figure 12 is removed from the construction of the fixing clip 30 of Figure 12 according to the second embodiment of the present invention. The insertion portion 41 includes a hinge
10 portion 41b and a couple-of-force portion 41a, and the support portion 42 includes a co-working portion 42a extended from the other end of the couple-of-force portion 41a and arranged in parallel on the upper portion of the couple-of-force portion 41a and a pressing portion 42b extended from the co-working portion 42a and arranged in parallel below the co-working portion 42a. As shown in Figure 16,
15 the insertion portion 41 and the support portion 42 have the triangle cross sections.

 In the rail fixing clip of the railway according to the second embodiment of the present invention, since the insertion portion 41 and the support portion 42 have a thrust cross section structure, it is possible to obtain a small size and a certain strength compared to the rail fixing clips of other embodiments of the present
20 invention. Therefore, it is possible to decrease the consuming amount of the material, and the fabrication cost is low, and it is easy to carry and assembly based on a small volume.

Figures 17 and 18 are views illustrating a second example of the rail fixing clip 40 of the railway according to the second embodiment of the present invention. In the case of the rail fixing clip 50, the first and second co-working portions 32a and 32b of Figure 12 are removed from the construction of the rail fixing clip 30 of Figure 12 according to the second embodiment of the present invention. Namely, the rail fixing clip 30 includes a couple-of-force portion 51a and a hinge portion 51b which are parallel in the upper and lower portions and a pressing portion 52 extended from the hinge portion 51b and being parallel with respect to the hinge portion 51b for thereby forming a n-shaped structure as shown in Figure 18.

The rail fixing clip of the railway according to the second embodiment of the present invention has a short total length from the couple-of-force portion 51a and the pressing portion 52. Therefore, the consuming amount of material is small, and the fabrication cost is decreased, and an easier carrying and assembling effect are obtained due to the small volume.

As described above, in the rail fixing clip of the railway according to the present invention, more than two separated points are supported with respect to the fixing implement fixed in the tie or the concrete railway, so that the torsion stress concentration phenomenon is decreased at a certain portion, and the durability is enhanced.

Therefore, in the case that the railway is constructed using the rail fixing clip according to the present invention, since the life span is long, it is possible to significantly decrease the maintenance cost of the railway and to prevent the rail

from being damaged due to the damaged rail fixing clip by the accumulated fatigue due to the repeatedly applied impact weight of the train.

As the present invention may be embodied in several forms without departing from the spirit or essential characteristics thereof, it should also be understood that
5 the above-described embodiments are not limited by any of the details of the foregoing description, unless otherwise specified, but rather should be construed broadly within its spirit and scope as defined in the appended claims, and therefore all changes and modifications that fall within the meets and bounds of the claims, or equivalences of such meets and bounds are therefore intended to be embraced
10 by the appended claims.

CLAIMS

What is claimed is:

1. In a rail fixing clip of a railway for fixing a rail of a railway with respect to a rail support, a rail fixing clip of a railway, comprising:

5 an insertion portion including a couple-of-force portion of a straight line-shaped rod and a hinge portion extended from one end of the couple-of-force portion and arranged in parallel with respect to the couple-of-force portion above the couple-of-force portion; and

a support portion including a co-working portion extended from the hinge
10 portion at a certain horizontal distance in parallel with respect to the hinge portion and a pressing portion extended from the co-working portion and arranged in parallel with respect to the co-working portion below the co-working portion for pressing the upper surface of the flange portion of the rail of the railway.

15 2. The rail clip of claim 1, further comprising a mounting portion mounted in the elongated hole in such a manner that a part of the hinge portion is sunk in the direction of the couple-of-force portion in the hinge portion.

3. The rail clip of claim 1, wherein said support portion and insertion portion are
20 symmetric.

4. The rail clip of claim 1, wherein said support portion and insertion portion are

arranged in the vertical direction.

5. The rail clip of claim 1, wherein said support portion and insertion portion has a certain slant angle in the opposite direction.

5

6. The rail clip of claim 5, wherein said slant angle of the support portion and the insertion portion is 45°.

7. The rail clip of claim 1, wherein the lengths of the couple-of-force portion and
10 hinge portion are longer than the lengths of the co-working portion and the pressing portion.

8. In a rail fixing clip of a railway for fixing a rail of a railway with respect to a rail support of a railway, a rail fixing clip of a railway, comprising:

15 an insertion portion including a hinge portion of a straight line rod shape and a couple-of-force portion extended from one end of the hinge portion and arranged in parallel with respect to the hinge portion above the hinge portion and inserted into an elongated home of the fixing implement of the rail support of the railway; and

a support portion including a second co-working portion extended from the
20 other end of the couple-of-force portion and arranged in parallel with respect to the couple-of-force portion above the couple-of-force portion, a first co-working portion extended from the second co-working portion and arranged in parallel with respect to

the second co-working portion at a certain horizontal distance with the second co-working portion, and a pressing portion extended from the second co-working portion and arranged in parallel with respect to the co-working portion below the co-working portion for thereby pressing the upper surface of the flange portion of the rail of the railway.

9. In a rail fixing clip of a railway for fixing a rail of a railway with respect to a rail support of a railway, a rail fixing clip of a railway, comprising:

an insertion portion including a hinge portion of a straight line rod shape and a couple-of-force portion extended from one end of the hinge portion and arranged in parallel with respect to the hinge portion above the hinge portion and inserted into an elongated hole of a fixing implement of the rail support of the railway; and

a support portion including a co-working portion extended from the other end of the couple-of-force portion and arranged in parallel with respect to the couple-of-force portion above the couple-of-force portion and a pressing portion extended from the co-working portion and arranged in parallel with respect to the insertion portion at a certain horizontal distance below the co-working portion for thereby pressing the upper surface of the flange portion of the rail of the railway.

Fig.1

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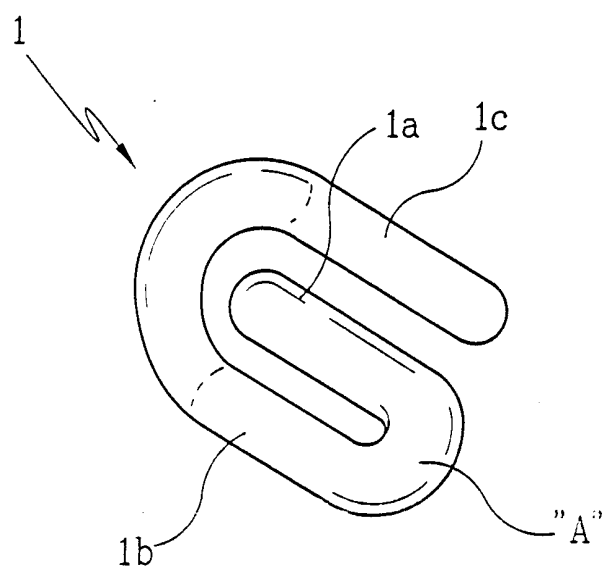


Fig.2

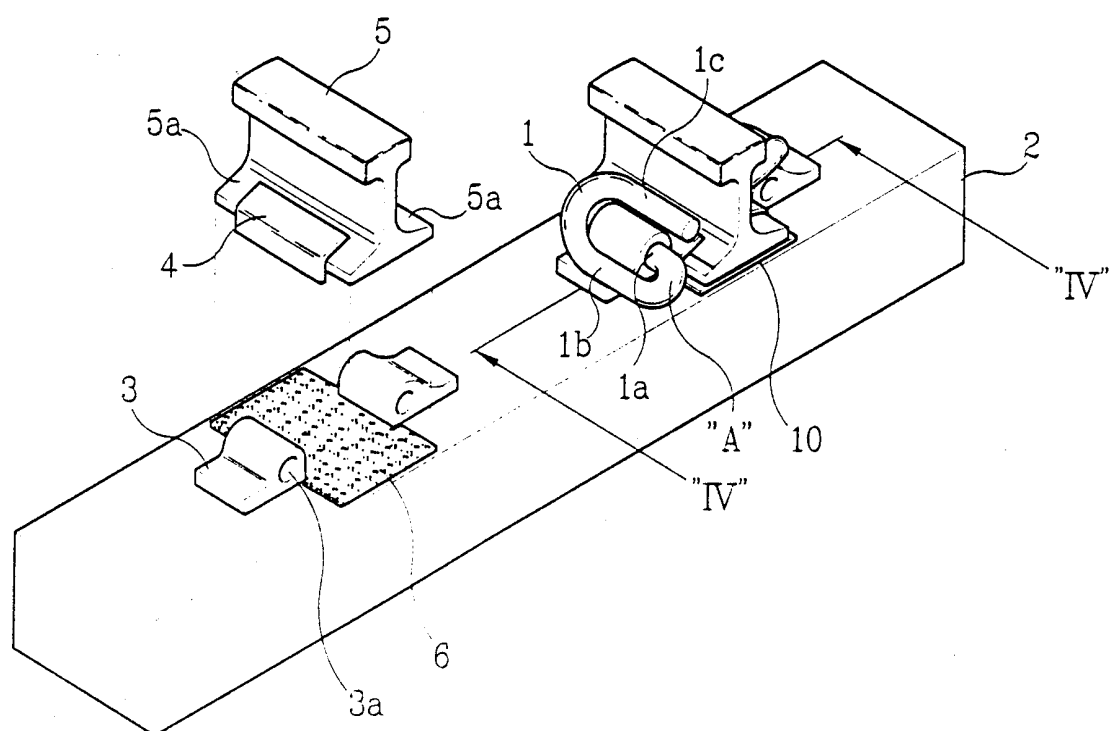


Fig.3a

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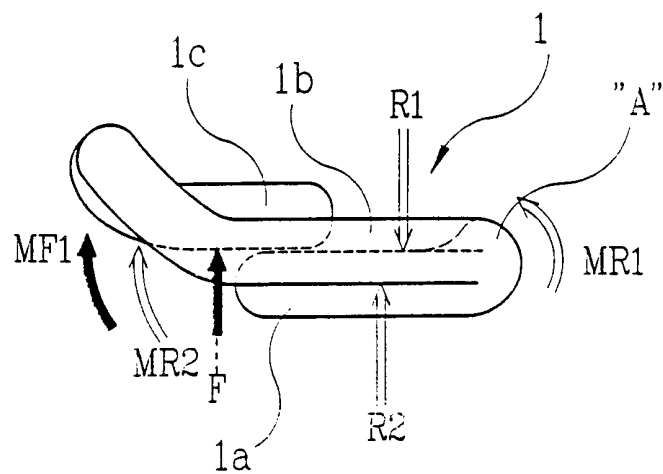


Fig.3b

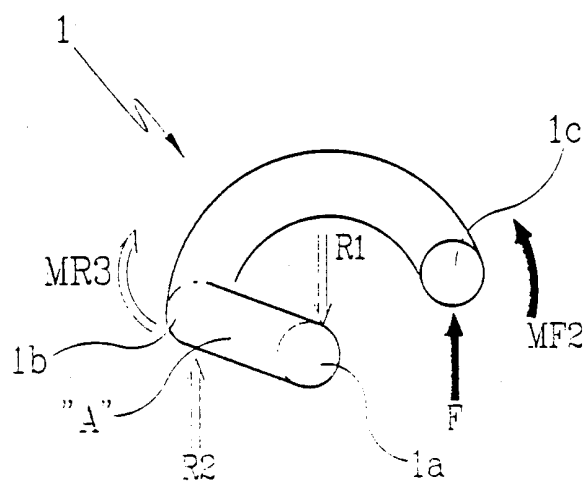


Fig.4

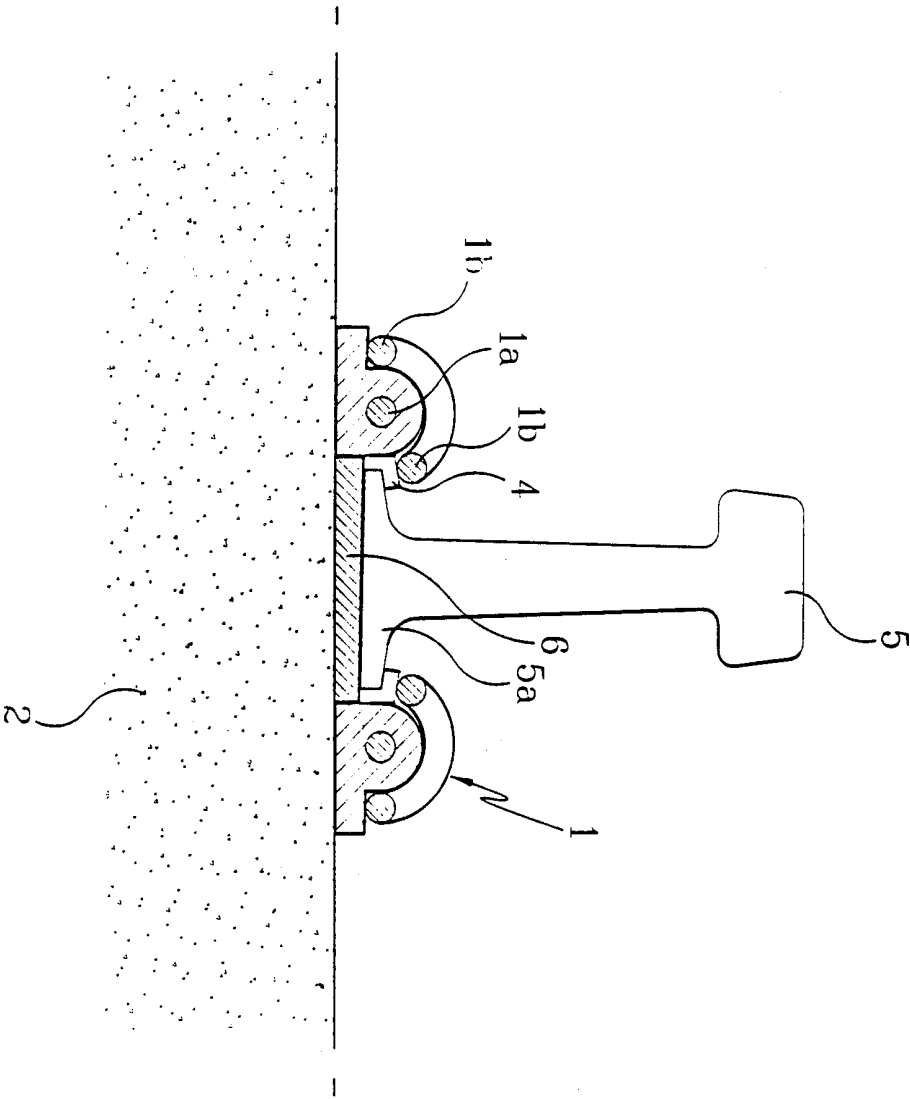


Fig.5

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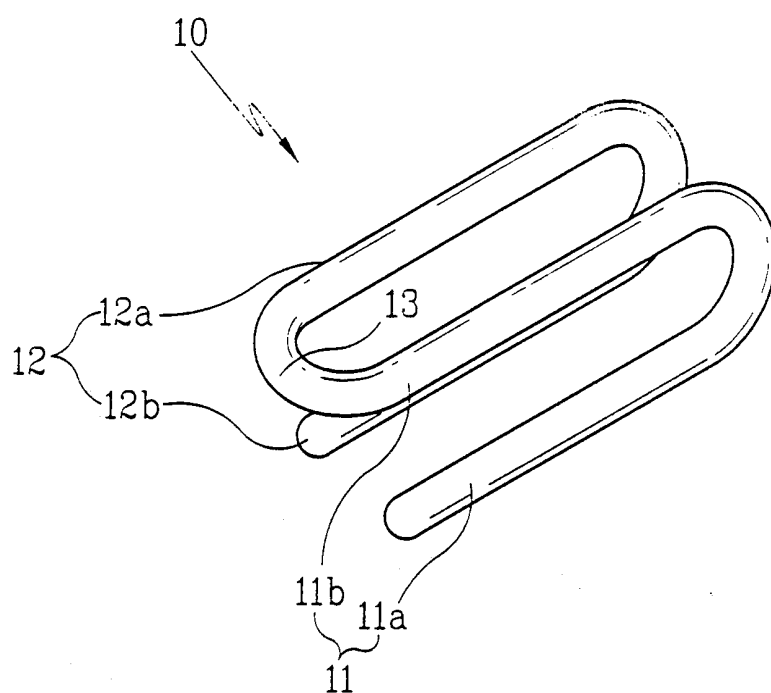


Fig.6

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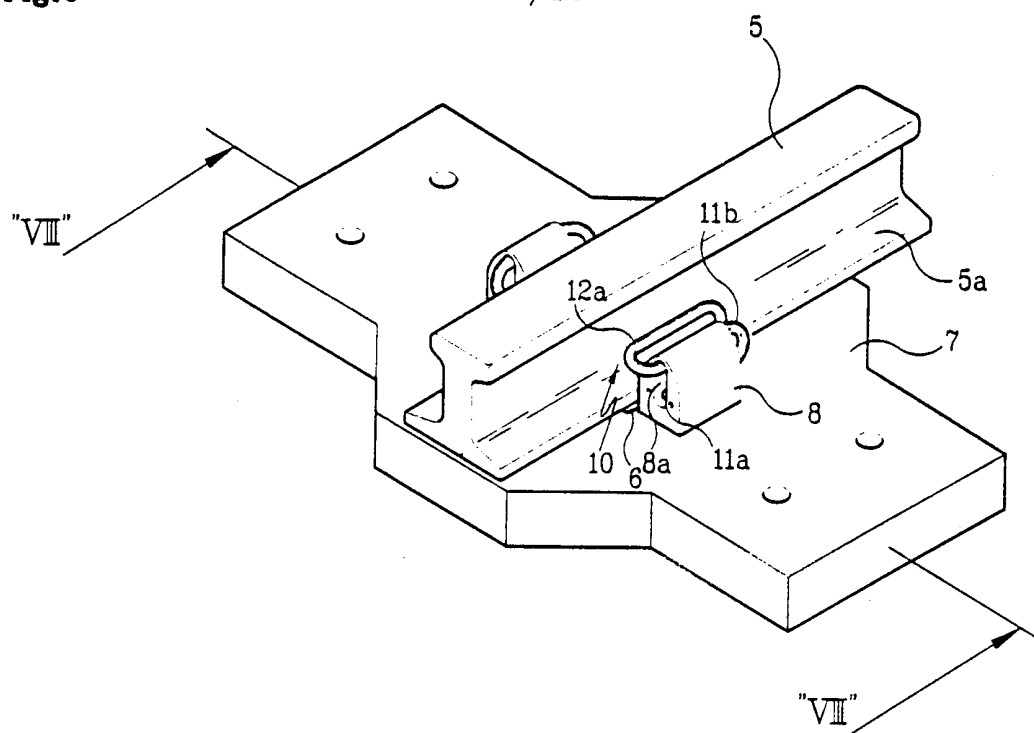


Fig.7a

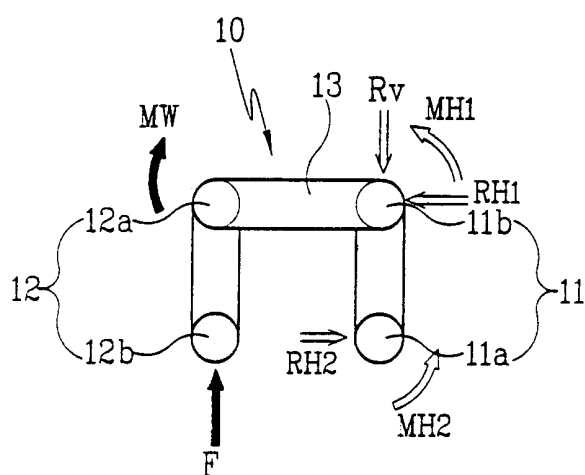
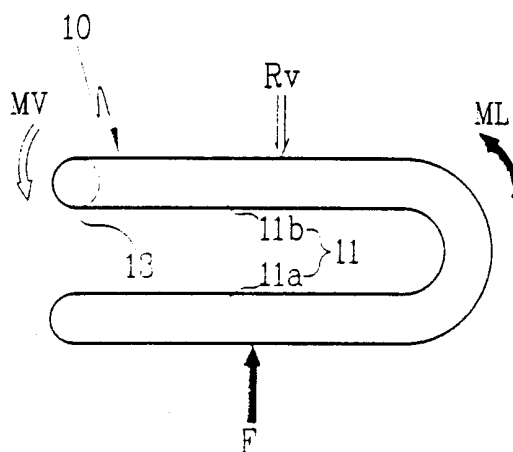


Fig.7b



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Fig.8

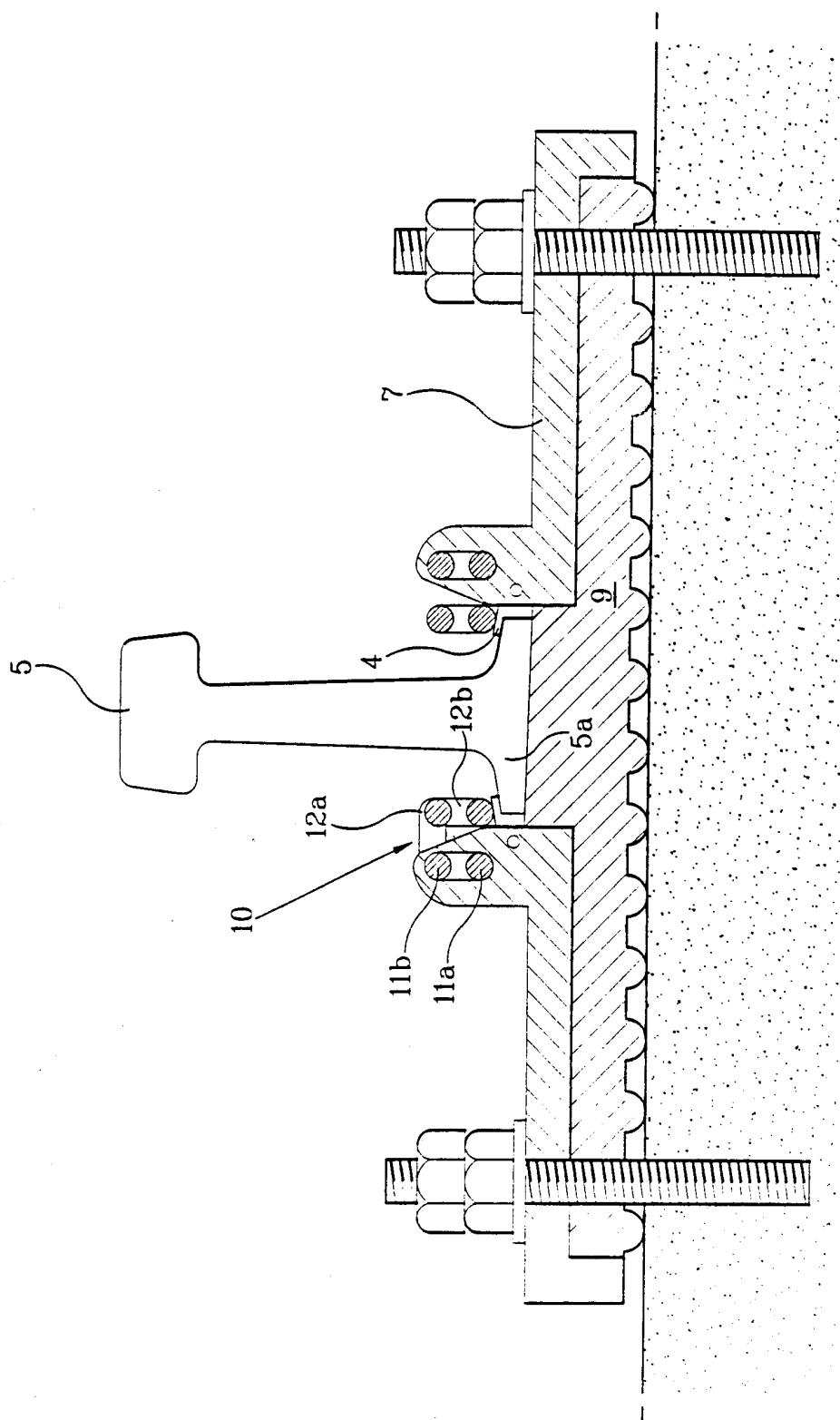


FIG. 9

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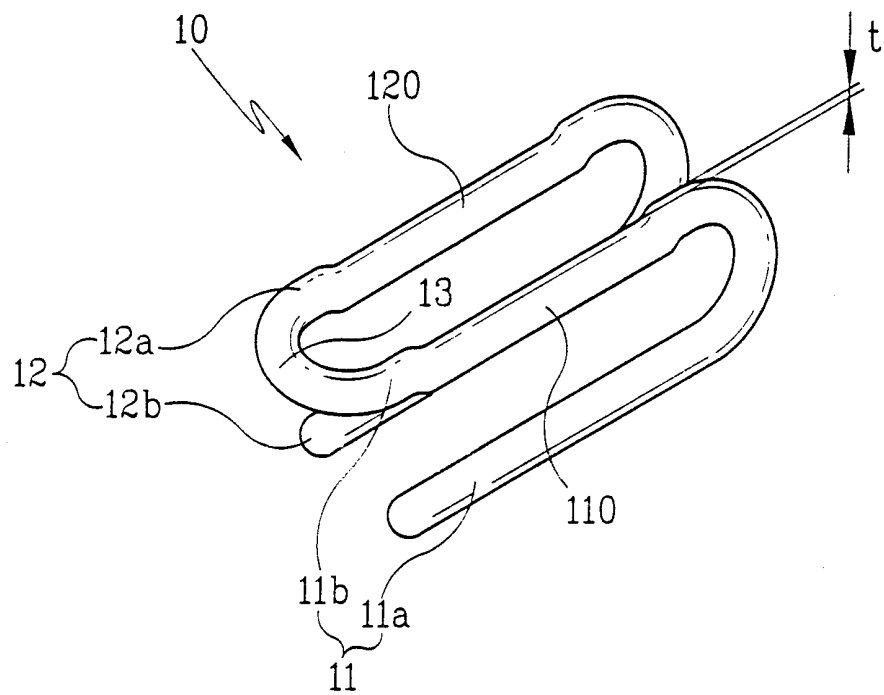


Fig.10

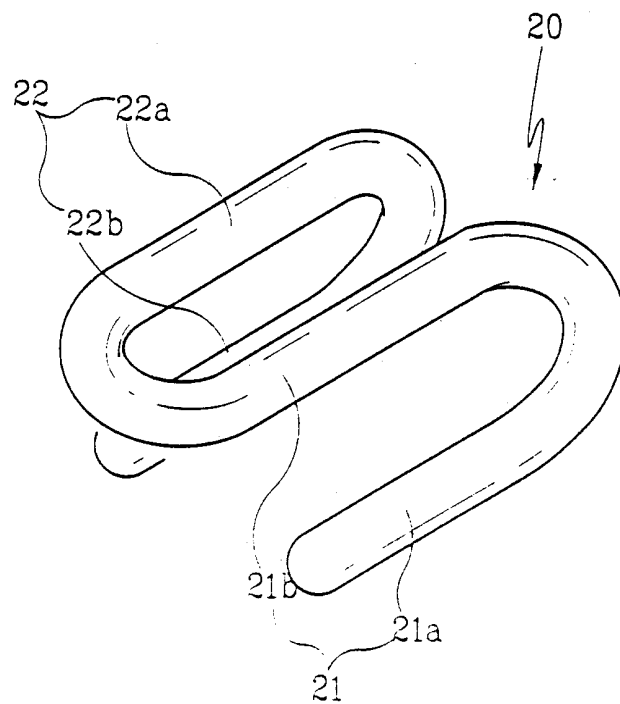


Fig.11

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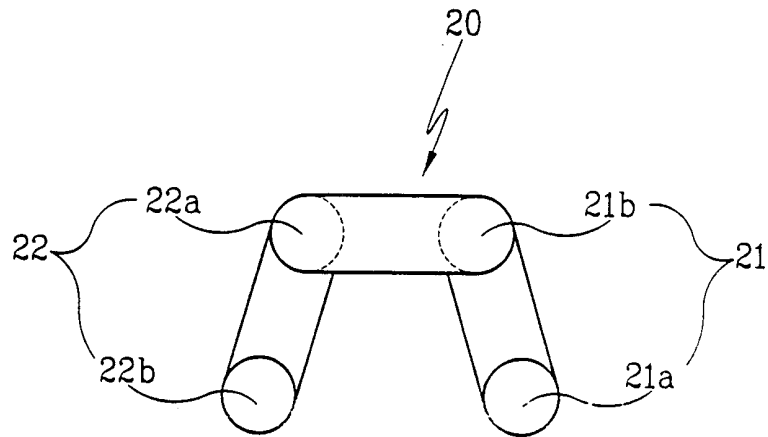


Fig.12

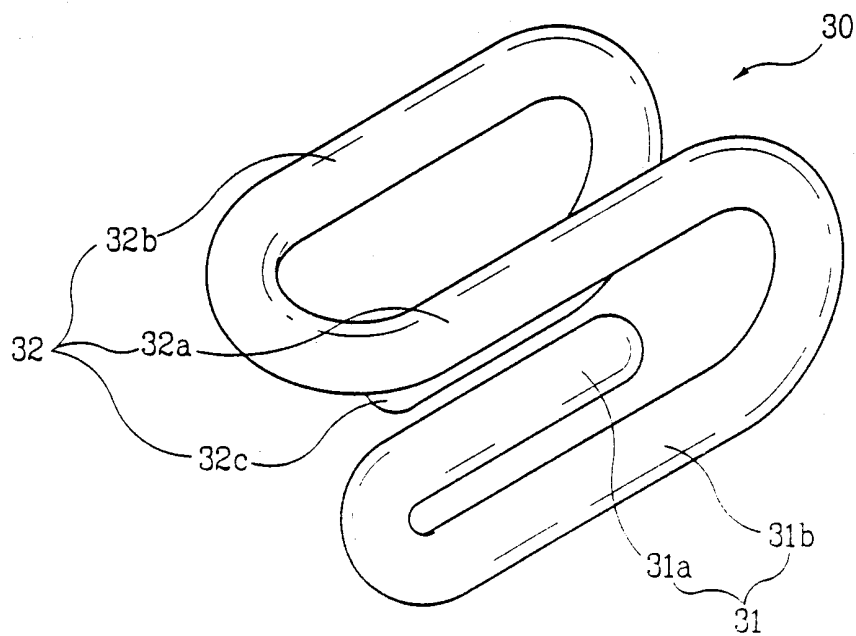
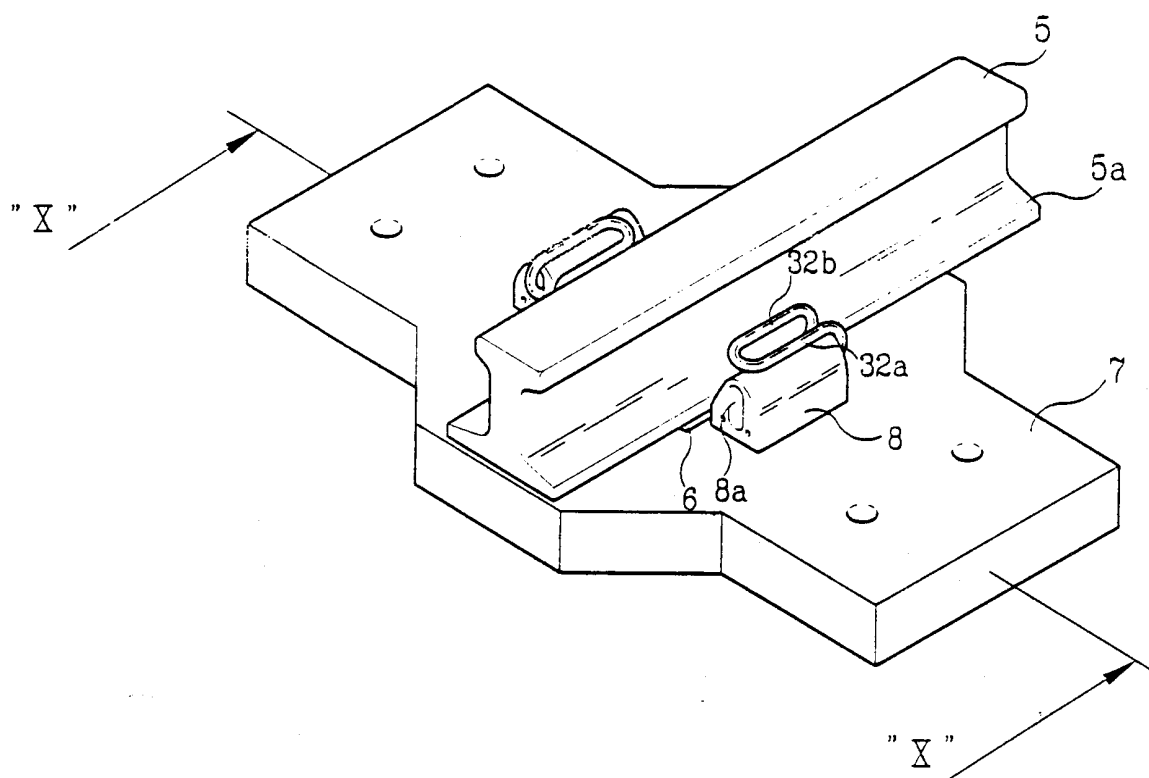


Fig.13

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Fig.14

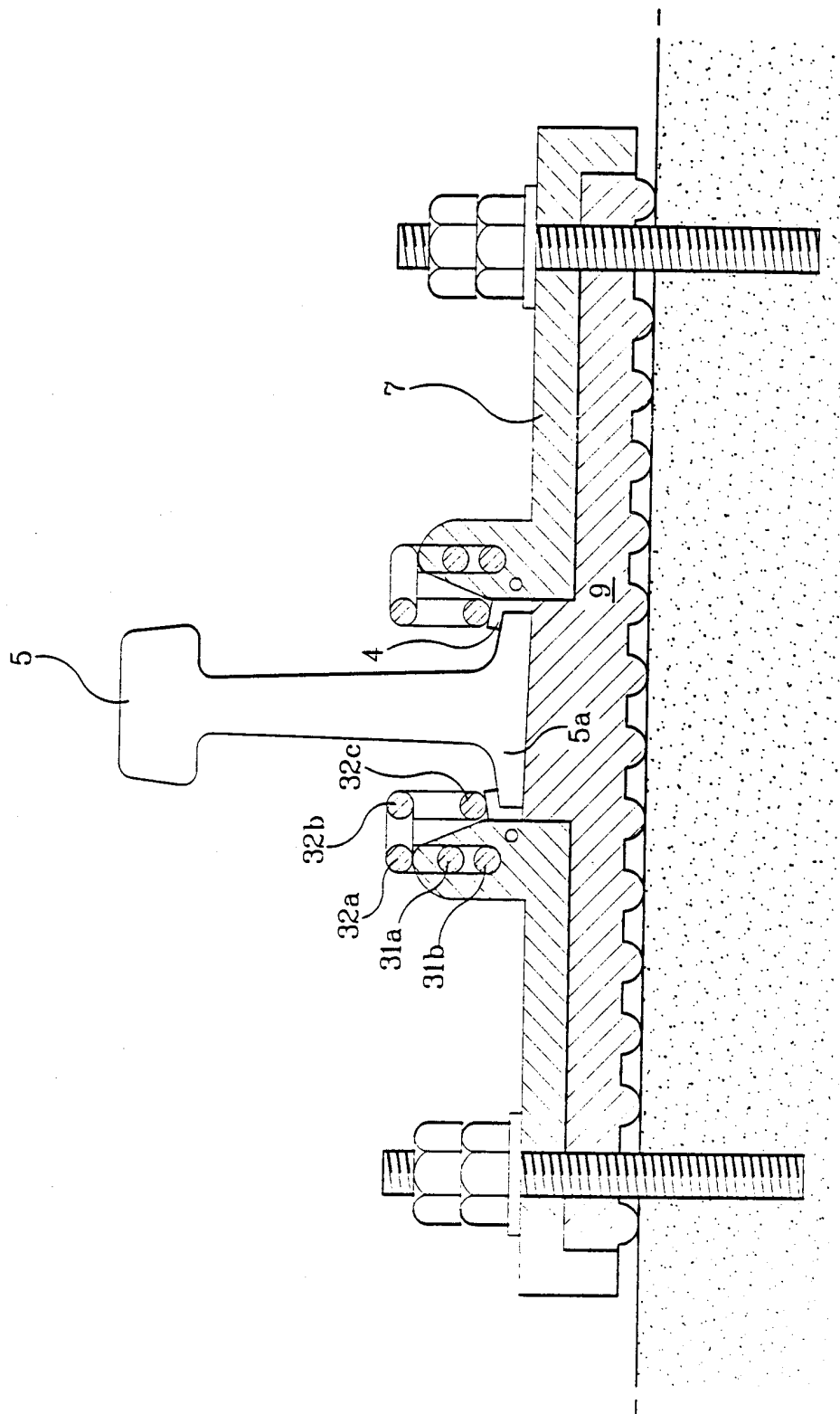


Fig.15

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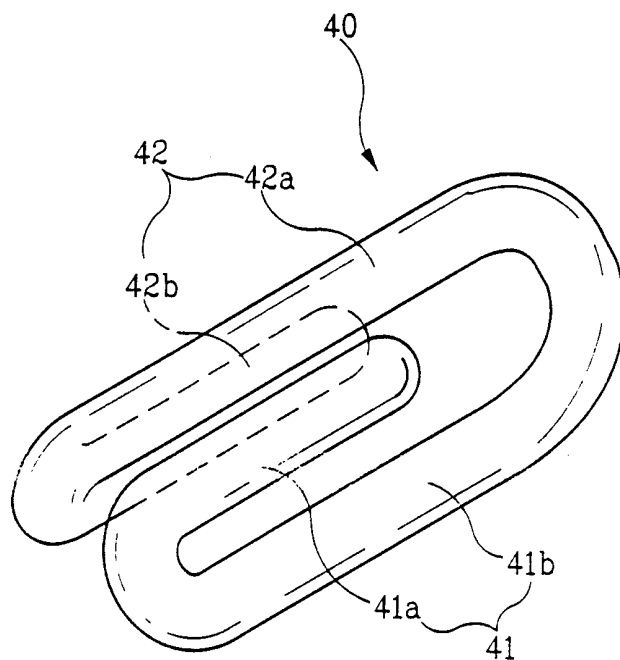


Fig.16

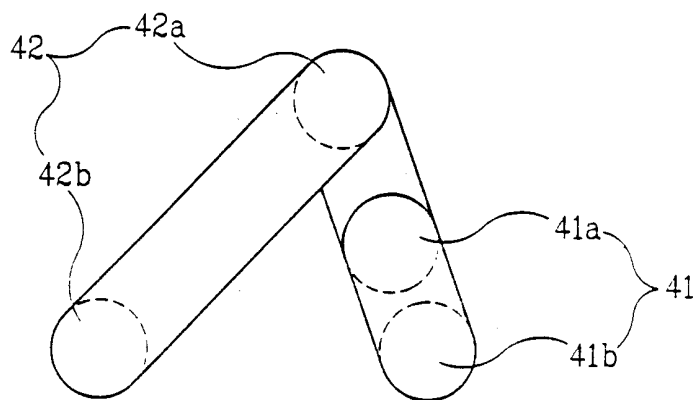


Fig.17

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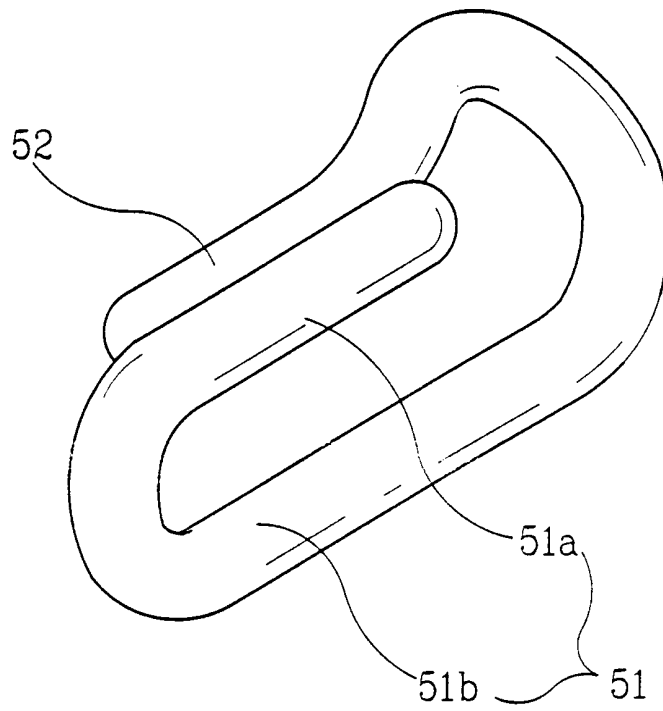
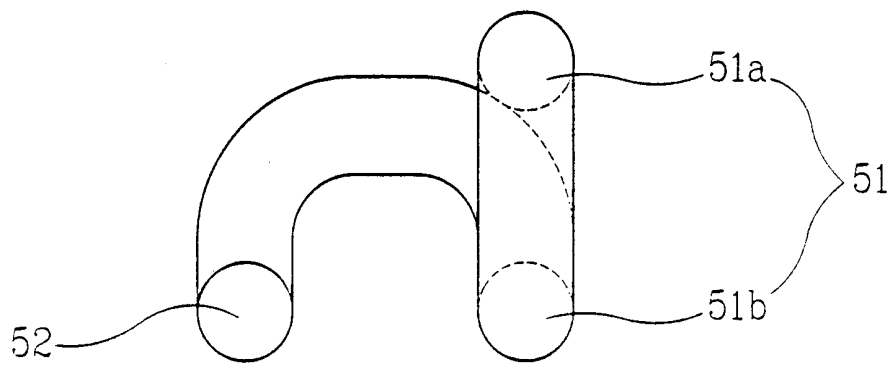


Fig.18



INTERNATIONAL SEARCH REPORT

international application No.

PCT/KR00/01324

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 E01B 9/48

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)

IPC7 E01B9/30, 9/34, 9/48

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

KR, JP : E01B9/30, 9/34, 9/48

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.
Y	JP 57- 41901 U (Kouga Co. Ltd.), 6 Mar. 1982 (06. 03. 1982), Full text : Figs 10 to 11	1 - 7
Y	KR 83-529 U (Electric Rail Spike Co. Ltd.), 17 Jun. 1983 (17. 06. 1983), Full text : Figs 1 to 2	1 - 7
A	JP 8-226415 A (Pandorooru. Ltd.), 3 Sep. 1996 (03. 09. 1996), Full text : Figs 1 to 6	1 - 9

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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"&" document member of the same patent family

Date of the actual completion of the international search

28 MARCH 2001 (28.03.2001)

Date of mailing of the international search report

29 MARCH 2001 (29.03.2001)

Name and mailing address of the ISA/KR

Korean Industrial Property Office
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Metropolitan City 302-701, Republic of Korea

Facsimile No. 82-42-472-7140

Authorized officer

LEE, Young Min

Telephone No. 82-42-481-5804



INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/KR00/01324

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 57- 41901 U	06. 03. 1982	None	
KR 83-529 U	17. 06. 1983	None	
JP 8-226415 A	03. 09. 1996	GB 2295178 A1	22. 05. 1996