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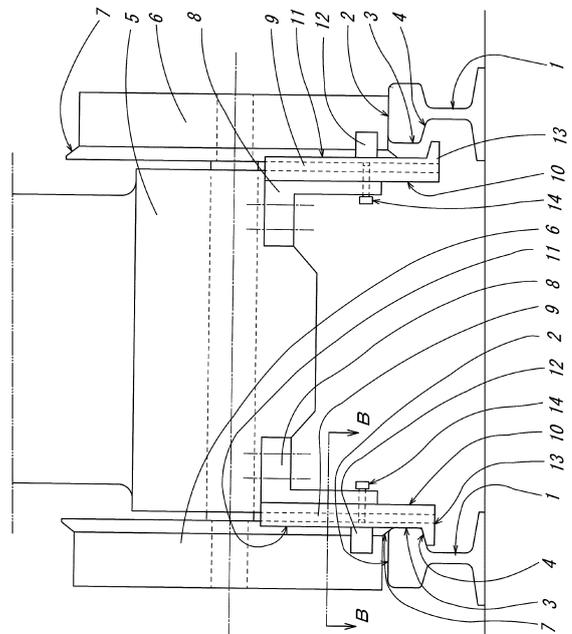
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(54) **RAILWAY CARRIAGE DERAILMENT PREVENTION STRUCTURE**

(57) To prevent derailment of a high-speed vehicle on a curved railway track of a railway track and derailment due to an earthquake.

Escape prevention device main bodies (8) are each installed on left and right sides of a lower part of a bogie main body (5) of a vehicle, and in wide grooves (9) provided in the main bodies (8), escape preventing thick plates (10) are housed so as to be vertically slidable. When the vehicle runs on a railway track curved to the right, a centrifugal force causes a left flange part (7) to ride on a left rail (1), the left escape prevention device main body (8) moves obliquely upward toward the rail (1), a front surface (11) of the escape preventing thick plate (10) collides with a side surface (3) of a rail head (2), an L-shaped hook part (13) of the escape preventing thick plate (10) collides with a lower surface of an eave (4) of the rail head (2), and the escape prevention device main body (8) further floats, thereby cutting a positioning pin (14) between the escape prevention device main body (8) and the escape preventing thick plate (10). The escape prevention device main body (8) is guided by the escape preventing thick plate (10), sprung up almost vertically by 10 cm or more, and then, dropped, and the wheel (6) is returned onto the rail (1), and the derailment is prevented.

FIG.3



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Description

[Technical Field]

[0001] Technical field of preventing derailment of a railway vehicle on a curved railway track at high speed and derailment due to an earthquake.

[Background Art]

[0002] As a method for preventing derailment of the railway vehicle, special guard rails are currently used to prevent the railway vehicle from largely deviating from the rails after derailment. However, it seems that no method for preventing derailment of the vehicle itself has been developed.

[Summary of Invention]

[Problem to be Solved by the Invention]

[0003] A mechanism capable of preventing derailment is added to the structure of the vehicle to prevent derailment from a curved railway track and derailment due to an earthquake.

[Means for Solving the Problem]

[0004] Escape prevention device main bodies 8 are each installed on left and right sides of a lower part of a bogie main body 5 of a vehicle, and in wide grooves 9 provided in the main bodies 8, escape preventing thick plates 10 are housed so as to be vertically slidable. When the vehicle runs on a railway track curved to the right, a centrifugal force causes a flange part 7 of a left wheel to ride on a left rail 1, the left escape prevention device main body 8 moves obliquely upward toward the rail, a front surface 11 of the escape preventing thick plate 10 collides with a side surface 3 of a rail head 2, an L-shaped hook part 13 of the escape preventing thick plate 10 collides with a lower surface of an eave 4 of the rail head 2, and the escape prevention device main body further floats, thereby cutting a positioning pin 14 between the escape prevention device main body and the escape preventing thick plate. The escape prevention device main body is guided by the escape preventing thick plate, sprung up almost vertically by 10 cm or more, and then, dropped, and the wheel 6 is returned onto the rail, and the derailment is prevented.

[0005] When the bogie main body 5 jumps up due to an earthquake, the L-shaped hook parts 13 of the left and right escape preventing thick plates collide with the eaves 4 of the left and right rail heads 2, which cuts the left and right positioning pins 14. The left and right escape prevention device main bodies 8 are further guided by the escape preventing thick plates 10 fitted to the wide grooves 9 of the escape prevention device main bodies 8, sprung up almost vertically by 10 cm or more, and

then, dropped to original positions, and the derailment is prevented.

[Advantageous Effects of Invention]

[0006] Safety during traveling is maintained by adding the mechanism capable of preventing the derailment of the vehicle. Further, the cost due to railway track repair can be reduced.

[Brief Description of Drawings]

[0007]

FIG. 1 is a longitudinal sectional view when escape prevention device main bodies are attached to a bogie main body of a vehicle, as an example of implementation of the present invention.

FIG. 2 is a sectional view taken along line A-A of FIG. 1.

FIG. 3 is a longitudinal sectional view when a flange part of a wheel of the vehicle rides on a left rail and the escape prevention device main body floats, as an example of implementation of the present invention.

FIG. 4 is a sectional view taken along line B-B of FIG. 3.

FIG. 5 is a longitudinal sectional view when the escape prevention device main body greatly springs up, as an example of implementation of the present invention.

FIG. 6 is a sectional view taken along line C-C of FIG. 5.

[Mode for carrying out the Invention]

[0008] In a structure for preventing derailment of a railway vehicle, escape prevention device main bodies 8 are each installed on left and right sides of a lower part of a bogie main body 5 of the vehicle, and the escape prevention device main bodies have wide grooves 9 in which escape preventing thick plates 10 are housed so as to be vertically slidable, and when wheels 6 are on rails 1 in a normal state, front surfaces 11 of the escape preventing thick plates 10 and side surfaces 3 of rail heads 2 are spaced apart approximately 15 mm. The escape preventing thick plates have lower ends provided with L-shaped hook parts 13, and the hook parts have upper sides arranged under eaves 4 of the rail heads 2 with a distance of approximately 15 mm. At this time, positioning pins 14 are driven into the escape preventing thick plates 10 from the escape prevention device main bodies 8.

[0009] When the vehicle runs on a railway track curved to the right, a centrifugal force causes a flange part 7 of the left wheel to ride on the left rail 1, the left escape prevention device main body 8 moves obliquely upward toward the rail, the front surface 11 of the escape preventing thick plate 10 collides with the side surface 3 of

the rail head 2, the L-shaped hook part 13 of the escape preventing thick plate 10 collides with a lower surface of the eave 4 of the rail head 2, and the escape prevention device main body further floats, thereby cutting the positioning pin 14 between the escape prevention device main body and the escape preventing thick plate. The escape prevention device main body is guided by the escape preventing thick plate, sprung up almost vertically by 10 cm or more, and then, dropped, and the wheel 6 is returned onto the rail, and the derailment is prevented.

[0010] Further, when the bogie main body 5 jumps up due to an earthquake, the L-shaped hook parts 13 of the left and right escape preventing thick plates collide with the eaves 4 of the left and right rail heads 2, which cuts the left and right positioning pins 14. The left and right escape prevention device main bodies 8 are further guided by the escape preventing thick plates 10 fitted to the wide grooves 9 of the escape prevention device main bodies 8, sprung up almost vertically by 10 cm or more, and then, dropped to original positions, and the derailment is prevented. The structure for preventing derailment by the escape prevention device attached to the railway vehicle as described above.

[Description of Reference Signs]

[0011]

- | | | |
|----|---|----|
| 1 | Rail | |
| 2 | Rail head | |
| 3 | Side surface of rail head | |
| 4 | Eave of rail head | |
| 5 | Bogie main body | |
| 6 | Wheel | |
| 7 | Flange part of wheel | |
| 8 | Escape prevention device main body | |
| 9 | Wide groove of escape prevention device main body | |
| 10 | Escape preventing thick plate | |
| 11 | Front surface of escape preventing thick plate | 40 |
| 12 | Protrusion of escape preventing thick plate | |
| 13 | L-shaped hook part of escape preventing thick plate | |
| 14 | Positioning pin | 45 |

Claims

1. A structure for preventing derailment of a railway vehicle, **characterized in that** escape prevention device main bodies (8) are each installed on left and right sides of a lower part of a bogie main body (5) of the vehicle; the escape prevention device main bodies (8) have wide grooves (9) in which escape preventing thick plates (10) are housed so as to be vertically slidable; when wheels (6) are on rails (1) in a normal state, front surfaces (11) of the escape preventing thick plates (10) and side surfaces (3) of

rail heads (2) are spaced apart approximately 15 mm; the escape preventing thick plates (10) have lower ends provided with L-shaped hook parts (13); the hook parts (13) have upper sides arranged under eaves (4) of the rail heads (2) with a distance of approximately 15 mm; at this time, positioning pins (14) are driven into the escape preventing thick plates (10) from the escape prevention device main bodies (8); when the vehicle runs on a railway track curved to the right, a centrifugal force causes a flange part (7) of the left wheel (6) to ride on the left rail (1), the left escape prevention device main body (8) moves obliquely upward toward the rail (1), the front surface (11) of the escape preventing thick plate (10) collides with the side surface (3) of the rail head (2), the L-shaped hook part (13) of the escape preventing thick plate (10) collides with a lower surface of the eave (4) of the rail head (2), the escape prevention device main body (8) further floats, thereby cutting the positioning pin (14) between the escape prevention device main body (8) and the escape preventing thick plate (10), the escape prevention device main body (8) is guided by the escape preventing thick plate (10), sprung up almost vertically by 10 cm or more, and then, dropped, the wheel (6) is returned onto the rail (1), and the derailment is prevented; and when the bogie main body (5) jumps up due to an earthquake, the L-shaped hook parts (13) of the left and right escape preventing thick plates (10) collide with the eaves (4) of the left and right rail heads (2), which cuts the left and right positioning pins (14), the left and right escape prevention device main bodies (8) are further guided by the escape preventing thick plates (10) fitted to the wide grooves (9) of the escape prevention device main bodies (8), sprung up almost vertically by 10 cm or more, and then, dropped to original positions, and the derailment is prevented, the structure for preventing derailment by escape prevention devices attached to the railway vehicle as described above.

FIG.1

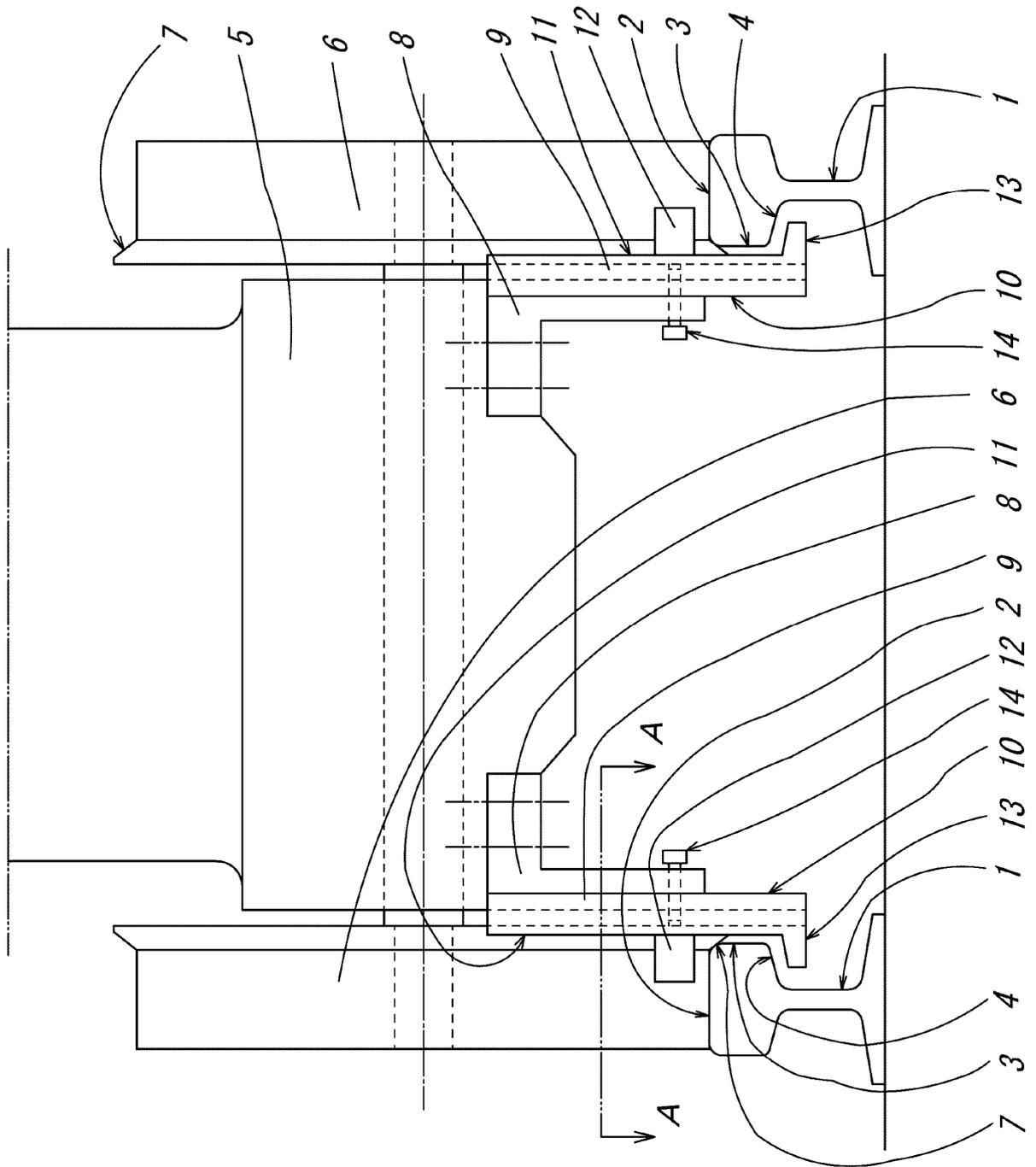


FIG.2

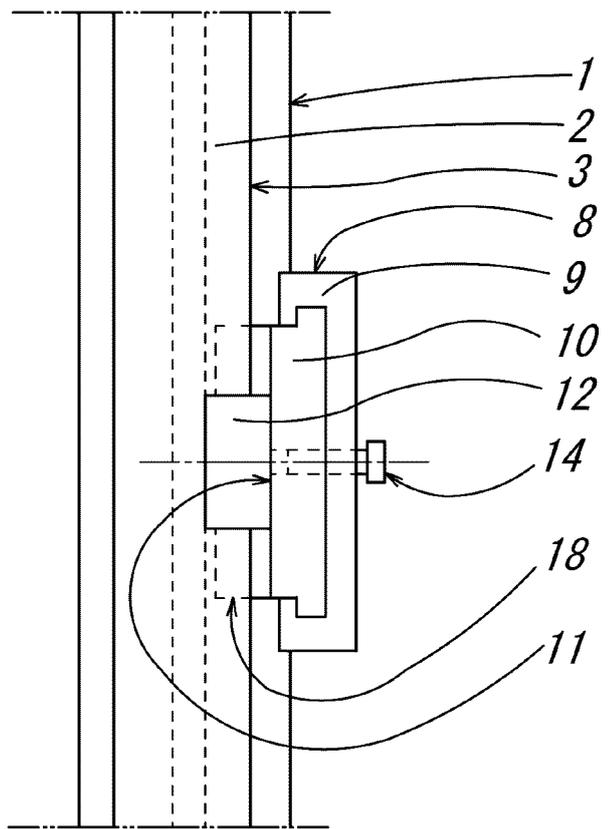


FIG.3

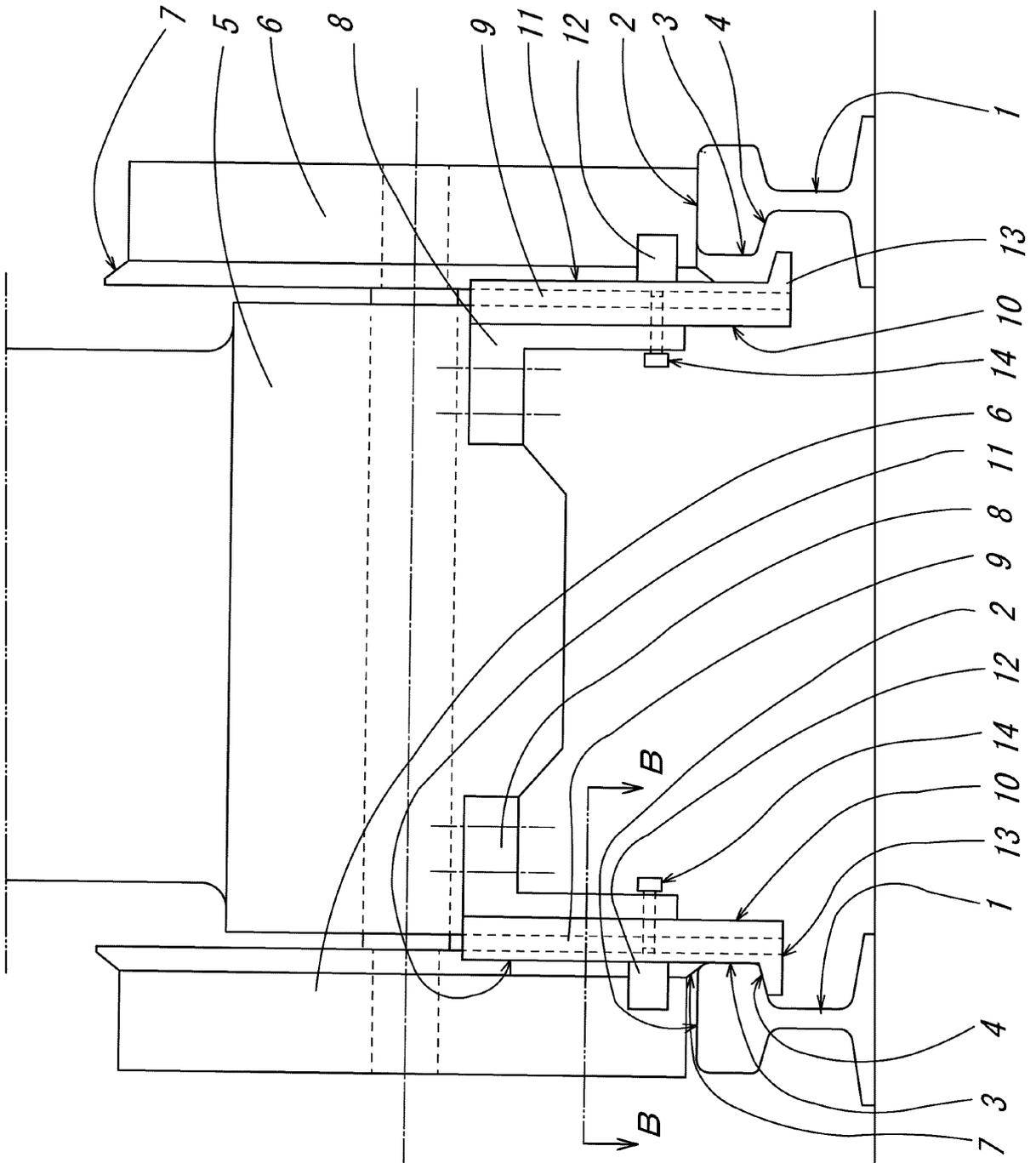


FIG.4

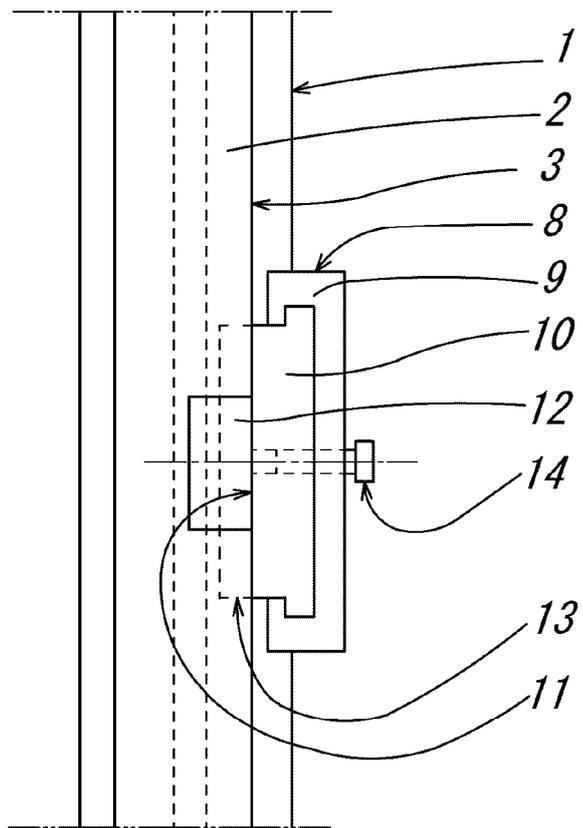


FIG.5

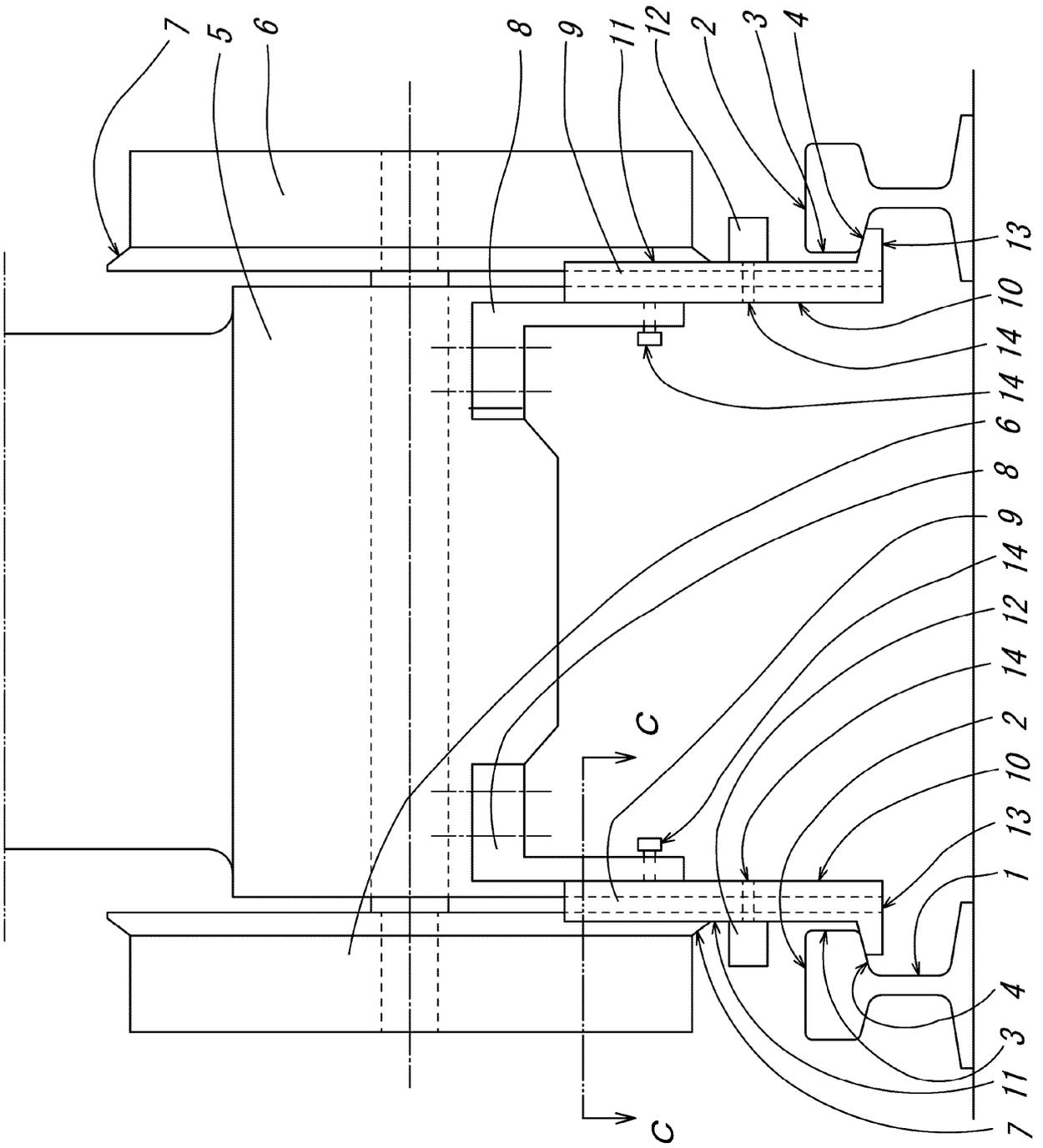
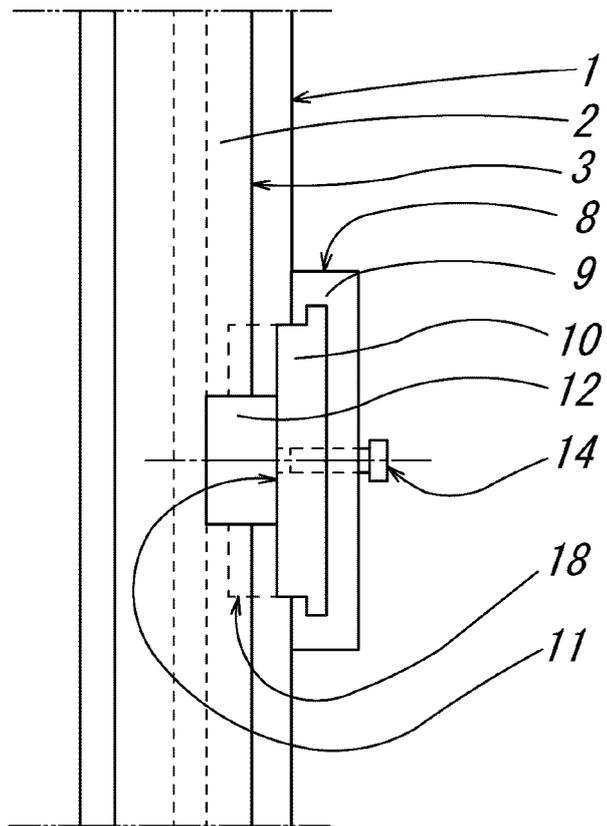


FIG.6



INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2023/019648

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A. CLASSIFICATION OF SUBJECT MATTER
B61F 9/00(2006.01)i
 FI: B61F9/00
 According to International Patent Classification (IPC) or to both national classification and IPC

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B. FIELDS SEARCHED
 Minimum documentation searched (classification system followed by classification symbols)
 B61F9/00

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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 1971-2023
 Registered utility model specifications of Japan 1996-2023
 Published registered utility model applications of Japan 1994-2023
 Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

25

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	JP 3127719 U (OTA, Ryozo) 14 December 2006 (2006-12-14)	1
A	JP 2007-204028 A (OTA, Ryozo) 16 August 2007 (2007-08-16)	1
A	JP 2011-168078 A (ONISHI, Noriyuki) 01 September 2011 (2011-09-01)	1
A	KR 10-1001095 B1 (KO, Kwang nam) 14 December 2010 (2010-12-14)	1

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

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