



(11)

EP 3 862 242 A1

(12)

EUROPEAN PATENT APPLICATION

published in accordance with Art. 153(4) EPC

(43) Date of publication:

11.08.2021 Bulletin 2021/32

(51) Int Cl.:

B61B 12/00 (2006.01)

B61B 12/02 (2006.01)

(21) Application number: 19907215.8

(86) International application number:

PCT/CN2019/095772

(22) Date of filing: 12.07.2019

(87) International publication number:

WO 2020/140417 (09.07.2020 Gazette 2020/28)

(84) Designated Contracting States:

AL AT BE BG CH CY CZ DE DK EE ES FI FR GB
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO
PL PT RO RS SE SI SK SM TR

Designated Extension States:

BA ME

Designated Validation States:

KH MA MD TN

(30) Priority: 02.01.2019 CN 201910002222

(71) Applicant: CRRC Zhuzhou Locomotive Co., Ltd.
Zhuzhou, Hunan 412001 (CN)

(72) Inventors:

- XIAO, Ti
Zhuzhou, Hunan 412001 (CN)
- CHEN, Xihong
Zhuzhou, Hunan 412001 (CN)

- HE, Shizhong

Zhuzhou, Hunan 412001 (CN)

- TAO, Gongan

Zhuzhou, Hunan 412001 (CN)

- QIN, Tao

Zhuzhou, Hunan 412001 (CN)

- LI, Xiaochuan

Zhuzhou, Hunan 412001 (CN)

- ZHOU, He

Zhuzhou, Hunan 412001 (CN)

- LI, Xiaoyan

Zhuzhou, Hunan 412001 (CN)

(74) Representative: von Tietzen und Hennig, Nikolaus

Lorenz Seidler Gossel

Rechtsanwälte Patentanwälte

Partnerschaft mbB

Widenmayerstraße 23

80538 München (DE)

(54) CABLE CAR AND CABLE CAR CURVE PASSING STRUCTURE

(57) Disclosed are a cable car curve passing structure and a cable car. The cable car curve passing structure comprises wheel (5), a curved steel rail line (2), and a straight line steel cable line (1) configured to extend outwards from and end part of the steel rail line (2), wherein in the wheel (5) are set with wheel grooves (10) used for being erected on the steel cable line (1) and supporting rims (7) used for being supported on the steel rail line (2); and the cable car comprises the cable car curve passing structure, so that a cable car body can continuously pass on a curved line.

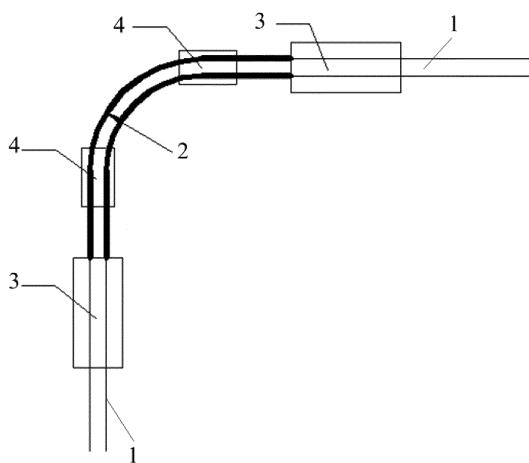


Figure 1

Description

[0001] This application claims priority of Chinese Patent Application No. 201910002222.X, titled "CABLE CAR AND CABLE CAR CURVE PASSING STRUCTURE", filed with the China National Intellectual Property Administration on January 2, 2019, which is incorporated herein by reference in its entirety.

FIELD

[0002] The present application relates to the technical field of cable cars, and in particular to a curve passing structure of a cable car. In addition, the present application further relates to a cable car including the curve passing structure of the cable car.

BACKGROUND

[0003] At present, a typical cable car is a secured style cable car with circulating cable holder, which performs both traction and load-bearing by a single moving steel cable. Since the steel cable needs to be pre-tensioned, a travelling line of the cable car is generally a straight line, and platforms are connected by a point-to-point manner. If a curve is to be set in the travelling line, a turning wheel needs to be set at the platform, and connection between a cable car body and the steel cable needs to be released by an unhooking device. The connection with the steel cable needs to be rebuilt through the unhooking device by speeding up after the cable car body slows down to have passengers get on and off at the platform, so the cable car body cannot pass continuously.

[0004] Therefore, a technical issue to be addressed presently by those skilled in the art is to realize a continuous passing of the cable car body on the curved line.

SUMMARY

[0005] In view of this, a curve passing structure of a cable car is provided according to the present application, which realizes a cable car body continuously passing on a curved line. A cable car including the curve passing structure of the cable car is further provided according to the present application, which realizes the cable car body continuously passing on a curved line.

[0006] In order to achieve the above objects, the following technical solutions are provided according to the present application.

[0007] A curve passing structure of a cable car includes a wheel, a curved steel rail line and a linear steel cable line extending outward from an end of the steel rail line. The wheel defines a wheel groove for installing the wheel on the steel cable line and is provided with a supporting flange for supporting the wheel on the steel rail line.

[0008] Preferably, a cable groove is provided on the steel rail line. A steel cable is provided in the cable groove

and extends from an end of the cable groove and out of the steel rail line, and a part of the steel cable that extends out of the cable groove forms the steel cable line.

[0009] Preferably, the supporting flange is provided on an outer surface of a bottom of the wheel.

[0010] Preferably, two steel cables are provided in parallel in the steel cable line; two wheel grooves are provided in the wheel and in one-to-one correspondence to the two steel cables.

[0011] Preferably, a partition plate between the two wheel grooves is supported on the steel rail line.

[0012] Preferably, the supporting flange is provided on an outer surface of the wheel.

[0013] Preferably, a cross section of the steel cable is circular, and a groove depth of the wheel groove is greater than half of a diameter of the steel cable in the steel cable line.

[0014] Preferably, the curve passing structure further includes a steel cable column, which is supported at a junction of the steel cable line and the steel rail line, and the steel cable column is set with a transitional rail for realizing a smooth transition between the steel cable line and the steel rail line.

[0015] Preferably, the steel rail line is provided on a steel rail column.

[0016] A cable car includes a cable car body, and further includes the curve passing structure of the cable car according to any one of the above, and a wheel of the curve passing structure of the cable car is connected to the cable car body.

[0017] The curve passing structure of the cable car provided according to the present application, including the wheel, the curved steel rail line and the linear steel cable line extending outward from the end of the steel rail line, and the wheel defines the wheel groove for installing the wheel on the steel cable line and is provided with the supporting flange for supporting the wheel on the steel rail line.

[0018] In the curve passing structure of the cable car, an entire line includes the linear steel cable line and the curved steel rail line. The steel rail line and the steel cable line form the curved line as a whole. Guidance on the curve line is realized by interaction force between the supporting flange and the steel rail line. The cable car body may pass continuously and smoothly on the curved line, without stop as that in the conventional art, which can improve the operation efficiency, make the setup of the cable car line more flexible, achieve no stop at a non-station place, reduce the requirement for setting stations in the line and improve the operation efficiency. At the same time, since only the curved part needs to be set as the steel rail line and the other straight parts can be set as the steel cable line in the entire line, it is convenient for machining.

[0019] A cable car including the curve passing structure of the cable car provided according to the present application, and the cable car body can continuously pass on a curved line.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] For more clearly illustrating embodiments of the present application or the technical solutions in the conventional technology, drawings referred to for describing the embodiments or the conventional technology will be briefly described hereinafter. Apparently, drawings in the following description are only examples of the present application, and for the person skilled in the art, other drawings may be obtained based on the set drawings without any creative efforts.

Figure 1 is a schematic diagram of a curve passing structure of a cable car according to the present application;

Figure 2 is a cross-sectional view at a steel cable line of a curve passing structure of a cable car according to a first specific embodiment of the present application;

Figure 3 is a cross-sectional view at a rail line of the curve passing structure of the cable car according to the first specific embodiment of the present application;

Figure 4 is a cross-sectional view at a steel cable line of a curve passing structure of the cable car according to a second specific embodiment of the present application;

Figure 5 is a cross-sectional view at a steel rail line of the curve passing structure of the cable car according to the second specific embodiment of the present application; and

Figure 6 is a cross-sectional view at a rail line of the curve passing structure of the cable car according to a third specific embodiment of the present application.

[0021] In Figure 1 to Figure 6:

1-steel cable line,	2-steel rail line,
3-steel cable column,	4-steel rail column,
5-wheel,	6-steel cable,
7-supportting flange,	8-partition plate,
9-cable groove,	10-wheel groove.

DETAILED DESCRIPTION OF THE EMBODIMENTS

[0022] The technical solutions according to the embodiments of the present application will be described clearly and completely as follows in conjunction with the drawings in the embodiments of the present application. It is apparent that the described embodiments are only a part of the embodiments according to the present application,

rather than all of the embodiments. Based on the embodiments of the present application, all other embodiments obtained without creative efforts by those of ordinary skill in the art shall fall within the protection scope of the present application.

[0023] A core of the present application is to provide a curve passing structure of a cable car, so as to realize a cable car body continuously passing on a curved line. Another core of the present application is to provide a cable car including the curve passing structure of the cable car, so as to realize the cable car body continuously passing on the curved line.

[0024] In a specific embodiment of a curve passing structure of a cable car according to the present application, referring to Figures 1 to 6, the curve passing structure includes a wheel 5, a curved steel rail line 2 and a linear steel cable line 1 extending outward from an end of the steel rail line 2, and the wheel 5 are provided with a wheel groove 10 for installing the wheel 5 on the steel cable line 1 and a supporting flange 7 for supporting the wheel 5 on the steel rail line 2.

[0025] The shape of the steel rail line 2 may be set to be a circular arc shape or other curved shapes as required. In addition, the supporting flange 7 may be set on an outer side surface or an inner side surface of the wheel 5. In this case, the outer side surface is an outer surface perpendicular to a travelling direction and a height direction, and the inner side surface is an inner surface perpendicular to the travelling direction and the height direction.

[0026] On the steel cable line 1, as shown in Figure 2, the wheel groove 10 of the wheel 5 is in contact with the steel cable 6 in the steel cable line 1, and a vehicle is carried by the steel cable 6; on the steel rail line 2, as shown in Figure 3, the supporting flange 7 of the wheel 5 is in contact with a rail in the steel rail line 2, and the vehicle is carried by the rail. The steel cable line 1 directly extends from the end of the steel rail line 2 to an outside of the steel rail line 2. The wheel 5 may directly move from the steel cable line 1 to the steel rail line 2 by passing a junction of the steel cable line 1 and the steel rail line 2, or directly move from the steel rail line 2 to the steel cable line 1 by passing the junction of the steel cable line 1 and the steel rail line 2.

[0027] In the embodiment, the line includes the linear steel cable line 1 and the curved steel rail line 2. The steel rail line 2 and the steel cable line 1 form a curved line as a whole. With the guide of an interaction force between the supporting flange 7 and the steel rail line 2 on the curve line, the cable car body may pass continuously and smoothly on the curved line without stop as that in the conventional art, which can improve the operation efficiency, make the setup of the cable car line more flexible, achieve no stop at a non-station place, reduce the requirement for setting stations in the line and improve the operation efficiency. At the same time, since only the curved part needs to be set as the steel rail line 2 and the other straight parts can be set as the steel cable

line 1 in the line, it is convenient for machining.

[0028] On the basis of the above embodiment, referring to Figure 6, the cable groove 9 is defined on the steel rail line 2, the steel cable 6 is set in the cable groove 9 and extends from the end of the cable groove 9 and out of the steel rail 2, and the part of the steel cable 6 that extends out of the cable groove 9 constitutes the steel cable line 1.

[0029] In another embodiment, if straight lines are set at both ends of the steel rail line 2, referring to Figure 1, the both ends of the steel cable 6 may respectively extend from the both ends of the steel rail line 2.

[0030] In this embodiment, since the steel cable 6 sinks into the cable groove 9 at the steel rail line 2, the steel cable 6 may not be cut at the steel rail line 2. Also, since at least a part of the steel cable 6 is set in the cable groove 9, the steel cable 6 may be supported by the steel cable line 1, and the stability of the steel cable line 1 can be improved.

[0031] Of course, in other embodiments, the steel cable line 1 may also be set in other forms. For example, the steel cable 6 may also be integrally set outside the steel rail line 2 and abut against the end of the steel rail line 2.

[0032] On the basis of any of the above embodiments, please refer to Figures 4 to 6. Two steel cables 6 may be set in parallel in the steel cable line 1. Accordingly, two wheel grooves 10 may be set on the wheel 5 and in one-to-one correspondence with the two steel cables 6.

[0033] In this embodiment, the stationarity of cable car body travelling on the steel cable line 1 can be improved by adopting the two parallel steel cables 6 corresponding to the two wheel grooves 10.

[0034] Further, a partition plate 8 between the two wheel grooves 10 may be set to have a support function on the steel rail line 2. For details, please refer to Figure 3.

[0035] In this embodiment, the partition plate 8 between the wheel grooves 10 can not only separate the steel cables 6 but also have a support function on the steel rail line 2, which may improve the stationarity of travelling on the steel rail line 2.

[0036] Of course, in other embodiments, one, three, five, or other numbers of the steel cable 6 may also be set in the steel cable line 1.

[0037] On the basis of any of the above embodiments, a cross-section of the steel cable 6 may be circular, and a groove depth of the wheel groove 10 is preferably greater than half of a diameter of the steel cable 6 in the steel cable line 1, so as to avoid the wheel 5 derailing from the steel cable 6 when the cable car body running on the steel cable line 1, which can improve the reliability of travelling.

[0038] On the basis of any of the above embodiments, on the steel rail line 2, a bottom surface of the wheel 5 can form a certain distance with a top surface of a steel rail in the steel rail line 2, so as to reduce the abrasion between the steel rail and the wheel 5.

[0039] On the basis of any of the above embodiments,

the curve passing structure of the cable car may also include a steel cable column 3, which is supported at a junction of the steel cable line 1 and the steel rail line 2.. The steel cable column 3 is set with a transitional rail for

5 realizing a smooth transition between the steel cable line 1 and the steel rail line 2. The transitional rail may be generally tapered, an axial direction thereof generally extends along the travelling direction. An end, with a larger diameter, of the transitional rail is set on the side close to the steel rail line 2, so as to realize guidance, and the supporting flange 7 can be gradually in transition from the transitional rail to the steel rail line 2. In addition, the position of the transitional rail may be set in parallel and on one side of the steel cable line 1; or, the transitional 10 steel rail may be regarded as a part of the steel rail line 2, that is, the transitional steel rail is an end part of the steel rail line 2, and the steel cable line 1 abuts against the transitional rail.

[0040] In this embodiment, at the steel cable column 20 3, a contacting place of the wheel 5 is gradually in transition from the steel cable 6 to the steel rail, and finally the vehicle is completely carried by the steel rail.

[0041] On the basis of any of the above embodiments, the steel rail line 2 may be set on the steel rail column 4 to improve the reliability of installing the steel cable line 1.

[0042] On the basis of any of the above embodiments, the supporting flange 7 may be set on the outer side surface or the inner side surface of the wheel 5, specifically on the outer side surface or the inner side surface 25 of the bottom of the wheel 5.

First specific embodiment

[0043] Please refer to Figure 2 and Figure 3, the wheel 35 5 is set with two parallel wheel grooves 10, the supporting flange 7 is set on the inner side surface of the wheel 5, and the partition plate 8 can be supported on the steel rail line 2. Two steel cables 6 may be set in parallel on the steel cable line 1, and the two steel cables 6 are 40 matched with the two wheel grooves 10 in a one-to-one correspondence.

Second specific embodiment

[0044] Please refer to Figure 4 and Figure 5, on the wheel 5, the supporting flange 7 is set on the outer side surface of the wheel 5. The two steel cables 6 may be set in parallel on the steel cable line 1, and the two steel cables 6 are 45 matched with the two wheel grooves 10 in a one-to-one correspondence.

Third specific embodiment

[0045] Please refer to Figure 6, the cable groove 9 is 55 set on the steel rail line 2, the steel cable 6 is set in the cable groove 9 and extends from the end of the cable groove 9 and out of the steel rail line 2, and the part of the steel cable 6 that extends out of the cable groove 9

constitutes the steel cable line 1. On the steel rail line 2, the bottom surface of the wheel 5 can form a certain distance with the top surface of steel rail in the steel rail line 2.

[0046] In addition to the above curve passing structure of the cable car, the present application further provides a cable car including a cable car body and the curve passing structure of the cable car which may be the curve passing structure of the cable car in any of the above embodiments, and the beneficial effects may correspondingly refer to the above embodiments. The wheel 5 of the curve passing structure of the cable car is connected to the cable car body. Other structures of the cable car may refer to the conventional art, which will not be repeated here.

[0047] The above embodiments are described in a progressive manner. Each of the embodiments is mainly focused on describing its differences from other embodiments, and reference may be made among these embodiments with respect to the same or similar parts.

[0048] The cable car and the curve passing structure of the cable car according to the present application have been introduced in detail as above. Specific examples are used herein to illustrate the principle and implementation of the present application. The description of the above embodiments is for understanding the method and core idea of the present application. It should be pointed out that for those of ordinary skill in the art, various improvements and modifications can be made to the present application without departing from the principle of the present application, and these improvements and modifications shall fall within the protection scope of the present application as well.

Claims

1. A curve passing structure of a cable car, comprising a wheel (5), a curved steel rail line (2), and a linear steel cable line (1) extending outward from an end of the steel rail line (2), wherein the wheel (5) defines a wheel groove (10) for installing the wheel (5) on the steel cable line (1) and is provided with a supporting flange (7) for supporting the wheel (5) on the steel rail line (2).

2. The curve passing structure of the cable car according to claim 1, wherein a cable groove (9) is defined on the steel rail line (2), a steel cable (6) is provided in the cable groove (9) and extends from an end of the cable groove (9) and out of the steel rail line (2), a part of the steel cable (6) that extends out of the cable groove (9) forms the steel cable line (1).

3. The curve passing structure of the cable car according to claim 2, wherein a supporting flange (7) is provided on an outer side surface of a bottom of a wheel (5).

4. The curve passing structure of the cable car according to claim 1, wherein two steel cables (6) are provided in parallel in the steel cable line (1); two wheel grooves (10) are provided in the wheel (5) and in one-to-one correspondence to the two steel cables (6).

5. The curve passing structure of the cable car according to claim 4, a partition plate (8) between the two cable grooves (10) is supported on the steel rail line (2).

6. The curve passing structure of the cable car according to claim 5, wherein the supporting flange (7) is provided on an outer surface of the wheel (5).

7. The curve passing structure of the cable car according to claim 1, wherein a cross section of a steel cable (6) is circular, and a groove depth of the wheel groove (10) is greater than half of a diameter of the steel cable (6) in the steel cable line (1).

8. The curve passing structure of the cable car according to any one of claims 1 to 7, further comprising a steel cable column (3), which is supported at a junction of the steel cable line (1) and the steel rail line (2), wherein the steel cable column (3) is provided with a transitional rail for realizing a smooth transition between the steel cable line (1) and the steel rail line (2).

9. The curve passing structure of the cable car according to claim 8, wherein the steel rail line (2) is provided on a steel rail column (4).

10. A cable car, comprising a cable car body, and the curve passing structure of the cable car according to any one of claims 1 to 9, wherein the wheel (5) of the curve passing structure of the cable car is connected to the cable car body.

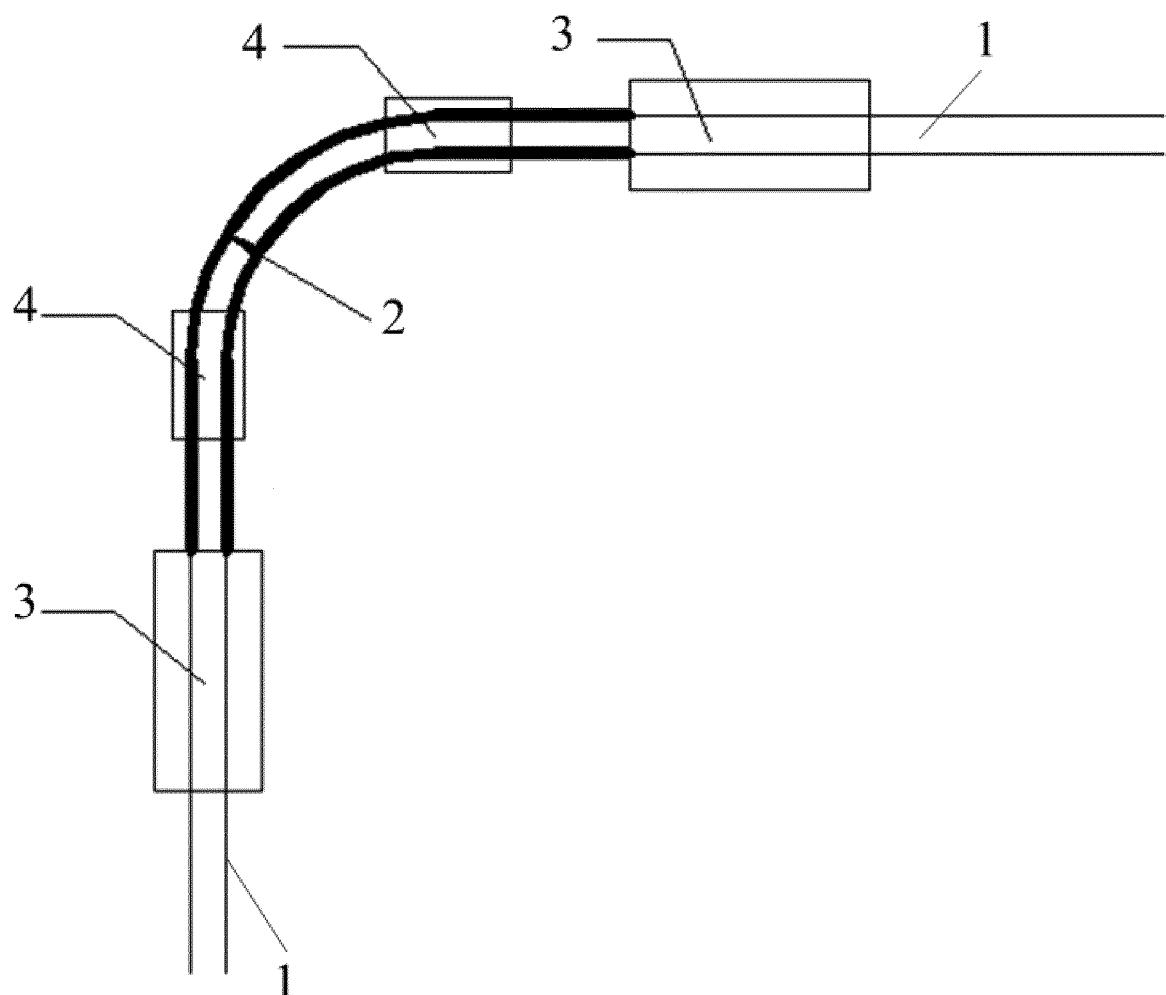


Figure 1

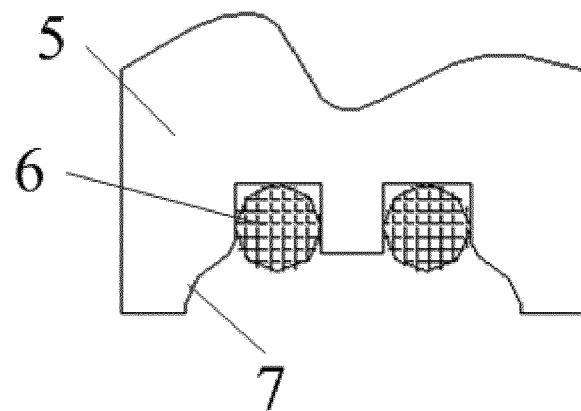


Figure 2

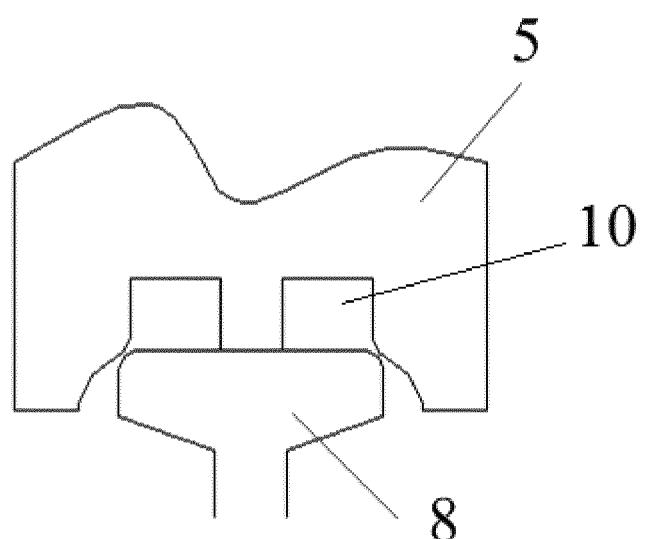


Figure 3

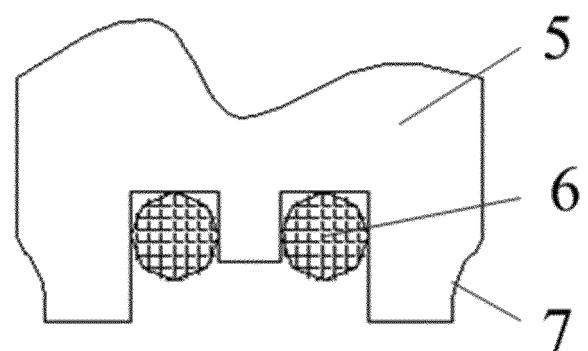


Figure 4

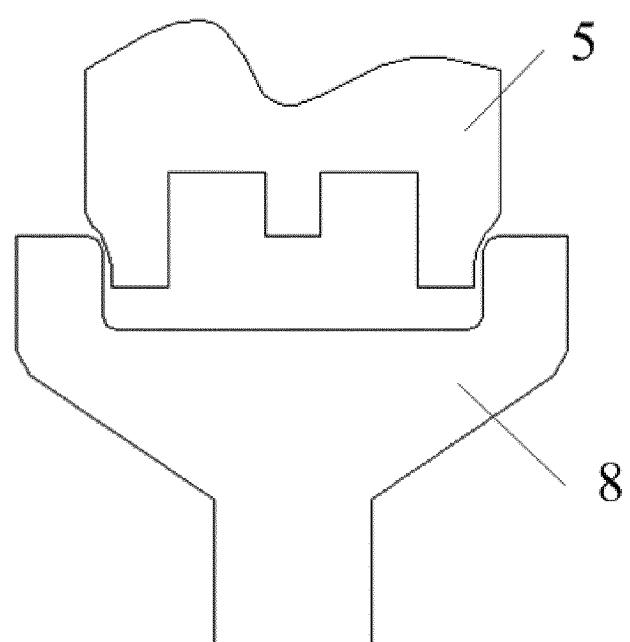


Figure 5

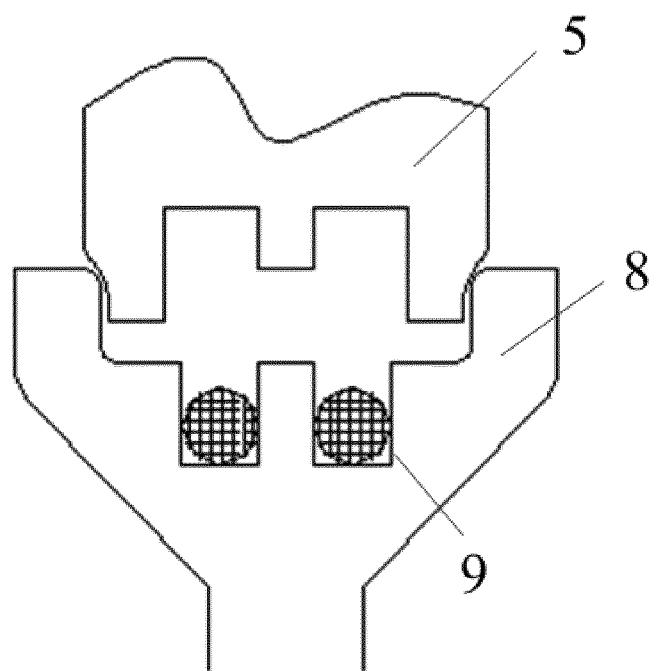


Figure 6

INTERNATIONAL SEARCH REPORT		International application No. PCT/CN2019/095772															
5	A. CLASSIFICATION OF SUBJECT MATTER B61B 12/00(2006.01)i; B61B 12/02(2006.01)i																
10	According to International Patent Classification (IPC) or to both national classification and IPC																
15	B. FIELDS SEARCHED Minimum documentation searched (classification system followed by classification symbols) B61B																
20	Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched																
25	Electronic data base consulted during the international search (name of data base and, where practicable, search terms used) CNABS; CNTXT; CNKI; DWPI; SIPOABS; WOTXT; USTXT; EPTXT: 中车株洲电力机车, 缆车, 拐弯, 弯曲, 转弯, 车轮, cable, bend, curve, round, turn, wheel																
30	C. DOCUMENTS CONSIDERED TO BE RELEVANT <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 2px;">Category*</th> <th style="text-align: left; padding: 2px;">Citation of document, with indication, where appropriate, of the relevant passages</th> <th style="text-align: left; padding: 2px;">Relevant to claim No.</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 2px;">PX</td> <td style="padding: 2px;">CN 109532877 A (CRRC ZHUZHOU LOCOMOTIVE CO., LTD.) 29 March 2019 (2019-03-29) claims 1-10</td> <td style="text-align: center; padding: 2px;">1-10</td> </tr> <tr> <td style="text-align: center; padding: 2px;">X</td> <td style="padding: 2px;">TW 201420402 A (PENG, Yulun) 01 June 2014 (2014-06-01) page 16, lines 1-23, and figure 2</td> <td style="text-align: center; padding: 2px;">1-10</td> </tr> <tr> <td style="text-align: center; padding: 2px;">A</td> <td style="padding: 2px;">CN 202557534 U (YANGZHOU BEST MECHANICAL EQUIPMENT CO., LTD.) 28 November 2012 (2012-11-28) entire document</td> <td style="text-align: center; padding: 2px;">1-10</td> </tr> <tr> <td style="text-align: center; padding: 2px;">A</td> <td style="padding: 2px;">FR 2899549 A1 (POMAGALSKI SA) 12 October 2007 (2007-10-12) entire document</td> <td style="text-align: center; padding: 2px;">1-10</td> </tr> </tbody> </table>		Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.	PX	CN 109532877 A (CRRC ZHUZHOU LOCOMOTIVE CO., LTD.) 29 March 2019 (2019-03-29) claims 1-10	1-10	X	TW 201420402 A (PENG, Yulun) 01 June 2014 (2014-06-01) page 16, lines 1-23, and figure 2	1-10	A	CN 202557534 U (YANGZHOU BEST MECHANICAL EQUIPMENT CO., LTD.) 28 November 2012 (2012-11-28) entire document	1-10	A	FR 2899549 A1 (POMAGALSKI SA) 12 October 2007 (2007-10-12) entire document	1-10
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.															
PX	CN 109532877 A (CRRC ZHUZHOU LOCOMOTIVE CO., LTD.) 29 March 2019 (2019-03-29) claims 1-10	1-10															
X	TW 201420402 A (PENG, Yulun) 01 June 2014 (2014-06-01) page 16, lines 1-23, and figure 2	1-10															
A	CN 202557534 U (YANGZHOU BEST MECHANICAL EQUIPMENT CO., LTD.) 28 November 2012 (2012-11-28) entire document	1-10															
A	FR 2899549 A1 (POMAGALSKI SA) 12 October 2007 (2007-10-12) entire document	1-10															
35	<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.																
40	* Special categories of cited documents: “A” document defining the general state of the art which is not considered to be of particular relevance “E” earlier application or patent but published on or after the international filing date “L” document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) “O” document referring to an oral disclosure, use, exhibition or other means “P” document published prior to the international filing date but later than the priority date claimed																
45	“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 “X” document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone “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																
50	Date of the actual completion of the international search 09 September 2019	Date of mailing of the international search report 09 October 2019															
55	Name and mailing address of the ISA/CN China National Intellectual Property Administration (ISA/CN) No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088 China	Authorized officer Telephone No.															

INTERNATIONAL SEARCH REPORT Information on patent family members				International application No. PCT/CN2019/095772				
5	Patent document cited in search report		Publication date (day/month/year)	Patent family member(s)		Publication date (day/month/year)		
	CN	109532877	A	29 March 2019		None		
	TW	201420402	A	01 June 2014		None		
	CN	202557534	U	28 November 2012		None		
10	FR	2899549	A1	12 October 2007	AT EP US FR US EP CA DE	423050 1845004 7559281 2899549 2007283840 1845004 2582681 602007000549	T A1 B2 B1 A1 B1 A1 D1	15 March 2009 17 October 2007 14 July 2009 27 June 2008 13 December 2007 18 February 2009 10 October 2007 02 April 2009
15								
20								
25								
30								
35								
40								
45								
50								
55	Form PCT/ISA/210 (patent family annex) (January 2015)							

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- CN 201910002222X [0001]