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(54) BOGIE AND SUSPENDED VEHICLE HAVING SAME

(57) Provided are a bogie and a suspended vehicle with the same. The bogie includes a frame, a swing bolster as well as a pin shaft, wherein the pin shaft is inserted into the frame and the swing bolster, such that the swing bolster is rotationally provided with respect to the frame; the swing bolster includes a swing bolster main body; a bottom end of the swing bolster main body is used for connecting to a vehicle body; the pin shaft is inserted into a top end of the swing bolster main body to connect the frame with the swing bolster, such that the vehicle body is stably suspended under a track, thereby solving a problem that in the conventional art a suspended vehicle is unable to travel stably along a track.

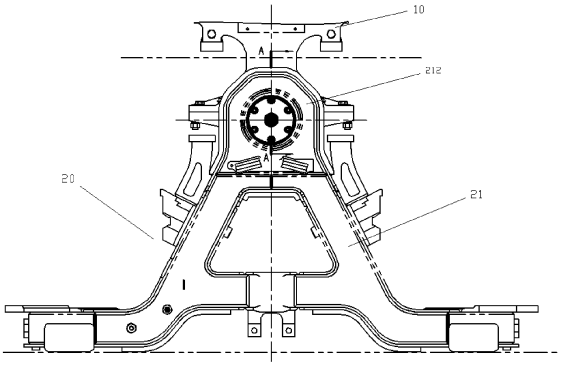

Fig. 1

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Description

Technical Field

[0001] The disclosure relates to a field of vehicles, and in particular to a bogie and a suspended vehicle with a bogie.

Background

[0002] As city spaces, road traffic resources and the like are in shortage day by day, related traffic resources have the defects of high investment cost, large operation noise, poor migration, long engineering periods, and the like.

[0003] Related traffic problems may be alleviated by using a suspended vehicle, a bogie of the suspended vehicle is positioned above a vehicle body, the vehicle body is suspended on the bogie, and an upper plane of a top of the vehicle body is lower than a track plane.

[0004] However, a connection relationship between a fame of a related bogie and a swing bolster cannot ensure security of suspension, and thus the suspended vehicle cannot operate stably on a track.

Summary

[0005] The disclosure mainly aims to provide a bogie and a suspended vehicle with a bogie, and aims to solve problems that in the related art a suspended vehicle cannot operate on a track stably.

[0006] An embodiment of the present disclosure provides a bogie, the bogie includes a frame and a swing bolster, the bogie further includes a pin shaft, wherein the pin shaft is provided on the frame and the swing bolster in a penetration manner, such that the swing bolster is rotationally provided with respect to the frame; wherein the swing bolster includes a swing bolster main body; a bottom end of the swing bolster main body is used for connecting to a vehicle body; the pin shaft is provided on a top end of the swing bolster main body in a penetration manner, so as to connect the frame and the swing bolster.

[0007] In an exemplary embodiment, the bogie further includes a bush, wherein the bush is provided on the pin shaft in a sleeving manner, and the bush is provided in an annular gap between the pin shaft and the swing bolster main body.

[0008] In an exemplary embodiment, the bogie further includes a baffle component, wherein the baffle component is provided in the annular gap between the pin shaft and the swing bolster main body, and the baffle component is provided on both sides of the bush.

[0009] In an exemplary embodiment, the baffle component includes two baffle rings, a radial cross section of each of the two baffle rings is of triangle shaped, and the two baffle rings are attached by a respective inclined surface.

[0010] In an exemplary embodiment, the radial cross section of the each of the two baffle rings is of right triangle shaped, and a right angle side of the radial cross section of the each of the two baffle rings is attached to a peripheral surface of the pin shaft.

[0011] In an exemplary embodiment, the bogie further includes an end cover, wherein the end cover is mounted on the swing bolster main body, and the end cover is provided on a side wall of the swing bolster main body to shield the pin shaft.

[0012] In an exemplary embodiment, the end cover is provided with a baffle bulge, a limiting bulge is provided on the swing bolster main body, and the bush and the baffle component are sandwiched between the baffle bulge and the limiting bulge.

[0013] In an exemplary embodiment, the end cover is provided with opposite to an end surface of the pin shaft, the bogie further includes an observation mirror, wherein the observation mirror is mounted on the end cover and is used for observing a positioning state of the pin shaft.

[0014] In an exemplary embodiment, a sealant is sandwiched between the end cover and the swing bolster main body.

[0015] In an exemplary embodiment, the bogie further includes a sliding bearing, wherein the sliding bearing is provided on the pin shaft in a sleeving manner, and the frame is provided on the pin shaft by a sliding bearing in a sleeving manner.

[0016] In an exemplary embodiment, the bogie further includes a bearing cover, wherein the bearing cover is mounted on the frame, and the bearing cover is provided on the pin shaft in a sleeving manner to shield the sliding bearing.

[0017] In an exemplary embodiment, the bogie further includes an oil seal member, wherein the oil seal member is provided on an inner side of the bearing cover, and the oil seal member is provided on the pin shaft in a sleeving manner.

[0018] In an exemplary embodiment, two oppositely arranged clamping parts are provided at a top end of the swing bolster main body, the frame is provided with a mounting part, the mounting part is clamped between the two clamping parts, and the pin shaft is provided on the two clamping parts and the mounting part in a penetration manner.

[0019] In an exemplary embodiment, the bogie further includes an antithrust gasket, wherein the antithrust gasket is positioned in a gap between the mounting part and each of the two clamping parts, and the antithrust gasket is provided around the pin shaft.

[0020] In an exemplary embodiment, the bogie further includes a first sealing ring, wherein at least a part of the first sealing ring is positioned in the gap between the mounting part and each of the the two clamping parts, and the first sealing ring is provided around the antithrust gasket.

[0021] In an exemplary embodiment, an accommodation groove is formed in an outer circumference wall of the first sealing ring, and at least a part of a groove open-

ing of the accommodation groove is positioned in the gap between the mounting part and the clamping parts.

[0022] Another embodiment of the present disclosure provides a suspended vehicle, the suspended vehicle includes a bogie, and the bogie is the above bogie.

[0023] According to the bogie provided by some embodiments of the disclosure, the frame is rotationally connected with the swing bolster by the pin shaft, the swing bolster is rotationally provided with respect to the frame, the bottom end of the swing bolster body of the swing bolster is connected with the vehicle body, furthermore connection of the bogie with the vehicle body is achieved, the vehicle body is stably suspended on a track, and a problem that in the related art a suspended vehicle cannot be operated on the track stably is solved.

Brief Description of the Drawings

[0024] A part of drawings of the disclosure are provided to further understand the disclosure, and schematic embodiments and description are adopted not to limit the disclosure but only to explain the disclosure. In the drawings:

Fig. 1 illustrates a structure diagram of a bogie according to an embodiment of the disclosure; and
Fig. 2 illustrates a section view A-A of the bogie in FIG. 1.

[0025] Herein, the drawings include the following drawing markers:
10: frame; 11: mounting part; 20: swing bolster; 21: swinging bolster main body; 211: limiting bulge; 212: clamping part; 30: pin shaft; 41: sliding bearing; 42: bearing cover; 43: oil seal member; 44: bush; 45: baffle component; 50: end cover; 51: baffle bulge; 60: observation mirror; 70: antithrust gasket; 80: first sealing ring; 90: second sealing ring; 100: first fastener; 110: second fastener; 120: third fastener; 130: sealant; 140: third sealing ring.

Detailed Description of the Embodiments

[0026] It needs to be noted that embodiments and characteristics of the embodiments of the disclosure may by mutually combined without confliction, and the disclosure is described in details with the drawings and the embodiments.

[0027] An embodiment of the present disclosure provides a bogie. As shown in Fig. 1 and Fig. 2, the bogie includes a frame 10 and a swing bolster 20, and further includes a pin shaft 30, the pin shaft 30 is provided on the frame 10 and the swing bolster 20 in a penetration manner, such that the swing bolster 20 is rotationally provided with respect to the frame 10, the swing bolster 20 includes a swing bolster main body 21, a bottom end of the swing bolster main body 21 is used for connecting to a vehicle body, the pin shaft 30 is provided on a top end of the swing bolster main body 21 in a penetration manner, so as to connect the frame 10 and the swing bolster 20.

[0028] According to the bogie of the disclosure, the frame 10 is rotationally connected with the swing bolster 20 by the pin shaft 30, such that the swing bolster 20 is rotationally provided with respect to the frame 10, the bottom end of the swing bolster main body 21 of the swing bolster 20 is connected to the vehicle body, then connection of the bogie with the vehicle body is achieved, the vehicle body is stably suspended on a track, and the problem that in the related art a suspended vehicle cannot be operated on a track stably is solved.

[0029] As shown in Fig. 2, the bogie further includes a sliding bearing 41, the sliding bearing 41 is provided on the pin shaft 30 in a sleeving manner, and the frame 10 is provided on the pin shaft 30 by the sliding bearing 41. Due to adoption of the sliding bearing 41, connection of the pin shaft 30 with the frame 10 is conveniently achieved, and furthermore the swing bolster 20 is rotationally provided with respect to the frame 10.

[0030] To achieve positioning of the sliding bearing 41, the bogie further includes a bearing cover 42, the bearing cover 42 is mounted on the frame 10, and the bearing cover 42 is provided on the pin shaft 30 in a sleeving manner to shield the sliding bearing 41. By mounting the bearing cover 42 on the frame 10, the sliding bearing 41 is fixed in a position of the pin shaft 30.

[0031] In addition, the bogie further includes an oil seal member 43, the oil seal member 43 is provided on an inner side of the bearing cover 42, and the oil seal member 43 is provided on the pin shaft 30 in a sleeving manner. By providing the oil seal 43 on an inner side of the bearing cover 42, an effect of internal oil sealing is achieved.

[0032] The bogie further includes a bush 44, the bush 44 is provided on the pin shaft 30 in a sleeving manner, and the bush 44 is provided in an annular gap between the pin shaft 30 and the swing bolster main body 21. By providing the bush 44 on the pin shaft 30 in a sleeving manner, the pin shaft 30 is prevented from direct contacting with the frame 10, damage of the pin shaft 30 is reduced, furthermore a function of protecting the pin shaft 30 is achieved, and the pin shaft 30 is enabled to make reciprocation movement in the bush 44.

[0033] According to an embodiment of the disclosure, the bogie further includes a baffle component 45, the baffle component 45 is provided in the annular gap between the pin shaft 30 and the swing bolster main body 21, and the baffle component 45 is provided on both sides of the bush 44. By providing the baffle component 45, the bush 44 is limited in the gap between the pin shaft 30 and the swing bolster main body 21.

[0034] In an exemplary embodiment, the baffle component 45 includes two baffle rings, a radial cross section of each of the two baffle ring is of triangle shaped, and the two baffle rings are attached by a respective inclined surface. In an exemplary embodiment, the two baffle

rings are connected by the longest side of a respective triangular cross section of the two baffle rings. By adopting the baffle rings with triangular cross sections, elastic positioning of the bush 44 is achieved by mutual extrusion of the two baffle rings, and furthermore the bush is compressed in the annular gap between the pin shaft 30 and the swing bolster main body 21.

[0035] In an exemplary embodiment, the radial cross section of the each of the two baffle ring is of right triangle shaped, and a right angle side of the radial cross section of the each of the two baffle ring is attached to a peripheral surface of the pin shaft 30.

[0036] In the embodiment, as shown in Fig. 2, the bogie further includes an end cover 50, the end cover 50 is mounted on the swing bolster main body 21, and the end cover 50 is provided on a side wall of the swing bolster main body 21 to shield the pin shaft 30. As the end cover 50 is provided on a side wall of the swing bolster main body 21, the pin shaft 30 is completely shielded.

[0037] In an exemplary embodiment, the end cover 50 is provided with a baffle bulge 51, a limiting bulge 211 is provided on the swing bolster main body 21, and the bush 44 and the baffle component 45 are sandwiched between the baffle bulge 51 and the limiting bulge 211. By providing the baffle bulge 51 and the limiting bulge 211, positioning of the bush 44 and the baffle component 45 is conveniently achieved.

[0038] As shown in Fig. 2, the end cover 50 is provided opposite to an end surface of the pin shaft 30, the bogie further includes an observation mirror 60, the observation mirror 60 is mounted on the end cover 50 and is used for observing a positioning state of the pin shaft 30. Before being assembled, a center of an end surface of the pin shaft 30 is marked, a relative position of the marker with respect to the end cover 50 may be observed by the observation mirror 60, furthermore a positioning state of the pin shaft 30 is observed, and assembling precision of the pin shaft 30 is ensured.

[0039] To improving a sealing effect of the end cover 50 and the swing bolster main body 21, a sealant 130 is sandwiched between the end cover 50 and the swing bolster main body 21.

[0040] To achieve stable connection of the swing bolster 20 and the frame 10, two oppositely arranged clamping parts 212 are provided at the top end of the swing bolster main body 21, the frame 10 is provided with a mounting part 11, the mounting part 11 is clamped between the two clamping parts 212, and the pin shaft 30 is provided on the two clamping parts 212 and the mounting part 11 in a penetration manner.

[0041] In an exemplary embodiment, two mounting parts 11 are provided, the two mounting parts 11 are provided at an interval between the two clamping parts 212, that is, the mounting parts 11 are sandwiched between the two clamping parts 212.

[0042] To achieve relative rotation of the frame 10 and the swing bolster 20, the bogie further includes an antithrust gasket 70, the antithrust gasket 70 is positioned in a gap between the mounting parts 11 and each of the two clamping parts 212, and the antithrust gasket 70 is provided around the pin shaft 30. In an exemplary embodiment, the antithrust gasket 70 is fixed on the frame 10 by a first fastener 100. In an exemplary embodiment, the antithrust gasket 70 is made of a wearing-resistant material, and the first fastener 100 is a hexagon socket countersunk head screw.

[0043] To further improve sealing between the mounting part 11 and the clamping part 212, the bogie further includes a first sealing ring 80, at least a part of the first sealing ring 80 is positioned in the gap between the mounting parts 11 and the clamping parts 212, and the first sealing ring 80 is provided around the antithrust gasket 70.

[0044] Herein, an accommodation groove is formed in an outer circumference wall of the first sealing ring 80, and at least a part of a groove opening of the accommodation groove is positioned in the gap between the mounting part 11 and the clamping parts 212. In an exemplary embodiment, the first sealing ring 80 is a V-shaped ring.

[0045] To prevent invasion of rainwater, the bogie further includes a second sealing ring 90 which is provided on the bearing cover 42 and a third sealing ring 140 which is provided on the clamping parts 212. In an exemplary embodiment, the second sealing ring 90 and the third sealing ring 140 are O-shaped sealing rings for sealing.

[0046] To ensure reliable and safe mounting and connection of different components, the bogie further includes a second fastener 110 which is provided on the bearing cover 42 and the mounting parts 11 in the penetration manner, and a third fastener 120 which is provided on the end cover 50 and the clamping parts 212 in the penetration manner. In an exemplary embodiment, a part between the end cover 50 and the clamping parts 212 is filled with the sealant 130.

[0047] An embodiment of the disclosure further provides a suspended vehicle, and the suspended vehicle includes the above bogie.

[0048] The disclosure relates to a mounting structure of a suspending device. The structure is provided between the swing bolster 20 and the frame 10. An embodiment of the disclosure sufficiently utilizes spatial structures of the frame 10 and the swing bolster 20, processibility of the mounting structure self is utilized, meanwhile, by using wearing-resistant materials such as the sliding bearing 41 and the antithrust gasket, relative rotation and sliding are achieved.

[0049] To achieve reliable compression, a triangular antithrust gasket is adopted to extrude the swing bolster and the pin shaft 30. In addition, to prevent invasion of rainwater, the O-shaped rings, the V-shaped ring, the sealant, and the like, are adopted for sealing. In order to ensure centering effect of the pin shaft 30, mounting situations of the pin shaft 30 is observed by using the observation mirror 60. Meanwhile, to ensure assembling fastening and reliability, a loctite adhesive-243 or a Nord-Lock anti-loosening "tooth-shaped" gasket is used.

[0050] The description shows that the embodiments of the disclosure achieve the following technical effects: According to the bogie of the disclosure, the frame is rotationally connected with the swing bolster by the pin shaft, then the swing bolster is rotationally provided with respect to the frame, the bottom end of the swing bolster body of the swing bolster is connected with the vehicle body, furthermore connection of the bogie and the vehicle body is achieved, the vehicle body is stably suspended on the track, and the problem that in the related art the suspended vehicle cannot be operated on the track stably is solved.

[0051] The above is only the optional embodiment of the disclosure and not intended to limit the scope of protection of the disclosure. For those skilled in the art, the disclosure may have various modifications and variations. Any modifications, equivalent replacements, improvements and the like made within the spirit and principle of the disclosure shall fall within the scope of protection of the disclosure.

Claims

1. A bogie, comprising a frame (10) and a swing bolster (20), and further comprising:

a pin shaft (30), wherein the pin shaft (30) is provided on the frame (10) and the swing bolster (20) in a penetration manner, such that the swing bolster (20) is rotationally provided with respect to the frame (10);
wherein the swing bolster (20) comprises a swing bolster main body (21); a bottom end of the swing bolster main body (21) is used for connecting to a vehicle body; the pin shaft (30) is provided on a top end of the swing bolster main body (21) in a penetration manner, so as to connect the frame (10) and the swing bolster (20).

2. The bogie as claimed in claim 1, further comprising: a bush (44), wherein the bush (44) is provided on the pin shaft (30) in a sleeving manner, and the bush (44) is provided in an annular gap between the pin shaft (30) and the swing bolster main body (21).

3. The bogie as claimed in claim 2, further comprising: a baffle component (45), wherein the baffle component (45) is provided in the annular gap between the pin shaft (30) and the swing bolster main body (21), and the baffle component (45) is provided on both sides of the bush (44).

4. The bogie as claimed in claim 3, wherein the baffle component (45) comprises two baffle rings, a radial cross section of each of the two baffle rings is of triangle shaped, and the two baffle rings are attached by a respective inclined surface.

5. The bogie as claimed in claim 4, wherein the radial cross section of the each of the two baffle rings is of right triangle shaped, and a right angle side of the radial cross section of the each of the two baffle rings is attached to a peripheral surface of the pin shaft (30).

6. The bogie as claimed in claim 3, further comprising: an end cover (50), wherein the end cover (50) is mounted on the swing bolster main body (21), and the end cover (50) is provided on a side wall of the swing bolster main body (21) to shield the pin shaft (30).

7. The bogie as claimed in claim 6, wherein the end cover (50) is provided with a baffle bulge (51), a limiting bulge (211) is provided on the swing bolster main body (21), and the bush (44) and the baffle component (45) are sandwiched between the baffle bulge (51) and the limiting bulge (211).

8. The bogie as claimed in claim 6, wherein the end cover (50) is provided opposite to an end surface of the pin shaft (30), the bogie further comprises an observation mirror (60), wherein the observation mirror (60) is mounted on the end cover (50) and is used for observing a positioning state of the pin shaft (30).

9. The bogie as claimed in claim 6, wherein a sealant (130) is sandwiched between the end cover (50) and the swing bolster main body(21).

10. The bogie as claimed in claim 1, further comprising a sliding bearing (41), wherein the sliding bearing (41) is provided on the pin shaft (30) in a sleeving manner, and the frame (10) is provided on the pin shaft (30) by the sliding bearing (41) in a sleeving manner.

11. The bogie as claimed in claim 10, further comprising a bearing cover (42), wherein the bearing cover (42) is mounted on the frame (10), and the bearing cover (42) is provided on the pin shaft (30) in a sleeving manner to shield the sliding bearing (41).

12. The bogie as claimed in claim 11, further comprising an oil seal member (43), wherein the oil seal member (43) is provided on an inner side of the bearing cover (42), and the oil seal member (43) is provided on the pin shaft (30) in a sleeving manner.

13. The bogie as claimed in claim 1, wherein two oppositely arranged clamping parts (212) are provided at a top end of the swing bolster main body (21), the frame (10) is provided with a mounting part (11), the mounting part (11) is clamped between the two clamping parts (212), and the pin shaft (30) is provided on the two clamping parts (212) and the mount-

ing part (11) in a penetration manner.

14. The bogie as claimed in claim 13, further comprising an antithrust gasket(70), wherein the antithrust gasket (70) is positioned in a gap between the mounting part (11) and each of the two clamping parts (212), and the antithrust gasket (70) is provided around the pin shaft (30).

15. The bogie as claimed in claim 14, further comprising a first sealing ring (80), wherein at least a part of the first sealing ring (80) is positioned in the gap between the mounting part (11) and the each of the two clamping parts (212), and the first sealing ring (80) is provided around the antithrust gasket (70).

16. The bogie as claimed in claim 15, wherein an accommodation groove is formed in an outer circumference wall of the first sealing ring (80), and at least a part of a groove opening of the accommodation groove is positioned in the gap between the mounting part (11) and the clamping parts (212).

17. A suspended vehicle, comprising a bogie, wherein the bogie is the bogie as claimed in any one of claims 1-16.

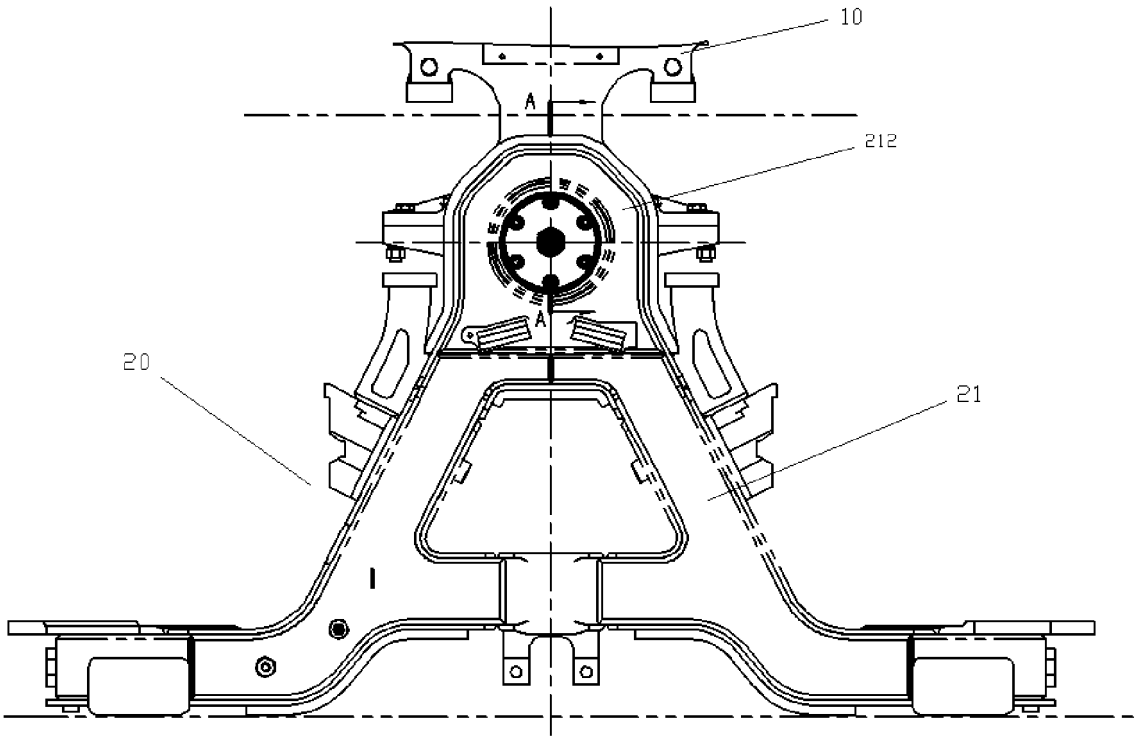
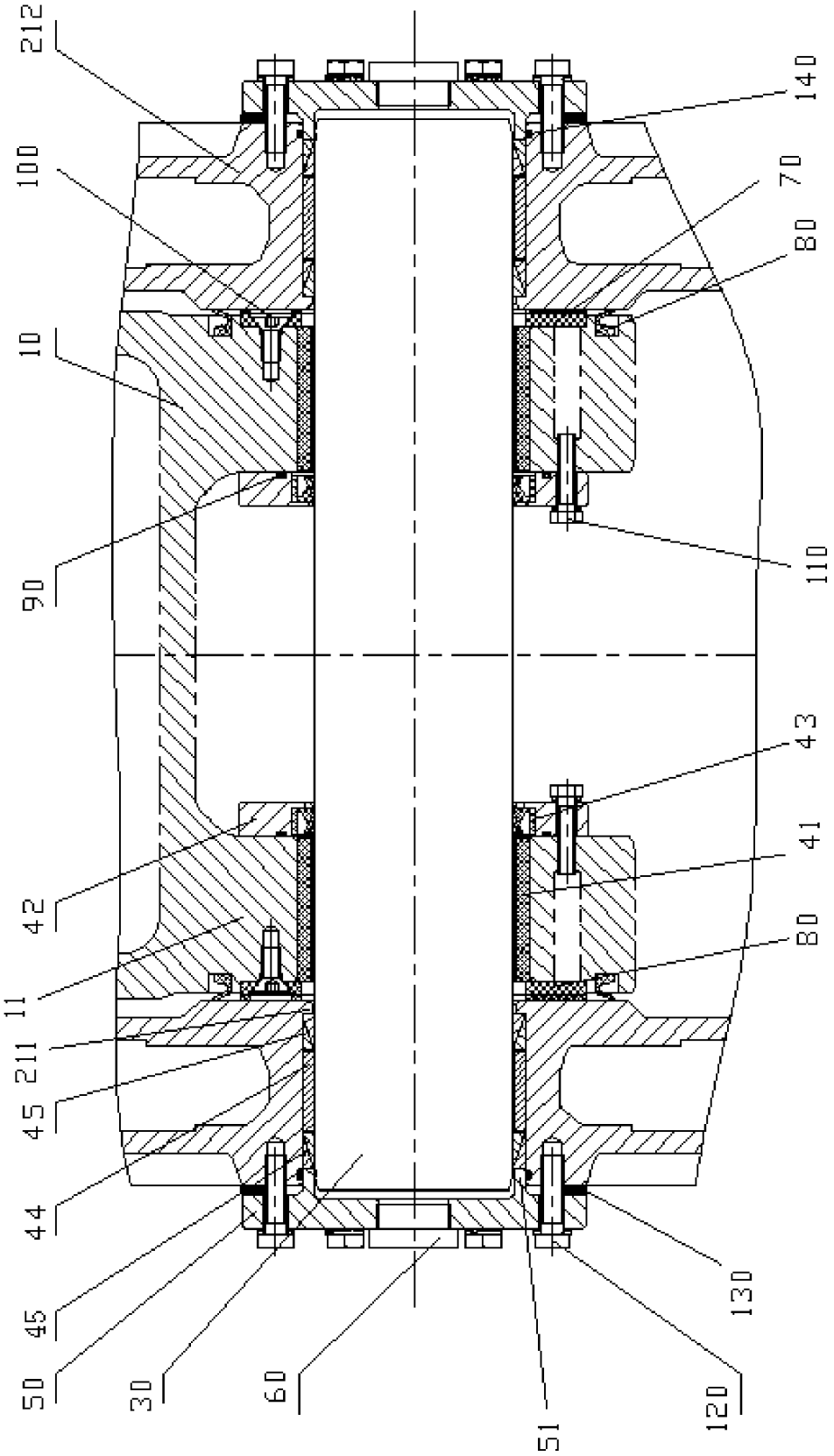


Fig. 1


212
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INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2017/108543

A. CLASSIFICATION OF SUBJECT MATTER

B61F 5/04 (2006.01) i; B61F 5/18 (2006.01) i; B61B 3/00 (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)

B61F; B61B

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

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

WPI, EPODOC, CNPAT, CNKI: 中车, 悬挂式, 空中, 空轨, 车, 车体, 车顶, 顶架, 车架, 单轨, 连接, 摇枕, 销轴, 中心轴, 中心销, 转向架, 构架, 衬套, 轴衬, 套筒, 轴承, suspend, car, vehicle, train, rail, monorail, truck, bogie, bolster, bolt, pin, king, center, bush, sleeve, bearing, journal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
PX	CN 107284463 A (CRRC QINGDAO SIFANG CO., LTD.) 24 October 2017 (24.10.2017), entire document	1-17
PX	CN 107284462 A (CRRC QINGDAO SIFANG CO., LTD.) 24 October 2017 (24.10.2017), entire document	1-17
X	CN 104442880 A (CSR ZHUZHOU ELECTRIC LOCOMOTIVE CO., LTD.) 25 March 2015 (25.03.2015), description, paragraphs [0024]-[0038], and figures 1-3	1-12, 17
X	CN 104228865 A (CSR ZHUZHOU ELECTRIC LOCOMOTIVE CO., LTD.) 24 December 2014 (24.12.2014), description, paragraphs [0018]-[0024], and figure 1	1-12, 17
A	SU 518402 A2 (BRYANSK TRANSPORT MAC.) 30 June 1976 (30.06.1976), entire document	1-17

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

* Special categories of cited documents:

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"&"document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
05 February 2018	24 February 2018
Name and mailing address of the ISA State Intellectual Property Office of the P. R. China No. 6, Xitucheng Road, Jimenqiao Haidian District, Beijing 100088, China Facsimile No. (86-10) 62019451	Authorized officer FAN, Jintao Telephone No. (86-10) 53960912

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

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2017/108543

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	DD 110814 A1 (VEB WAGGONBAU GORLITZ) 12 January 1975 (12.01.1975), entire document	1-17
A	WO 2004035383 A2 (SKY TRAIN CORP.) 29 April 2004 (29.04.2004), entire document	1-17

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2017/108543

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Form PCT/ISA /210 (patent family annex) (July 2009)