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(54) TRAILER FRAMEWORK AND TRAILER BOGIE HAVING SAME

(57) A trailer framework and a trailer bogie having the same. The trailer framework comprises a cross-beam (1) and side beams (2) fixedly disposed at two ends of the cross-beam (1). The side beams (2) are U-shaped structure beams. A first brake beam (3) is disposed between the side beams (2) above and in front of the cross-beam (1), and a second brake beam (5) is disposed between the side beams (2) above and behind the cross-beam (1). The first brake beam (3) and the second brake beam (5) are parallel to each other, and two ends thereof are fixedly connected to the respective side beams (2) at inner sides of the side beams. The first brake beam (3) and the second brake beam (5) are provided with brake seats (4) thereon respectively for mounting braking devices. The plurality of braking seats (4) of the first brake beam (3) are disposed on a front side of the first brake beam and arranged at intervals laterally on the first brake beam (3), and the plurality of braking seats (4) of the second brake beam (5) are disposed on a rear side of the second brake beam and arranged at intervals laterally on the second brake beam (5). The above trailer framework enables an easier design and processing of cross-beams and can reduce the concentration of stress on the cross-beams.

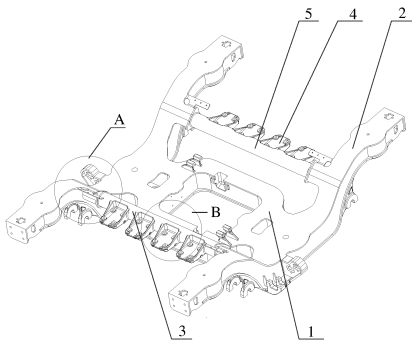

FIGURE 1

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Description

[0001] The application claims the priorities to Chinese patent application No. 201710848349.4 titled " TRAILER FRAME AND TRAILER BOGIE HAVING SAME", filed with the China National Intellectual Property Administration on September 19, 2017, and Chinese patent application No. 201721202607.3 titled " TRAILER FRAME AND TRAILER BOGIE HAVING SAME", filed with the China National Intellectual Property Administration on September 19, 2017, which are incorporated herein by reference in its entirety.

FIELD

[0002] The present application relates to the technical field of bogies, particularly relating to a trailer frame. Besides, the present application further relates to a trailer bogie having the trailer frame.

BACKGROUND

[0003] A bogie is an important component in a railway vehicle, the trailer bogie is installed at a lower side of a trailer body, and the trailer bogie generally includes a frame, a primary suspension, a secondary suspension, an axle box, a wheel set, a brake device and so on.

[0004] In a typical trailer bogie, the brake device includes a brake clamp, a brake seat is directly connected to a cross beam of the frame, the brake seat forms a cantilever structure with respect to the cross beam, and the brake clamp is connected to the corresponding brake seat.

[0005] However, the brake seat is directly connected to the cross beam, and has a relatively long cantilever in the running direction of the vehicle. In addition, a connection region of the brake seat and the cross beam usually has a varying cross section. Therefore, under the frequent effect of the braking force, a problem of stress concentration on the cross beam in this region is serious, and relatively complicated structural and welding designs are usually required, thereby increasing the difficulties in design and machining of the cross beam.

[0006] Therefore, a technical problem to be addressed by those skilled in the art is to overcome the defects of the conventional trailer bogies.

SUMMARY

[0007] In view of this, an object of the present application is to provide a trailer frame, the design and machining of a cross beam of the trailer frame is relatively convenient, and the stress concentration on the cross beam can reduced. Another object of the present application is to provide a trailer bogie including the above trailer frame, the design and machining of the cross beam of the trailer frame is relatively convenient, and the stress concentration on the cross beam can be reduced.

[0008] In order to realize the above objects, following technical solutions are provided according to the present application.

[0009] A trailer frame includes a cross beam and side beams fixedly arranged at two ends of the cross beam, and each of the side beams is an U-shaped structural beam, wherein a first brake beam located between the side beams is arranged in front of and above the cross beam, and a second brake beam located between the side beams is arranged in rear of and above the cross beam; the first brake beam is parallel with the second brake beam, two ends of each of the first brake beam and the second brake beam are fixedly connected to inner sides of the side beams respectively, and are each provided with a brake seat for mounting a brake device; the first brake beam has multiple brake seats, the multiple brake seats of the first brake beam are located at a front side of the first brake beam and are transversely arranged at intervals on the first brake beam; the second brake beam has multiple brake seats, and the multiple brake seats of the second brake beam are located at a rear side of the second brake beam and are transversely arranged at intervals on the second brake beam.

[0010] Preferably, an upper cover plate of the side beam extends inward at a position corresponding to the first brake beam and the second brake beam, to form a connecting plate; two ends of each of the first brake beam and the second brake beam are each provided with a connecting portion located below the corresponding connecting plate, and are connected to a side plate of the side beam and the connecting plate through the connecting portion.

[0011] Preferably, the connecting portion is an U-shaped plate having an opening facing the corresponding connecting plate, an U-shaped end surface of the connecting portion is welded to the side plate of the side beam, and a top end surface of the connecting portion is welded to a lower surface of the connecting plate.

[0012] Preferably, the first brake beam and the second brake beam each includes a radial flange at a position of a root of the corresponding connecting portion, and the radial flange abuts against the connecting plate and the connecting portion.

[0013] Preferably, the radial flange has an arc-shaped edge corresponding to the connecting portion and straight edges located at two sides of the arc-shaped edge, and has a laterally widened portion corresponding to the connecting plate.

[0014] Preferably, the brake seat is provided with four hanging points for mounting the brake device through hanging at the four points.

[0015] Preferably, a back of the brake seat is C-shaped, and is arranged to match an outer surface of the first brake beam or the second brake beam respectively.

[0016] Preferably, the brake seat includes a horizontal seat plate and an upper skirt on a top of the seat plate and a lower skirt on a bottom of the seat plate, and a height of the upper skirt and a height of the lower skirt gradually increase from a front end to a root of the seat plate.

[0017] A trailer bogie includes the trailer frame according to any one of the above solutions.

[0018] In the trailer frame according to the present application, the brake seats are arranged on the first brake beam and the second brake beam, which, compared with the conventional technology in which the brake seats are directly fixed on the cross beam, can simplify the manufacturing technique of the cross beam, make the design and machining of the cross beam easier and reduce the stress concentration on the cross beam, and can also reduce the amount of welding on the cross beam and greatly reduce the load that the cross beam is required to bear. Besides, the first brake beam and the second brake beam are supported between the two side beams, which can improve the stability of the frame to prevent the deformation of the frame.

[0019] The trailer bogie includes the trailer frame according to the present application, and by employing the trailer frame, the trailer bogie can simplify the manufacturing technique of the cross beam, make the design and machining of the cross beam easier and reduce the stress concentration on the cross beam.

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 describe the embodiments or the conventional technology will be briefly described hereinafter. Apparently, the drawings in the following description are only some examples of the present application, and for those skilled in the art, other drawings may be obtained based on these drawings without any creative efforts.

Figure 1 is a schematic view showing the structure of a trailer frame according to the present application;

Figure 2 is an enlarged view showing a portion A in Figure 1;

Figure 3 is an enlarged view showing a portion B in Figure 1;

Figure 4 is a schematic view showing the structure of a trailer bogie according to the present application.

Reference Numerals in Figures 1 to 4:

1	cross beam,	2	side beam,
21	connecting plate,	3	first break beam,
4	brake seat,	41	hanging point,
5	second break beam,	6	connecting portion,
7	radial flange.		

DETAIL DESCRIPTION

[0021] The technical solution according to the embodiments of the present application will be described clearly and completely as follows in conjunction with the accompany drawings in the embodiments of the present application. It is obvious that the described embodiments are only a part of the embodiments according to the present application, rather than all of the embodiments. All the other embodiments obtained by those skilled in the art based on the embodiments in the present application without any creative work belong to the scope of the present application.

[0022] An aspect of the present application is to provide a trailer frame, and the design and machining of a cross beam of the trailer frame is relatively convenient and the stress concentration on the cross beam can be reduced. Another aspect of the present application is to provide a trailer bogie including the above trailer frame, and the design and machining of the cross beam of the trailer frame is relatively convenient and the stress concentration on the cross beam can be reduced.

[0023] Reference is made to Figures 1 to 4, Figure 1 is a schematic view showing the structure of a trailer frame according to the present application; Figure 2 is an enlarged view showing a portion A in Figure 1; Figure 3 is an enlarged view showing a portion B in Figure 1; and Figure 4 is a schematic view showing the structure of a trailer bogie according to the present application.

[0024] A specific embodiment of the trailer frame according to the present application includes a frame. The frame includes a cross beam 1 and two side beams 2 fixedly arranged at two ends of the cross beam 1. Each of the two side beams 2 is an U-shaped structural beam, and an end portion of the cross beam 1 is usually connected to a downward concaved portion of the side beam 2. A first brake beam 3 located between the side beams 2 is arranged in front of and above the cross beam 1, a second brake beam 5 located between the side beams 2 is arranged in rear of and above the cross beam 1, and the first brake beam 3 is parallel with the second brake beam 5. Two ends of the first brake beam 3 are fixedly connected to inner sides of the side beams 2 respectively, and two ends of the second brake beam 5 are fixedly connected to the inner sides of the side beams 2 respectively. The first brake beam 3 and the second brake beam 5 are each provided with a brake seat 4 for mounting a brake device. The first brake beam 3 has multiple brake seats 4, the multiple brake seats 4 are located at a front side of the first brake beam 3, and all of the brake seats 4 of the first brake beam 3 are transversely arranged at intervals on the first brake beam 3. The second brake beam 5 has multiple brake seats 4, the multiple brake seats 4 of the second brake beam 5 are located at a rear side of the second brake beam 5, and all of the brake seats 4 of the second brake beam 5 are transversely arranged at intervals on the second brake beam 5. The first brake beam 3 and the second brake beam 5 may be fixedly connected to the side beams 2 by welding. The trailer frame may be manufactured by welding, forging, casting and combination of various machining methods.

[0025] In this trailer frame according to the present application, the brake seats 4 are arranged on the first brake beam 3 and the second brake beam 5, which, compared with the conventional technology in which the brake seats 4 are directly fixed on the cross beam 1, can simplify the manufacturing technique of the cross beam 1, make the design and machining of the cross beam 1 easier and reduce the stress concentration on the cross beam 1, and can also reduce the amount of welding on the cross beam 1 and greatly reduce the load that the cross beam 1 is required to bear. Besides, the first brake beam 3 and the second brake beam 5 are supported between the two side beams 2, which can improve the stability of the frame to prevent the deformation of the frame.

[0026] In above embodiments, an upper cover plate of the side beam 2 extends inward at a position corresponding to the first brake beam 3 and the second brake beam 5, to form a connecting plate 21. "Extending inward" herein refers to that the connecting plate 21 on one of the side beams 2 extends toward the other one of the side beams 2. Two ends of each of the first brake beam 3 and the second brake beam 5 are respectively provided with a connecting portion 6 located below the corresponding connecting plate 21, and are connected to a side plate of the side beam 2 and the connecting plate 21 through the connecting portion 6. The arrangement of the connecting plate 21 can increase a connecting area between the brake beam and the side beam 2, besides, a part of the structure of the upper cover plate of the side beam 2 is separately extended to connect the first brake beam 3 and the second brake beam 5, which can prevent the first brake beam 3 and the second brake beam 5 from occupying a space used for connecting other components on the side beams 2, thus preventing the first brake beam 3 and the second brake beam 5 from interfering with other components on the side beams 2.

[0027] Further, the connecting portion 6 may be an U-shaped plate having an opening facing the corresponding connecting plate 21, an U-shaped end surface of the connecting portion 6 is welded to the side plate of the side beam 2, and a top end surface of the connecting portion 6 is welded to a lower surface of the connecting plate 21. By arranging the connecting portion 6 as the U-shaped plate, the weight of the connecting portion 6 can be reduced under the premise that a welding area between the connecting portion 6 and the connecting plate 21 can be ensured. Of course, the connecting portion 6 may also be a C-shaped plate, a polygonal frame or other structures.

[0028] In the above embodiments, the first brake beam 3 and the second brake beam 5 may each has a radial flange 7 at a position of a root of the corresponding connecting portion 6, and the radial flange 7 abuts against the connecting plate 21 and the connecting portion 6. By arranging the radial flange 7, connecting areas between the first brake beam 3 and the connecting plate 21, and between the second brake beam 5 and the connecting plate 21 can be further increased, to ensure reliable connections between the first brake beam 3 and the side beam 2, and between the second brake beam 5 and the side beam 2.

[0029] Further, the radial flange 7 may have an arc-shaped edge corresponding to the connecting portion 6 and straight edges located at two sides of the arc-shaped edge, and has a laterally widened portion corresponding to the connecting plate 21. Referring to Figure 2, a bottom of an abutting plate is the arc-shaped edge, the portions above the arc-shaped edge are the straight edges, and the portion above the straight edge is the laterally widened portion matching the connecting plate 21 in shape. Such arrangement can facilitate the assembly between the radial flange 7 and the connecting plate 21, besides, since the radial flange 7 is arranged around the root of the connecting portion 6, an outer peripheral surface of the radial flange 7 is relatively smooth, and the stress concentration phenomenon can be reduced.

[0030] In the above embodiments, the brake seat 4 may specifically be provided with four hanging points 41 for

mounting the brake device through hanging at the four points, so as to ensure the reliable connection of the brake device.

[0031] In the above embodiments, a back of the brake seat 4 may be C-shaped, and is arranged to match an outer surface of the first brake beam 3 or the second brake beam 5 correspondingly. The back of the brake seat 4 is C-shaped so that a part of the brake seat 4 is located at an upper side of the first brake beam 3 or the second brake beam 5 and another part of the brake seat 4 is located at a lower side of the first brake beam 3 or the second brake beam 5, thereby enhancing the reliability of the connection. Wherein, the first brake beam 3 and the brake seat 4 may be an integral casting piece or an integral forging piece, and the second brake beam 5 and the brake seat 4 may be an integral casting piece or an integral forging piece, to ensure the overall structural strength. Of course, the first brake beam 3 and the brake seat 4, as well as the second brake beam 5 and the brake seat 4, may also be separately formed and then be connected by welding or other manners.

[0032] In the above embodiments, the brake seat 4 may include a horizontal seat plate and an upper skirt on a top of the seat plate and a lower skirt on a bottom of the seat plate, wherein a height of the upper skirt and a height of the lower skirt both gradually increase from a front end to a root of the seat plate. The heights of the upper skirt and the lower skirt of the brake seat 4 gradually increase from the front end to the root of the seat plate, which can ensure the strength at the joint between the brake seat 4 and the first brake beam 3 or the second brake beam 5, and meanwhile reduce the weight of the brake seat 4 and save the materials.

[0033] The seat plate may be embodied as a rectangular plate, and the four hanging points 41 are located at four top points of the brake seat 4, to facilitate the positioning of the hanging points 41, thereby ensuring the reliability of the hanging.

[0034] In the above embodiments, the first brake beam 3 and the second brake beam 5 may employ the integrally casting structure, which facilitates reducing the space occupied by the first brake beam 3 and the second brake beam 5 in the bogie, and ensures that the first brake beam 3 and the second brake beam 5 both have a relatively high strength to meet the bearing needs. Of course, the first brake beam 3 and the second brake beam 5 may also be formed by segmental forging or by casting and welding or may adopt other structural forms.

[0035] In the above embodiments, the number of the brake seats 4 on the first brake beam 3 and the second brake beam 5 can be set according to actual situations. For example, the number of the brake seat 4 may be two, three, or four.

[0036] In the above embodiments, a certain number of partitions may be arranged in the cross beam 1 and the side beam 2 as needed to further increase the torsional strength of the frame. In addition, a lightening hole can be arranged in the partition to reduce an overall weight of the bogie and save the material as much as possible while meeting strength requirements of the bogie.

[0037] In addition to the trailer frame, a trailer bogie including the trailer frame provided in the above embodiments is further provided according to the present application. By employing the trailer frame, the trailer bogie can simplify the manufacturing technique of the cross beam 1, make the design and machining of the cross beam 1 easier and reduce the stress concentration on the cross beam 1. Structures of other parts of the trailer bogie can be referred to the conventional technology and will not be described herein.

[0038] The above embodiments in this specification are described in a progressive manner. Each of the embodiments is mainly focused on describing its differences from other embodiments, and references may be made among these embodiments with respect to the same or similar portions among these embodiments.

[0039] The trailer frame and the trailer bogie having the trailer frame provided according to the present application are described in detail hereinbefore. The principle and the embodiments of the present application are illustrated herein by specific examples. The above description of examples is only intended to help the understanding of the method and the spirit of the present application. It should be noted that, for the person skilled in the art, a few of modifications and improvements may be made to the present application without departing from the principle of the present application, and these modifications and improvements are also deemed to fall into the scope of the present application defined by the claims.

Claims

1. A trailer frame, comprising a cross beam (1) and side beams (2) fixedly arranged at two ends of the cross beam (1), and each of the side beams (2) is an U-shaped structural beam, wherein a first brake beam (3) located between the side beams (2) is arranged in front of and above the cross beam (1), and a second brake beam (5) located between the side beams (2) is arranged in rear of and above the cross beam (1); the first brake beam (3) is parallel with the second brake beam (5), two ends of each of the first brake beam (3) and the second brake beam (5) are fixedly connected to inner sides of the side beams (2) respectively, and the first brake beam (3) and the second brake beam (5) are each provided with a brake seat (4) for mounting a brake device; the first brake beam (3) has a plurality of the brake seats (4), and the plurality of the brake seats (4) of the first brake beam (3) are located at a front side of the first brake beam (3) and are transversely arranged at intervals on the first brake beam (3); the

second brake beam (5) has a plurality of the brake seats (4), and the plurality of brake seats (4) of the second brake beam (5) are located at a rear side of the second brake beam (5) and are transversely arranged at intervals on the second brake beam (5).

2. The trailer frame according to claim 1, wherein an upper cover plate of the side beam (2) extends inward at a position corresponding to the first brake beam (3) and the second brake beam (5), to form a connecting plate (21); two ends of each of the first brake beam (3) and the second brake beam (5) are each provided with a connecting portion (6) located below the corresponding connecting plate (21), and the first brake beam (3) and the second brake beam (5) are each connected to a side plate of the side beam (2) and the connecting plate (21) through the respective connecting portion (6).

3. The trailer frame according to claim 2, wherein the connecting portion (6) is an U-shaped plate having an opening facing the corresponding connecting plate (21), an U-shaped end surface of the connecting portion (6) is welded to the side plate of the side beam (2), and a top end surface of the connecting portion (6) is welded to a lower surface of the connecting plate (21).

4. The trailer frame according to claim 2, wherein the first brake beam (3) and the second brake beam (5) each comprises a radial flange (7) at a position of a root of the corresponding connecting portion (6), and the radial flange (7) abuts against the connecting plate (21) and the connecting portion (6).

5. The trailer frame according to claim 4, wherein the radial flange (7) has an arc-shaped edge corresponding to the connecting portion (6) and straight edges located at two sides of the arc-shaped edge, and has a laterally widened portion corresponding to the connecting plate.

6. The trailer frame according to any one of claims 1 to 5, wherein the brake seat (4) is provided with four hanging points (41) for mounting the brake device through hanging at the four points.

7. The trailer frame according to claim 6, wherein a back of the brake seat (4) is C-shaped, and is arranged to match an outer surface of the first brake beam (3) or the second brake beam (5).

8. The trailer frame according to claim 6, wherein the brake seat (4) comprises a horizontal seat plate and an upper skirt on a top of the seat plate and a lower skirt on a bottom of the seat plate, and a height of the upper skirt and a height of the lower skirt gradually increase from a front end to a root of the seat plate.

9. A trailer bogie, comprising the trailer frame according to any one of claims 1 to 8.

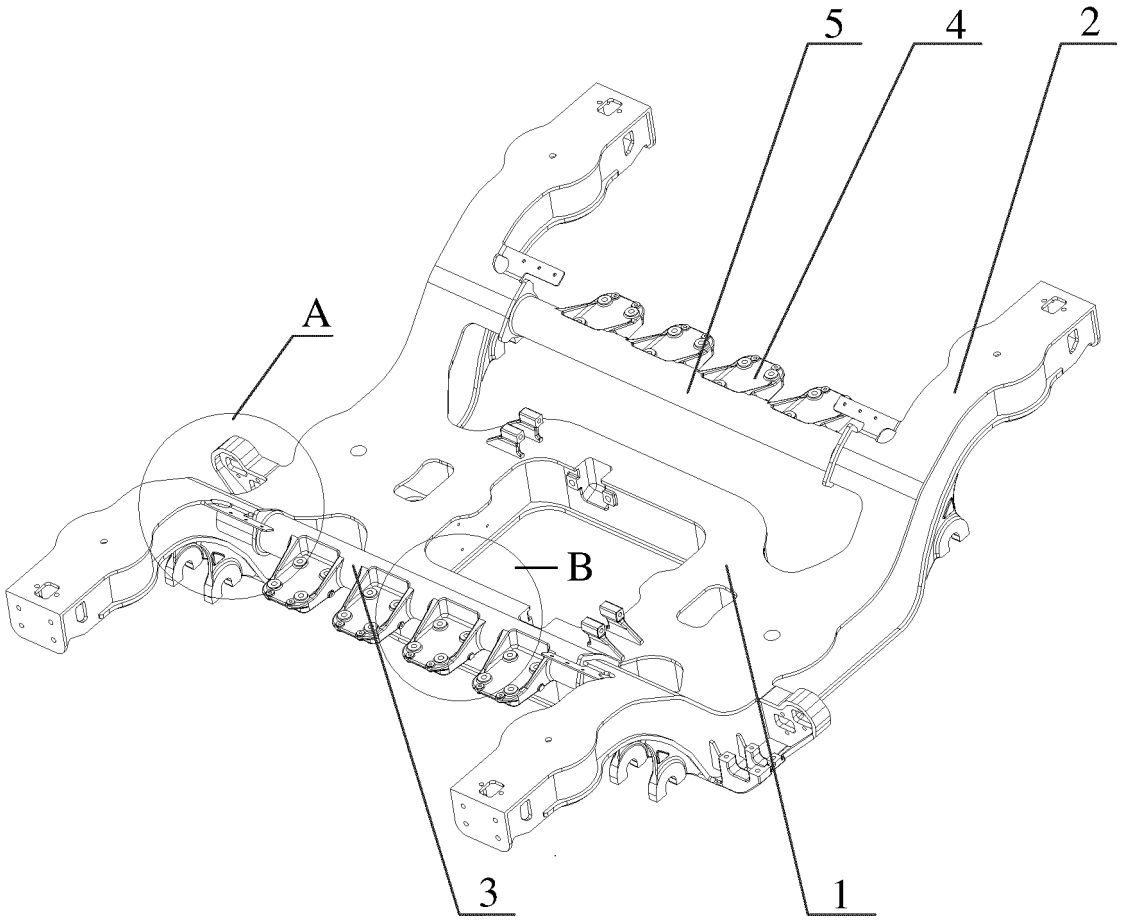

FIGURE 1

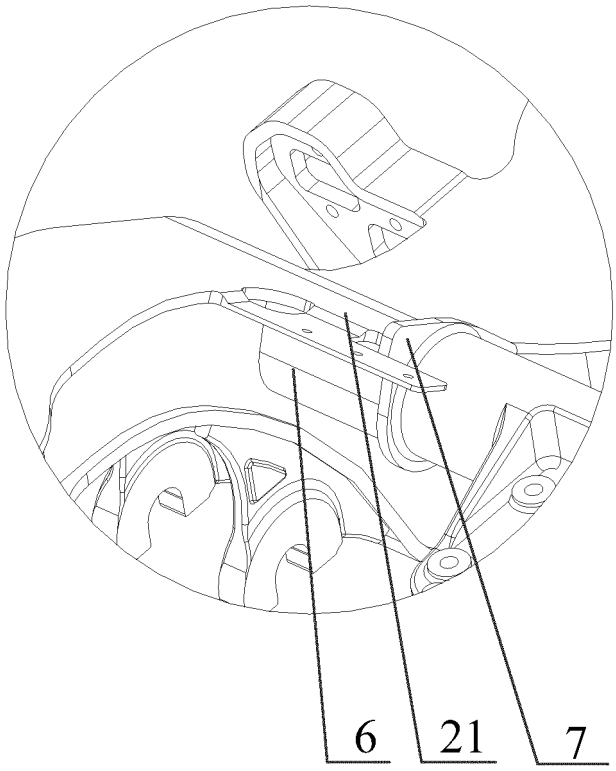

FIGURE 2

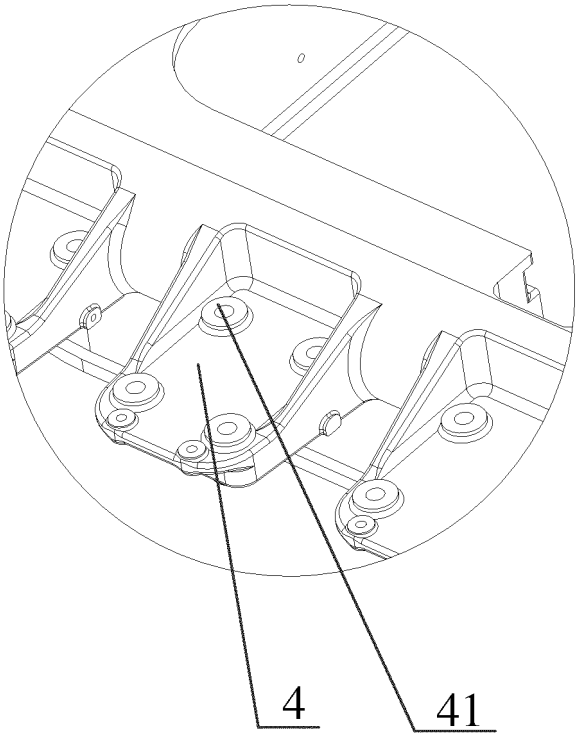

FIGURE 3

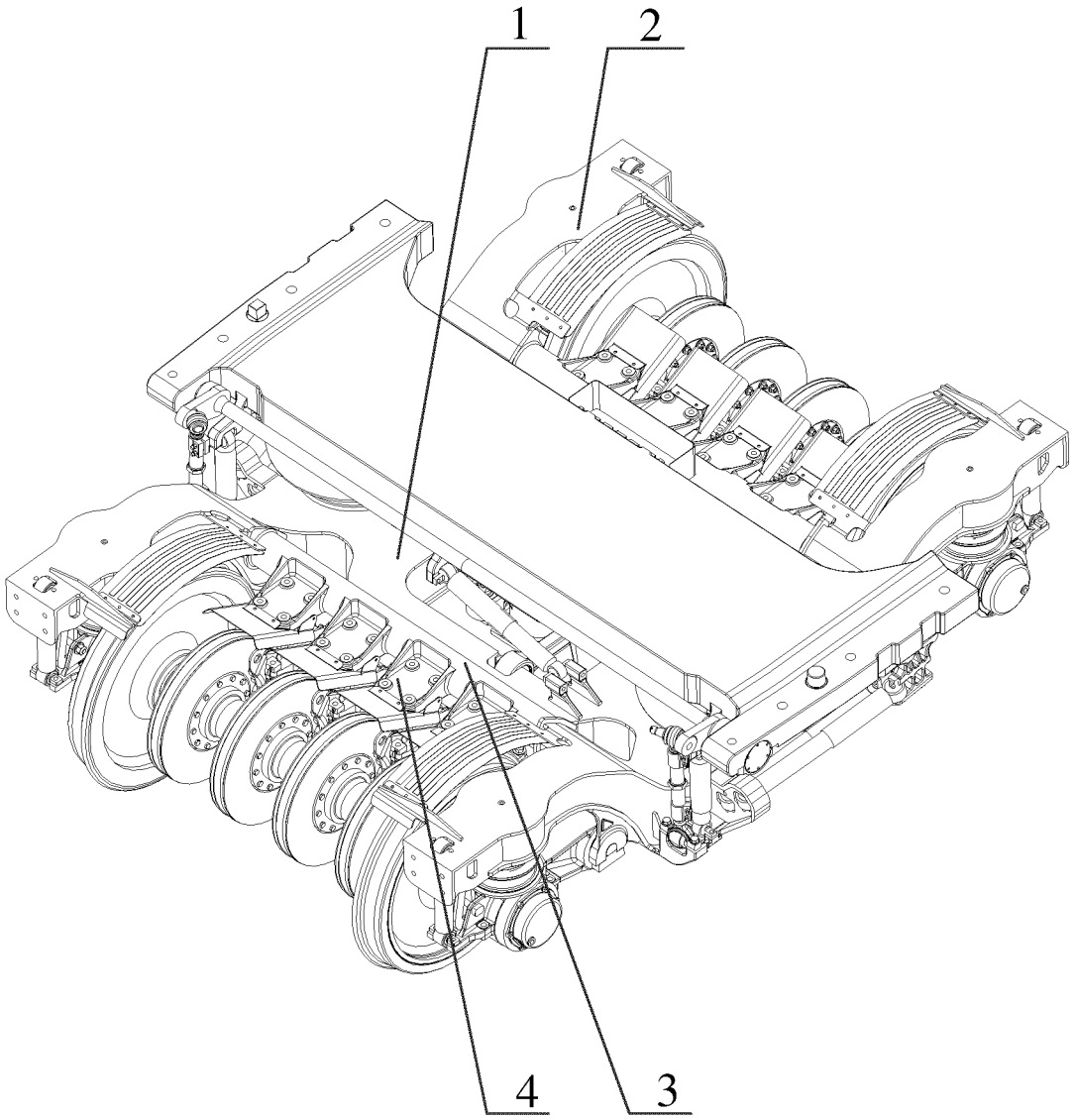

FIGURE 4

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CN2017/119273

A. CLASSIFICATION OF SUBJECT MATTER

B61F 5/52(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

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)

CNMED; CPRSABS; CNABS; VEN: 机车, 转向架, 构架, train, steering, frame

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CN 104802822 A (CHANGCHUN RAILWAY VEHICLES CO., LTD.) 29 July 2015 (2015-07-29) entire document	1-9
A	CN 205311621 U (CRRC QINGDAO SIFANG CO., LTD.) 15 June 2016 (2016-06-15) entire document	1-9
A	CN 202879513 U (CSR QINGDAO SIFANG CO., LTD.) 17 April 2013 (2013-04-17) entire document	1-9
A	US 2017232979 A1 (CRRC QINGDAO SIFANG CO., LTD.) 17 August 2017 (2017-08-17) entire document	1-9
PX	CN 107472283 A (CRRC CHANGCHUN RAILWAY VEHICLES CO., LTD.) 15 December 2017 (2017-12-15) entire document	1-9

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

* Special categories of cited documents:

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Date of the actual completion of the international search	Date of mailing of the international search report
11 January 2018	**26 February 2018**
Name and mailing address of the ISA/CN **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 Telephone No.

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

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/CN2017/119273

Patent document cited in search report	Publication date (day/month/year)	Patent family member(s)	Publication date (day/month/year)
CN 104802822 A	29 July 2015	None	
CN 205311621 U	15 June 2016	None	
CN 202879513 U	17 April 2013	None	
US 2017232979 A1	17 August 2017	DE 112015003399 T5	20 April 2017
		WO 2016124030 A1	11 August 2016
CN 107472283 A	15 December 2017	None	

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

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 201710848349 **[0001]**
- CN 201721202607 **[0001]**