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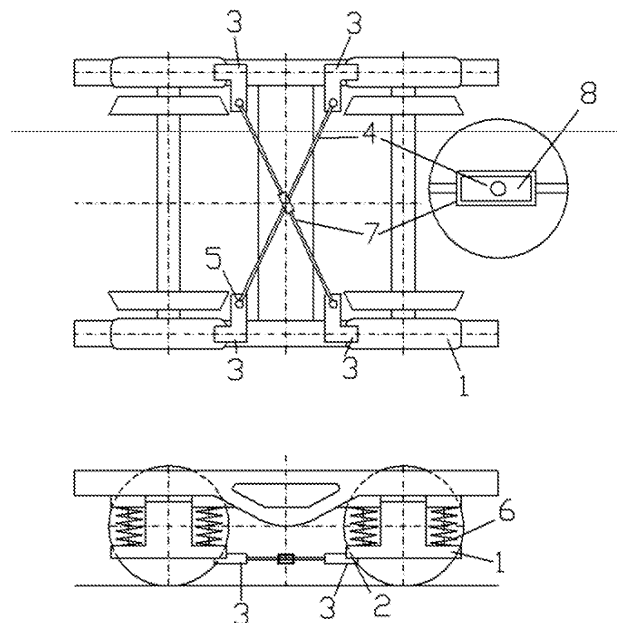
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(54) Two-axle bogie for railway vehicle with radially adjustable wheelsets with cross coupling

(57) Two-axle bogie for trailing railway vehicle with radially adjustable wheelsets with cross coupling, which consists of 2 crossed draw rods and which diagonally connects both wheelsets of one bogie, contains L-shaped dimensional adapters (3), which are connected by two crossed draw rods (4) and (7), and which are firmly

connected to the axle box (1) through an axle box carrier (2), whereby dimensional adapter arms (3) do not lie in one plane and therefore dimensional adapter (3) contains at least one more bend, through which its connecting points to the axle box carrier (2) and draw rod (4) and/or (7) will get into the required position.



Picture 5

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Description

Field of technology

[0001] Technical solution is related to the railway vehicles.

Actual state of technology

[0002] For reduction of force effects and wear in the wheel - rail contact, it is preferred, in the field of railway vehicles, loosening of the connection between bogie frame and wheelset (loosening of the wheelset in other) in order to create conditions for radial adjustment of the wheelset during transition through a curve. Except meeting requirements for dynamic conditions, its application into railway vehicles has to meet requirements for simple and trouble-free maintenance, inspection, exchange and adjustability.

[0003] Radial adjustment of the wheelsets during transition through a curve can be reached when using suspension, in the wheelset guidance, which is sufficiently elastic in the longitudinal direction (direction that is parallel with the direction of railway vehicle movement). Forces that are created between wheel and rail during transition through a curve will ensure automatic adjustment of the wheelsets into the position that is very close to the optimal position. This position is characterised by the fact that there occur minimal or no sliding between wheel and rail.

[0004] In the presence, a bogie Y25 Lsod, which belongs among one of standardized bogies of UIC, is known for loose wheelset.

This constructional solution has a tendency to worsen stability of vehicle travel and without additional measures it leads to decrease of speed, during which the stability of the travel occurs. This effect is unwanted and even dangerous, and, therefore, additional measures for securing the stability of the vehicle travel during speed that safely exceed design speed are necessary.

This bogie is not equipped with any device for improvement of the stability (Picture 1).

[0005] A solution for improvement of guiding characteristics in the curve and stability of two-axle bogie is known; the basis of this solution is diagonal interconnection of the wheels of the two-axle bogie by draw rod - so called cross coupling.

[0006] For example, these applications of diagonal interconnection of the wheels of two-axle bogie by draw rod are known:

1. So called Scheffel bogie (Picture 2), named after its inventor Herbert Scheffel, protected by USP 4067261, WO2000/030914.

At this type of the bogie, both wheelsets are connected in the way that radial adjustment of preceding wheelset is transferred to the next wheelset. This is gained by mutual interconnection of the wheelsets

by cross coupling, which diagonally connects wheels of two-axle bogie by draw rod, by which the effect of automatic guiding and stability of travel is reached. Individual railway vehicle consists of two bogies and superstructure that is fulcrumed on the bogies.

This bogie has usually two auxiliary frames of U shape, marked in the picture as 5 and 6, which are connected to the axle boxes 7 of the bogie wheelsets. The auxiliary frames are mutually connected through cross coupling 9, which lies basically in the diagonals of the bogie. Cross coupling 9 are connected to the U-shaped auxiliary frames 5 and 6 in the anchor points 10, which lie basically in the plane of the wheelsets axis 3a and 3b. Approximately in the same plane lie the cross couplings 9, too.

2. Another arrangement contains USP 6910426. According to this solution, showed in the picture 3, the bogie contains two pairs of C-shaped guiding arms, marked in the picture as 5 and 6. two pairs of C-shaped guiding arms are mutually diagonally connected through cross coupling 9. Cross coupling 9 is connected to the guiding arms 5 and 6 through pins in the anchor points 10.

3. Another known solution for use of diagonal coupling between wheelsets through a cross anchor is that used in the construction of the bogie LEILA. This is an experimental bogie - prototype, which does not have a serial application (Picture 4). In comparison to the other solutions, the axle box is installed from the inner side of wheels.

Nature of technical solution

[0007] The nature of technical solution of two-axle bogie for trailing railway vehicles with radially adjustable wheelsets with cross coupling, which consists of 2 crossed draw rods, which diagonally connects both wheelsets of one bogie, is that ends of the draw rods are equipped with L-shaped dimensional adapters connected to the axle box through axle box carrier, whereby the L-shaped dimensional adapter is realized in the variant left and right and, at the beginning of the free arm, it contains an eye, to which the draw rods are connected through a pin, and which second arm is connected to the axle box carrier by screwing, welding or it is in the variant of one integral part containing the axle box, axle box carrier and L-shaped dimensional adapter. Two crossed draw rods are identical, but one of them contains in the middle a rectangular opening, which dimensions exceed dimensions of the draw rod.

[0008] The nature of technical solution is also the axle box carrier, which becomes an integral part of the axle box by screwing, welding or it is from one piece.

[0009] The nature of the technical solution is also the fact that the L-shaped dimensional adapter is with one arm immovably connected to the axle box carrier, which

has for connection with dimensional adapter created one or more mutually related surfaces, whereby each dimensional adapter bypasses wheel from the inner side in order to avoid brake blocks. The arms of L-shaped dimensional adapter do not lie in one plane and therefore the L-shaped dimensional adapter contains at least one more bend, through which its connecting points to the axle box carrier and draw rods will get into the required position.

[0010] L-shaped dimensional adapter is manufactured by welding, forging, bending or by casting or by combination of these methods.

[0011] Cross coupling according to this solution lies under the plane created by axis of the bogie wheelsets and bypasses bearing structure of the bogie frame.

Review of pictures in the drawings

[0012] In the pictures, there are showed known solutions of the bogies with or without cross coupling and solution according to this utility model. In the Picture 1, there is showed bogie Y25 Lsod, which is one of UIC standardized bogies and it is not equipped with any device for stability improvement. In the Picture 2, there is so called Scheffel bogie with cross coupling, in which the radial positioning of previous wheelset is transfer to the next wheelsets. In the picture 3, there is depicted another type of cross coupling, bogie LHB, developed for conditions in the Northern Europe. Picture 4 shows diagonal connection between wheelsets in the construction of the bogie LEILA (experimental bogie, prototype). Technical solution according to this utility model in the Y25 bogie is executed in 2 variants showed in the pictures 5 and 6. In the picture 7, there is showed an example of L-shaped dimensional adapter.

Example of technical solution

Example 1

[0013] Submitted technical solution was applied into the bogie Y25 (Picture 5) L-shaped dimensional adapter 3, which free arm contains an eye 5, to which a draw rod 4 is connected and second arm is connected to the axle box carrier 2. The axle box carrier 2 is an integral part of the axle box 1. The axle box carrier 2 is connected to the axle box 1 by welding. Alternatively, it can be connected by screwing, or the axle box carrier 2 is a part of the axle box 1 made from one piece as a cast. Base of the dimensional adapter 3 is firmly connected to the axle box carrier 2 by screwing. Alternatively, connection can be realized through pin or as a cast, and then the axle box 1, as a whole, will contain the axle box carrier 2, as well as the dimensional adapter 3. The dimensional adapter 3 has to be realized in the variant left and right piece. Alternatively, the axle box 1, as one piece, is in the version left and right. The dimensional adapter 3, according to this example, contains an eye 5 on the free arm, to which a

draw rod 4 and 7 are connected through a pin. The eye 5 of the dimensional adapter 3 lies in the plane that is located under the bearing surface of the spring 6 of the axle box 1. The draw rod 7 is in the version with rectangular opening and the draw rod 4 without an opening, as can be seen in the picture. Rectangular opening of the draw rod 7 will provide crossing of both draw rods without mutual interference. At both ends of the draw rods 4 and 7, there are ball joints that provide swivel type connection with the dimensional adapter 3 or, in another variant, with the axle box 1 as one whole. Alternatively, rubber-metal pins or bushes can be used instead of ball joints in order to provide necessary freedom of movement in connection with the dimensional adapter 3, or with the axle box 1 as a whole.

Example 2

[0014] Similarly, as in the example 1, submitted technical solution was applied into the bogie Y25 (Picture 6) The L-shaped dimensional adapter 3 is connected to the axle box carrier 2, whereby the shorter arm - base, of the dimensional adapter, which together with its longer free arm comprises L-shape, is created by construction of the eye 5, to which the draw rod 4 is connected. The axle box carrier 2 is an integrated part of the axle box 1. Connection of the axle box carrier 2 to the axle box 1 is realized by welding. Alternatively, it can be realized through screwing or the axle box carrier 2 is a part of the axle box 1 made from one piece as a cast. The arm of the dimensional adapter 3 is firmly connected to the axle box carrier 2 by screwing. Alternatively, connection can be realized through pin or as a cast, and then the axle box 1, as a whole, will contain the axle box carrier 2, as well as the dimensional adapter 3. The L-shaped dimensional adapter 3 has to be realized in the variant left and right piece. Alternatively, the axle box 1, as one piece, is in the version left and right. The dimensional adapter 3 contains an eye 5, to which draw rod 4 and 7 are connected through a pin. The eye 5 of the dimensional adapter 3 lies in the plane that is located under the bearing surface of the spring 6 of the axle box 1. The draw rod 7 is in the version with rectangular opening and the draw rod 4 without an opening, as can be seen in the picture. Rectangular opening of the draw rod 7 will provide crossing of both draw rods without mutual interference. At both ends of the draw rods 4 and 7, there are ball joints that provide swivel type connection with the dimensional adapter 3 or, in another variant, with the axle box 1 as one whole. Alternatively, rubber-metal pins or bushes can be used instead of ball joints in order to provide necessary freedom of movement in connection with the dimensional adapter 3, or with the axle box 1 as a whole.

List of related marks

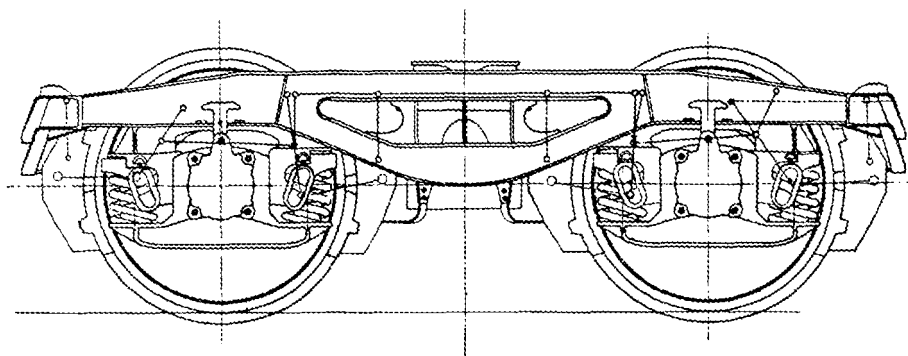
[0015]

1. axle box
2. axle box carrier
3. L-shaped dimensional adapter
4. draw rod
5. eye
6. spring
7. draw rod with rectangular opening

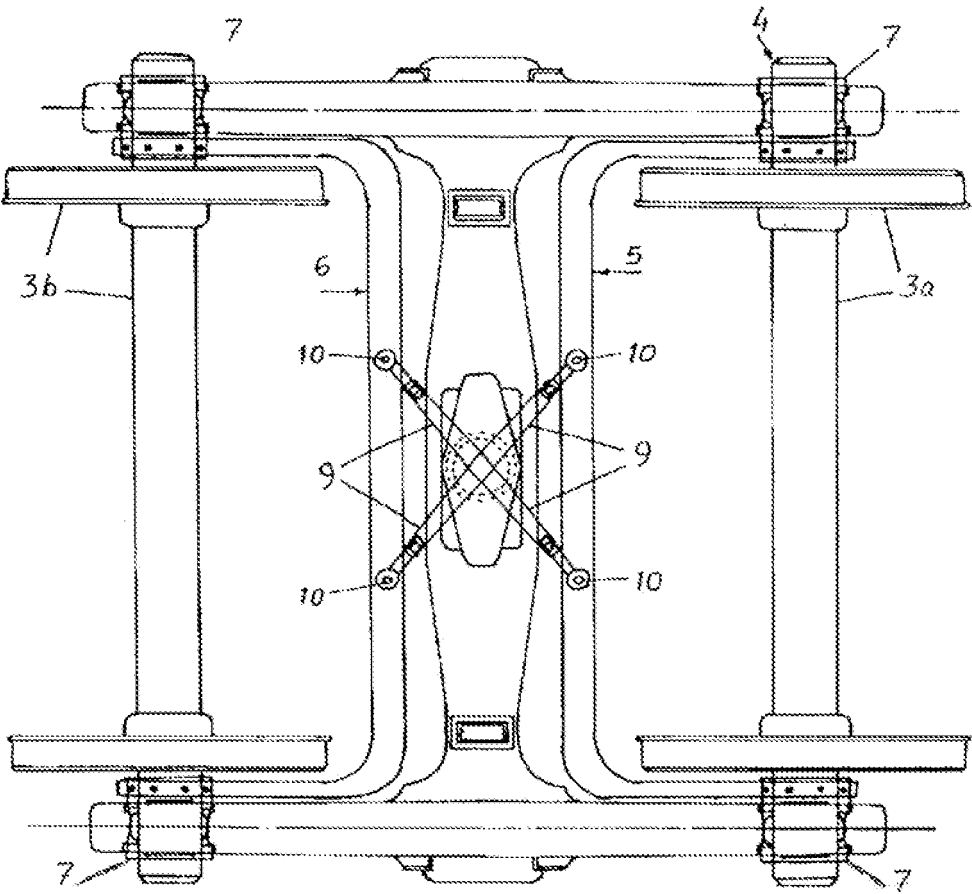
in claim 1, wherein the L-shaped dimensional adapter (3) is manufactured by welding, forging, bending or casting or by combination of these methods.

Claims

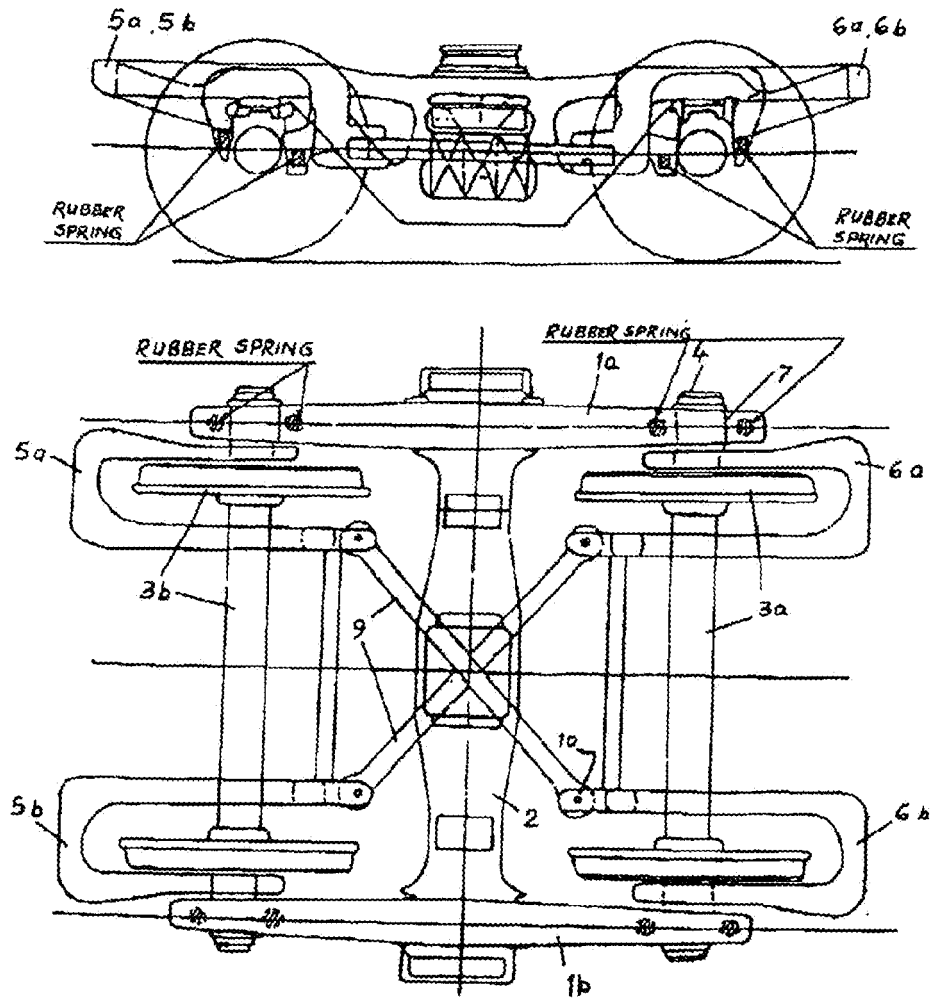
1. Two-axle bogie for trailing railway vehicle with radially adjustable wheelsets with cross coupling, which consists of 2 crossed draw rods, which diagonally connects both wheelsets of one bogie, comprising crossed draw rods (4) and (7), which ends are provided with L-shaped dimensional adapters (3) connected with axle box (1) through axle box carrier (2). 10 15
2. Two-axle bogie for trailing railway vehicle as claimed in claim 1, wherein L-shaped dimensional adapter (3) is in the variant left and right and it contains an eye (5), at the end of the free arm, into which a draw rod (4) and/or (7) is connected through a pin, and which second arm is connected to the axle box carrier (2) by screwing, welding, or it is in the version of one integral part, containing axle box (1), axle box carrier (2) and dimensional adapter (3). 20 25
3. Two-axle bogie for trailing railway vehicle as claimed in claims 1 and 2, wherein 2 crossed draw rods (4) and (7) are identical, but draw rod (7) contains in the middle a rectangular opening (8), which dimensions exceed dimensions of the draw rod. 30 35
4. Two-axle bogie for trailing railway vehicle as claimed in claims 1 up to 3, wherein the axle box carrier (2) is an integral part of the axle box (1) by welding, screwing or from one piece. 40
5. Two-axle bogie for trailing railway vehicle as claimed in claim 1, wherein the L-shaped dimensional adapter (3) is with one arm immovably connected to the axle box carrier (2), which has for connection with dimensional adapter (3) created one or more mutually related surfaces, whereby each dimensional adapter (3) bypasses wheel from the inner side in order to avoid brake blocks. 45
6. Two-axle bogie for trailing railway vehicle as claimed in claim 5, wherein the arms of L-shaped dimensional adapter (3) do not lie in one plane and therefore the L-shaped dimensional adapter (3) contains at least one more bend, through which its connecting points to the axle box carrier (2) and draw rod (4) and/or (7) will get into the required position. 50 55
7. Two-axle bogie for trailing railway vehicle as claimed



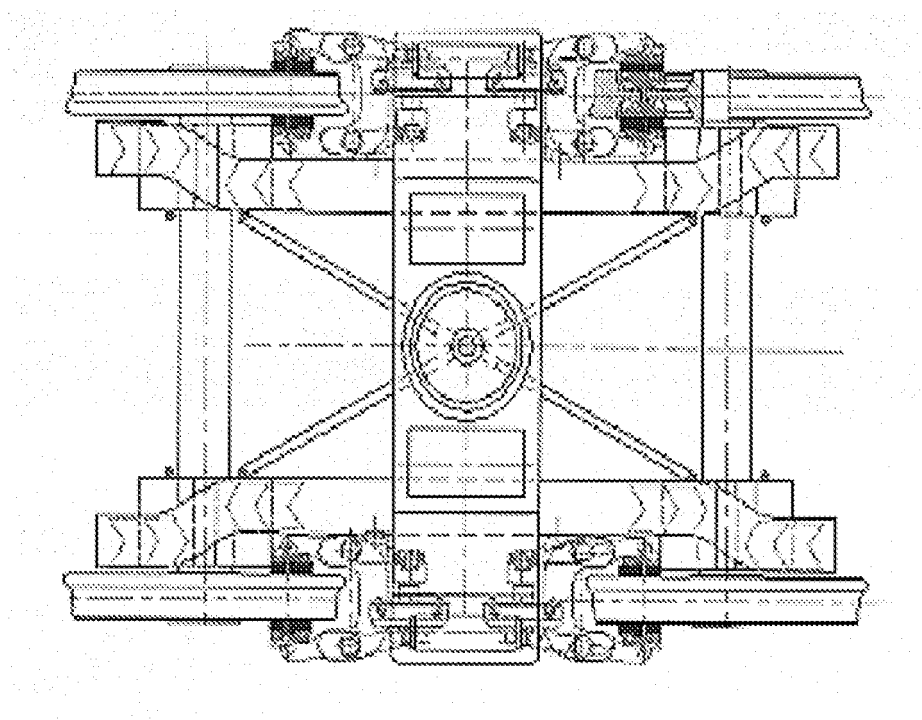
Picture 1



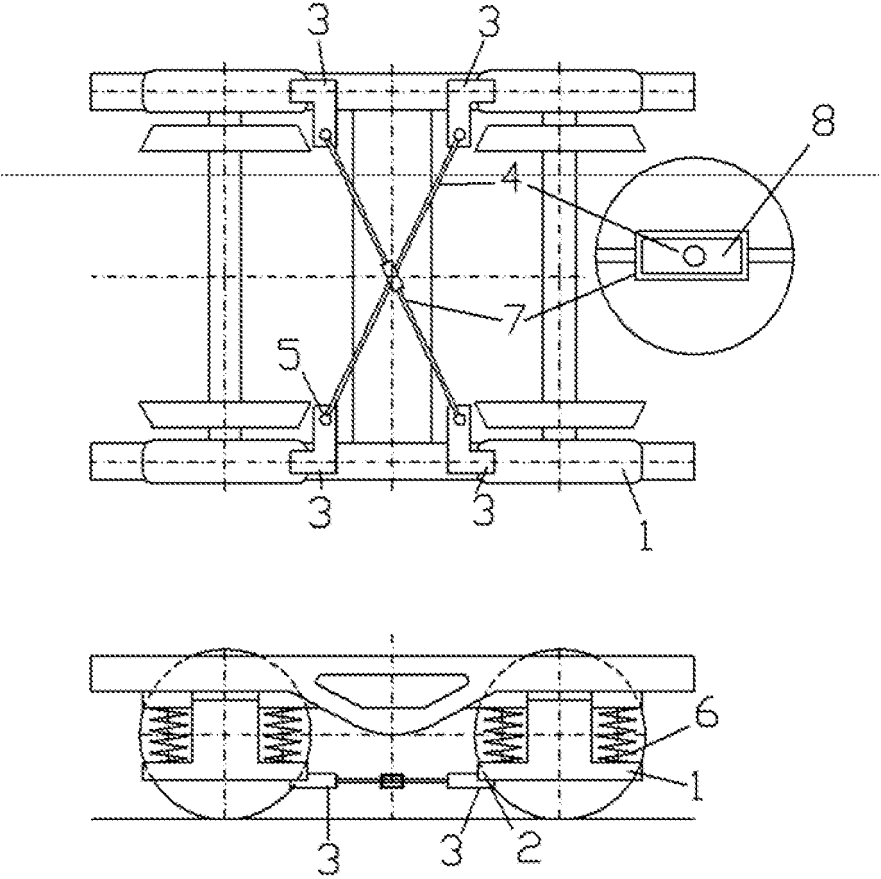
Picture 2



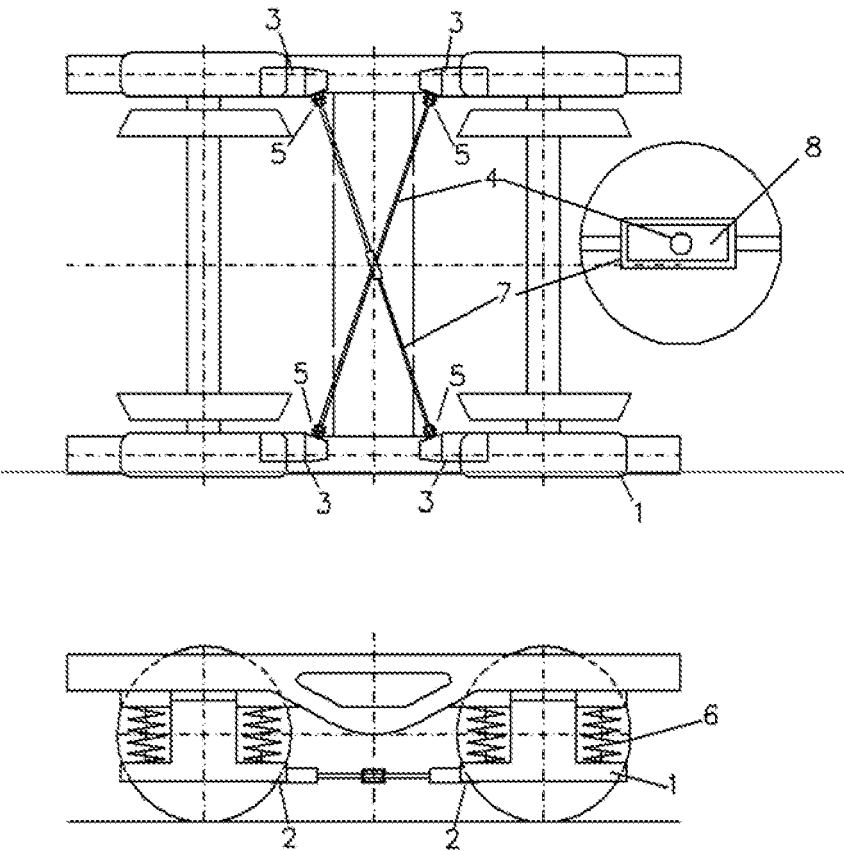
Picture 3



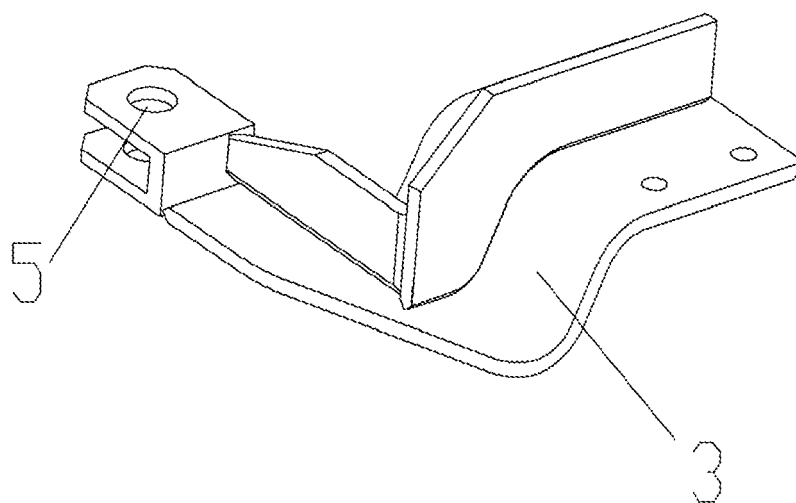
Picture 4



Picture 5



Picture 6



Picture 7



EUROPEAN SEARCH REPORT

Application Number
EP 09 47 5002

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Place of search Munich		Date of completion of the search 27 November 2009	Examiner Lorandi, Lorenzo	
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EPO FORM 1503 03.82 (P04C01)



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Place of search Munich		Date of completion of the search 27 November 2009	Examiner Lorandi, Lorenzo
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