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(54) Connection system of wheelsets in self-steering railway bogie

Verbindungssystem von Radsätzen in selbstlenkenden Eisenbahndrehgestellen

Système de connexion de trains de roues de bogie ferroviaire autodirecteur

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Description

[0001] The subject of the invention is a connection system of wheelsets in a self-steering railway bogie, designated for self-adjusting wheelsets of railway bogie, which makes it possible to reduce the wheel wear during running on a curved track and to achieve stable running of the vehicle at high speeds.

[0002] A solution of an elastic system for connection of wheelsets in a self-steering railway bogie is known from the patent description US 6439130. That solution applies arms attached to bearing housings of wheelset axles, each of the arms parallel to the longitudinal axis of the railway bogie and directed towards the center of the railway bogie. The arms at a given side of the railway bogie, on the left and on the right, are connected with one another using an assembly containing many elements such as preloaded coil springs, flat springs, limiters, ball-and-socket joints, bolts, pins, screws, nuts and their protections, constituting a complex elastic apparatus. A disadvantage of that solution is the high cost of manufacturing of the elastic apparatus, complex adjustment, and operational reliability threatened by the high number of complex elements of the apparatus.

[0003] Another apparatus for rail vehicles for adjusting of wheel axles during running on a curved track, with high number of complex elements, is presented in patent specification - CH 225097 and EP 0803426.

[0004] The purpose of the invention is to eliminate these disadvantages with a connection system of wheelsets of a new construction in self-steering railway bogies, making it possible to reduce the wheel wear and to achieve a stable running of the vehicle at high speeds by providing a sufficiently high stiffness to counteract the parallel anti-symmetric relative displacements of wheelsets in the horizontal plane, called the substitute shear stiffness of the system, while providing a low stiffness counteracting the symmetric angular displacements of wheelsets in the horizontal plane, called the substitute bending stiffness of the system.

[0005] This purpose is achieved by means of a system according to the appended claim.

[0006] The system according to the invention has a simple structure with no moving parts, where the elastic element is made of a single sheet of material, and obtaining the required stiffness depends on the choice of dimensions of the elastic element.

[0007] An example of implementation of the subject matter of the invention is presented in the drawing, where fig. 1 presents the connection system of wheelsets in the railway bogie in a top view, fig. 2 presents the elastic element attached to the arms of the wheelsets, and fig. 3 presents the elastic element before being shaped from a sheet of elastic material.

[0008] As presented in fig. 1, 2, the wheelsets 4 are connected on the left side of the bogie by means of a first subsystem and on the right side of the bogie by means of a second subsystem, whereby each subsystem com-

prises an elastic element located in parallel to the longitudinal axis of the railway bogie. Each elastic element is made of a single sheet 1 of elastic material, whose prepared fragment is shown in unfurled view in fig. 3. The elastic element 1 has - in the area between the arms 3 of the adjacent wheelset 4 - side strips 1b, symmetrically separated with longitudinal cuts parallel to the longitudinal axis of the elastic element 1, forming the central part 1a between them. The side strips 1b are cut off before the arm 3 and their free extremities are united together with the rigid cleat 2, attached to their upper surfaces. The central part 1a is bent upwards in the C-shape on the section between the ends of the cut and the cleat 2. The first extremity of the elastic element is connected to the first arm 3. The flat end of the longer central part 1a, passing under the cleat 2, is attached to the second arm 3 of the adjacent wheelset 4, and the arms 3 are attached to saddle protrusions of the bearing housings 5 of each wheelset 4.

[0009] When wheelsets 4 displace in parallel to one another and perpendicularly to the track axis, the arms 3 and the horizontal fragments of the elastic element are subject to bending in the horizontal plane and the vertical walls of the central fragment in the shape of a channel section are being twisted. When the wheelsets are subject to symmetric angular displacements in the horizontal plane relative to the lateral axis of the bogie, the vertical walls of the central fragment in the shape of a channel section are subject to twisting and bending in the vertical plane and the horizontal wall of that fragment is being bent in the horizontal plane. The arms 3 and the remaining horizontal fragments of the elastic element are also being bent. The required substitute bending stiffness of the connection system can be achieved by adequate choice of dimensions of the elements of the elastic element.

[0010] The connection system of wheelsets in a self-steering railway bogie according to the invention is particularly suitable for application in self-steering railway bogies in which the space between the axles of the wheelsets is not available for installation of another connection system of wheelsets, for example in the form of crossed rods or yokes connected with one another using a rubber element.

Claims

1. A connection system of the wheelsets for a self-steering railway bogie said system being composed of two connection subsystems arrangeable on the left side of the bogie and on the right side of the bogie respectively, each connection subsystem being composed of an elastic element (1) parallel to the longitudinal axis of the bogie and connected at a first extremity to a first arm (3) and at a second extremity to a second arm (3), the first and second arms being connectable (5) to respective wheelsets (4), where-

by each elastic element (1) of the connection system is made from a single sheet of elastic material and consists, seen in the direction of the longitudinal axis of the elastic element (1), of a central part (1a), which consists of a portion bent upwards in a C-shape channel and a flat extremity, and two flat side strips (1b), whereby the central part (1a) and the side strips (1b) are symmetrical and parallel and whereby the central part (1a) and the side strips (1b) are united together at the first extremity of the elastic element (1) and separated from each other by cuts in the remaining part of the elastic element (1) towards the second extremity, whereby the two side strips (1b) are of the same length and shorter than the central part (1a) and the free extremities of the side strips (1b) are bound together by a rigid cleat (2) attached to their upper surfaces, whereby the flat extremity of the central part is derived under the rigid cleat (2) and whereby the second extremity of the elastic element (1) connected to the second arm (3) is the flat extremity of the central part (1a).

Patentansprüche

1. Verbindungssystem der Radsätze für ein selbstlenkendes Eisenbahndrehgestell, wobei das System aus zwei Verbindungsuntersystemen besteht, die auf der linken Seite des Drehgestells bzw. auf der rechten Seite des Drehgestells anordenbar sind, wobei jedes Verbindungsuntersystem aus einem elastischen Element (1) parallel zur Längsachse des Drehgestells besteht und bei a verbunden ist erste und zweite Arme, die mit jeweiligen Radsätzen (4) verbindbar sind (5), wobei jedes elastische Element des Verbindungssystems aus einer einzigen Schicht aus elastischem Material hergestellt ist und in Richtung der Längsachse des elastischen Elements (1), aus einem Mittelteil (1a), das aus einem C-förmig nach oben gebogenen Abschnitt und einem flachen Ende besteht, und zwei flachen Seitenstreifen (1b), wobei der Mittelteil (1a) und die Seitenstreifen (1b) symmetrisch und parallel sind und wobei der Mittelteil (1a) und die Seitenstreifen (1b) am ersten Ende des elastischen Elements (1) miteinander verbunden und durch Schnitte im verbleibenden Teil des elastischen Elements (1) voneinander getrennt sind) zum zweiten Ende, wobei die beiden Seitenstreifen (1b) gleich lang und kürzer als der mittlere Teil (1a) sind und die freien Enden der Seitenstreifen (1b) durch eine an ihren oberen Flächen befestigte starre Klammer (2) miteinander verbunden sind, wobei das flache Ende des Mittelteils unter den starren Stollen (2) geführt wird und wobei das zweite Ende des elastischen Elements (1), das mit dem zweiten Arm (3) verbunden ist, das flache Ende des Mittelteils (1a) ist.

Revendications

1. Système de connexion des essieux pour un bogie ferroviaire autodirecteur, ledit système étant composé de deux sous-systèmes de connexion pouvant être disposés respectivement sur le côté gauche du bogie et sur le côté droit du bogie, chaque sous-système de connexion étant composé d'un élément élastique (1) parallèle à l'axe longitudinal du bogie et connecté à un premier et un second bras pouvant être connectés (5) aux essieux respectifs (4), où chaque élément élastique du système de connexion est fabriqué à partir d'une seule feuille de matériau élastique et consiste, vu dans la direction de l'axe longitudinal de l'élément élastique (1), en une partie centrale (1a) qui consiste en une portion pliée vers le haut dans un canal en forme de C et une extrémité plate, et deux bandes latérales plates (1b), dans lequel la partie centrale (1a) et les bandes latérales (1b) sont symétriques et parallèles et dans lequel la partie centrale (1a) et les bandes latérales (1b) sont unies ensemble à la première extrémité de l'élément élastique (1) et séparées l'une de l'autre par des coupures dans la partie restante de l'élément élastique (1) vers la seconde extrémité, les deux bandes latérales (1b) étant de même longueur et plus courtes que la partie centrale (1a) et les extrémités libres des bandes latérales (1b) étant reliées entre elles par un taquet rigide (2) fixé à leurs surfaces supérieures, l'extrémité plate de la partie centrale étant dérivée sous le taquet rigide (2) et la seconde extrémité de l'élément élastique (1) reliée au second bras (3) étant l'extrémité plate de la partie centrale (1a).

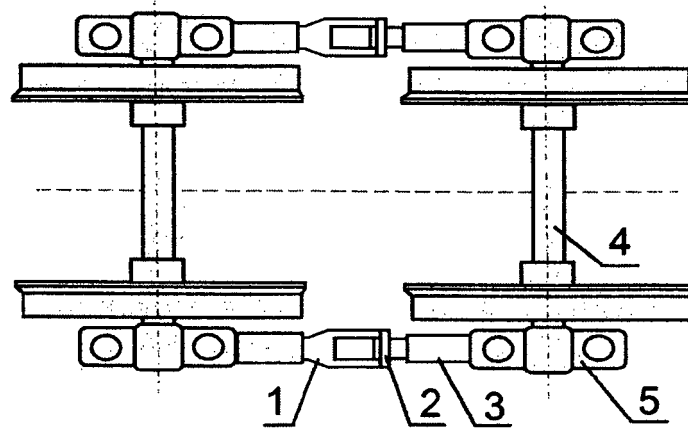


FIG. 1

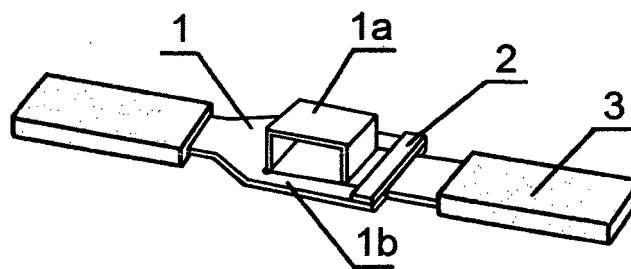


FIG. 2

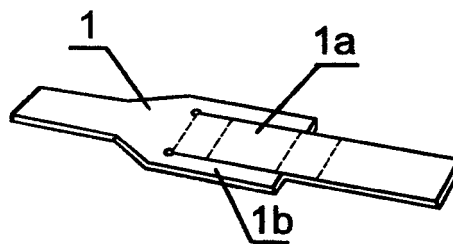


FIG. 3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 6439130 B [0002]
- CH 225097 [0003]
- EP 0803426 A [0003]