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Pelabon

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[54] **RAILWAY CAR BOGIE**

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[51] **Int. Cl.**..... **B61f 3/08;** B61f 5/20; B61f 5/24

[58] **Field of Search**..... 105/199 R, 182 R, 200, 105/202, 218 A; 188/107

[56] **References Cited**

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[57] **ABSTRACT**

In a multi-axle bogie for high-speed railway vehicles, the braking forces, and/or propulsion forces, exerted between the vehicle body and track are transmitted from the vehicle body to the bogie by a pair of parallel links connected to a crossbar, all lying substantially in the plane of the wheel axles so that substantially no turning movement is produced to cause galloping, or chattering, of the bogie.

6 Claims, 3 Drawing Figures

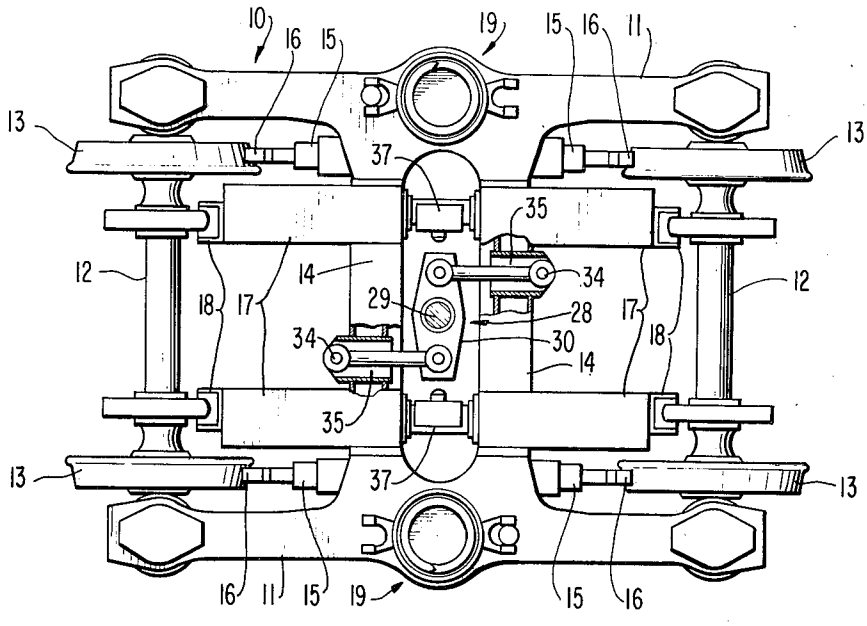


FIG. 1

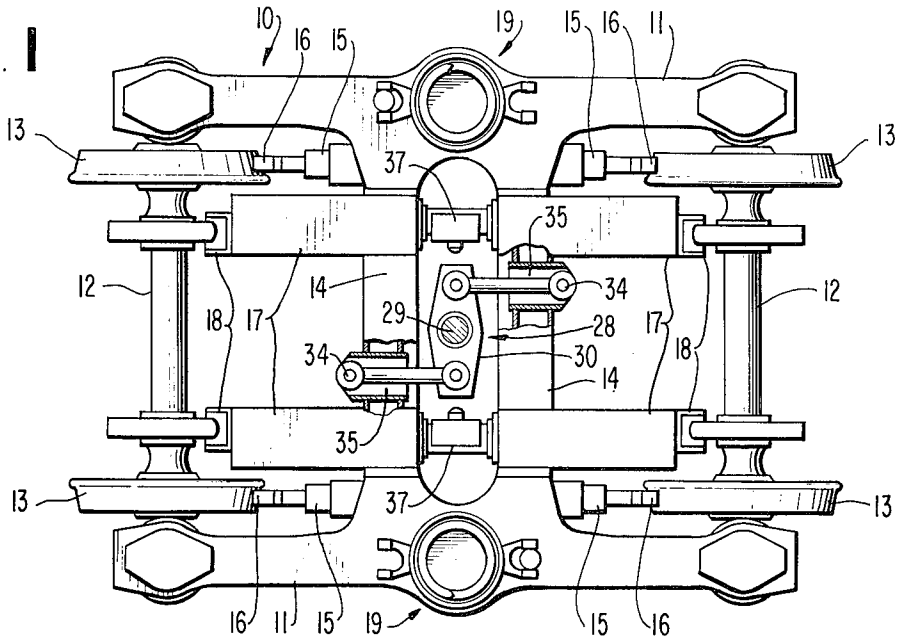


FIG. 2

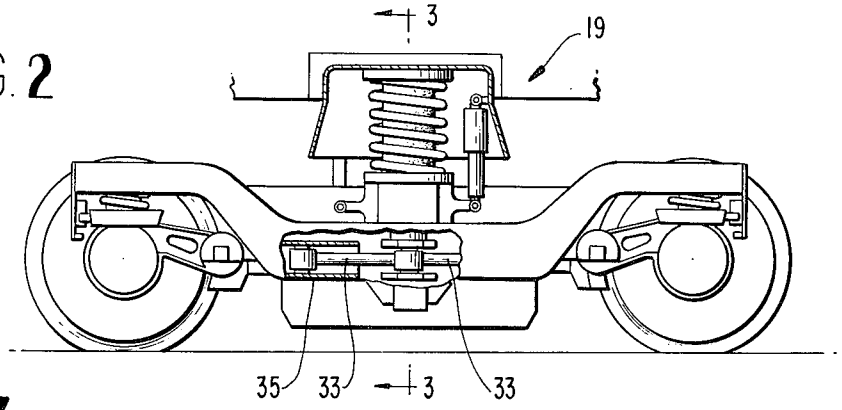
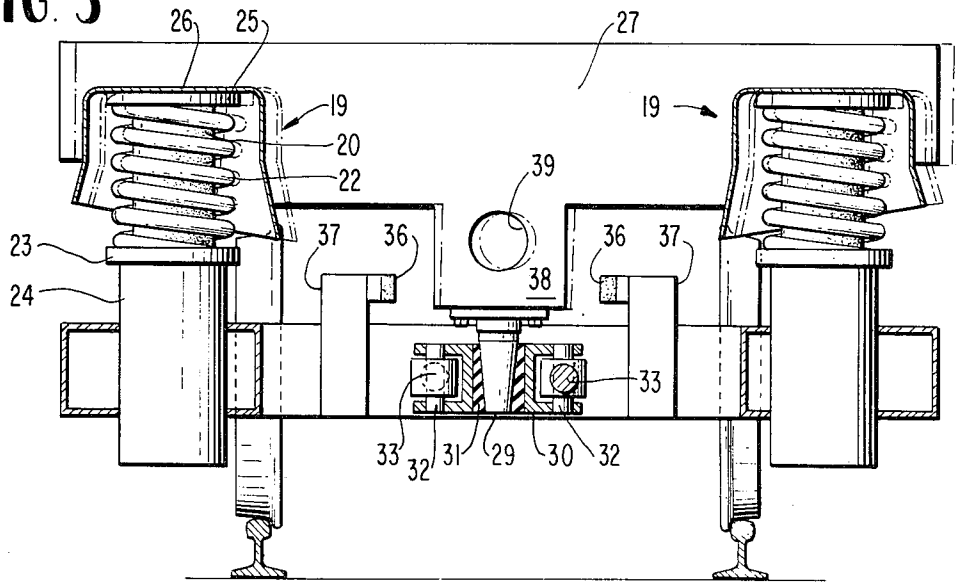


FIG. 3



RAILWAY CAR BOGIE

The present invention concerns a unit of railway rolling stock, and specifically a power bogie, designed to be coupled to the body of a vehicle for transmitting propulsion and/or braking forces to the vehicle, particularly in the case of high-speed vehicles.

So far, power bogies have been built with the following known features:

A bolster beam is mounted in a pivoting position on the bogie chassis between the axles, and supports the body by means of springs supported by the body's extremities.

Traction power is transmitted to the body by connecting rods, one on either side of the bolster beam, which connect the latter to the body.

The traction rods are located high above the track, a fact that, because of the application of traction forces to the bogie at a high level, makes the front part of the bogie tilt upward and its rear part tilt downward. This revolving motion around the transverse axis at the point at which the rods are connected to the bolster beam triggers a galloping motion of the bogie. By the same token, when the brakes are applied, there is a turning movement of force produced which acts in the opposite direction, to induce a galloping, or chattering, action.

The body usually rests on the bolster beam of the bogie via a secondary suspension consisting of helicoidal steel springs.

The purpose of the invention is to provide a bogie specifically adapted to a railway vehicle having a design which permits high-speed operation without the drawbacks listed above.

As provided by the invention, the bogie chassis is in the shape of an H, a special feature consisting in the fact that there is a central open area between two lateral branches connecting the side frame members.

This design makes it possible to use helicoidal spring suspensions equipped with an inner rubber lining located on either side of the longitudinal axis of the bogie chassis and in the center of the wheel base, and achieves the suspension of the bogie body without the intermediary of a bogie bolster beam.

This design ensures improved stability of the vehicle on its bogies. This results from the high support planes of the secondary lateral suspension springs in the body.

In addition, this design also facilitates the incorporation of an inclination correcting system into the bogie.

The railcar body is propelled by connecting rods, or links, attached to a crossbar at the level of the axle plane. This crossbar is connected to the body pivot by a rubber insert.

This design fosters an improved distribution of the adherence of the power bogie.

The arrangement of the bogie chassis according to the invention allows the use of supporting beams fixed to the bogie chassis, on which are located the solid-forged disc brakes.

A clearer understanding of the invention is provided by the description that follows, and by a scrutiny of the accompanying drawings, which show, as a nonlimitative example, a preferred form of bogie for a high-speed railway vehicle constructed in accordance with this invention.

FIG. **1** is a plan view of a preferred form of bogie constructed in accordance with the invention;

FIG. **2** is a side elevation, partly broken away, of the bogie of FIG. **1**, and;

FIG. **3** is a cross-section, taken on the line **3—3** of FIG. **2**.

In the drawings, numeral **10** indicates generally a main frame for a railway bogie which consists of a pair of side members **11** provided at their extremities with journal means for the ends of a pair of axles **12** carrying the track-engaging wheels **13**. At medial locations along their lengths the side members are connected together by a pair of spaced transverse beams **14** so that the bogie frame as a whole resembles an H. These beams support the actuator means **15** for a set of clasp type brake shoes **16** as well as the operating mechanisms **17** for a pair of disc brakes **18** mounted on each axle.

Positioned on top of each side member **11**, at its midpoint is a cusioning means, indicated generally by numeral **19**, each of which consists of an elongated cylindrical block **20** of an elastomeric material, such as rubber, having an open core **21**, surrounded by a helicoidal metal spring **22**. One end of the resilient block **20** and coil spring **22** is supported on a cup-shaped base **23**, resting on a collar **24** welded to the side member. The other end of the block and coil spring is received within a cup-shaped cap **25** contained within a downwardly and outwardly flaring protective shroud **26**, and the cap and shroud are rigidly secured to the under frame **27** of the railway vehicle (not shown). In the basic form of the invention the base **23** is welded to the collar **24**, or otherwise fixedly secured to the side member **11** so that relative movement between the bogie and car in a vertical direction takes place by axial deformation in contraction and expansion of the elastomeric block **20** and metal coil **22**, while any horizontal displacement between the bogie and car caused by irregularities in track alignment or rotation occurring when rounding a curve, is effected by a twisting, or bending, deformation of elements **20** and **22**, as exemplified by the dotted line positions in FIG. **2**. While only one position of deformation is shown, it should be evident that, in the absence of any other restraint, the angular direction of possible displacement extends throughout the entire horizontal arc of 360°.

However, for all practical purposes, it is essential to prevent any fore-and-aft displacement of the bogie as a whole with respect to the vehicle so that when the brakes are applied, the decelerating force of the wheels will be transmitted to the car body. Similarly, if the bogie is a driving bogie, having power driven wheels, the propulsion force must be transmitted to the vehicle.

Lateral displacement of the bogie can be limited by the attachment of a pair of oppositely disposed resilient bumpers **36**, mounted on brackets **37**, so that they will come into abutting engagement with an element depending from the underframe of the vehicle in the event of excessive sidewise displacement of the bogie.

Fore-and-aft displacement of the bogie in the direction of travel with respect to the vehicle is restricted by a pivot means, indicated generally by numeral **28**, which confines such displacement to rotation about a central vertical axis which lies in a vertical axis transverse to the direction of travel of the bogie while permitting side-to-side displacement and tilting motions about a horizontal axis parallel to the direction of travel. The spring suspension system described above is more fully described and claimed in my copending

application, Ser. No. 350,805 filed concurrently with this application.

A downwardly projecting tapered pivot pin **29** is bolted to the underframe **27** at the midpoint of the body, to which a transverse crossarm **30** is attached, as by means of an elastomeric body, or sleeve **31,** bonded to both the pin and crossarm to allow a certain amount of relative movement in all directions between the two members.

At the extremities of the crossarm, and equidistant from the center pivot, a pair of pivot pins **32** are inserted, each of which is connected to one end of a pair of parallel, oppositely extending, links **33** by means of bonded elastomeric inserts. The other ends of these links are similarly connected by elastomeric inserts to a pair of pivot pins **34** which are respectively inserted in housings **35,** each formed in a respective one of the beams **14** disposed at an elevation such that the links **33** lie substantially at all times in the horizontal plane of the axes of rotation of the four wheels **13.**

Thus, it will be realized that the bogie as a whole is restrained against any movement relative to the car body in a horizontal direction normal to a vertical plane passing through the central pivot axis **29** and also normal to the direction of movement of the bogie. At the same time the use of rubber, or elastomeric, inserts in the pivotal connections for the links and crossarm does permit a limited amount of rotation of the bogie about the central vertical axis and also a limited amount of canting, or tilting, of the car body with respect to the track. Finally, the arrangement of the force transmitting links **33** does not place any restriction on side-to-side horizontal displacement of the body with respect to the vehicle; such displacement is controlled by the bending of the cushioning means **19,** and is limited by the resilient bumpers **36,** mounted on brackets **37** extending between beams **14** so as to abut against opposite sides of a depending portion **38** of the car frame.

The advantages obtained by placing the force-transmitting links **33** in the plane of the wheel axles is, that whenever the brakes are applied, the deceleration force is transmitted in a straight line to the car pivot pin **29** and no bending is developed in the bogie frame which might cause it to gallop. This is also true when the bogie is modified for use as a driving bogie so long as the driving force from the prime mover is applied directly to the axles or wheels. Arrangements for driving the bogie wheels are well known in the art, and one specific apparatus for accomplishing this is shown in my copending application, Ser. No. 350,806 filed concurrently with this application. In that case, power is transmitted by a shaft from the engine in the car to a mechanical transmission attached to one of the axles **12,** the other axle being provided with a similar gearing arrangement connected to the first one by an auxiliary shaft which passes through the opening **39** provided in the car bolster.

I claim:

1. In a system for transmitting forces between a railway car and a bogie which supports said car, the combination including a rigid bogie frame means including a pair of side members and including means to rotatably support at least two pairs of track-engaging wheels, a vertical pivot element fixedly attached to and projecting downwardly from the underside of the car and located along the longitudinal centerline thereof, a horizontal transverse crossbar pivotally joined to said vertical pivot element at the midpoint of the crossbar to constrain longitudinal displacement of the bogie with respect to the car while permitting lateral and rotational displacement, the extremities of said crossbar being respectively pivotally connected to one end of each of a pair of force transmitting links disposed generally horizontally in the direction of movement of the bogie, the other ends of said links being respectively pivotally connected to said bogie frame means, and resilient means connected between said side members of the bogie frame means and said car to support the weight of the car and to limit said lateral and rotational displacement of the bogie with respect to the car, said crossbar and said force transmitting links being disposed generally in the horizontal plane of the rotational axes of said wheels.

2. The invention according to claim **1,** wherein said force transmitting links extend away from said crossbar in opposite directions.

3. The invention according to claim **1,** wherein said pivotal connections between said links, said crossbar, and the frame of a railway car include bearing elements composed of elastomeric material.

4. The invention according to claim **1,** wherein said railway car includes a transverse bolster means and said vertical pivot element comprises a pin secured to said bolster means, said pin being received in an opening of greater diameter than the pin provided in said crossbar, and an annular elastomeric bearing element disposed between, and bonded to, said pin and the inner surface of the opening.

5. The invention according to claim **4,** wherein said pin is downwardly and inwardly tapered.

6. The invention according to claim **4,** wherein each of the pivotal connections at the ends of said force transmitting links comprises an elastomeric bearing insert.

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