Nov. 21, 1950 J. WALDVOGEL 2,530,495

RAIL-VEHICLE BOGIE WITH DEPRESSED CENTER PIN

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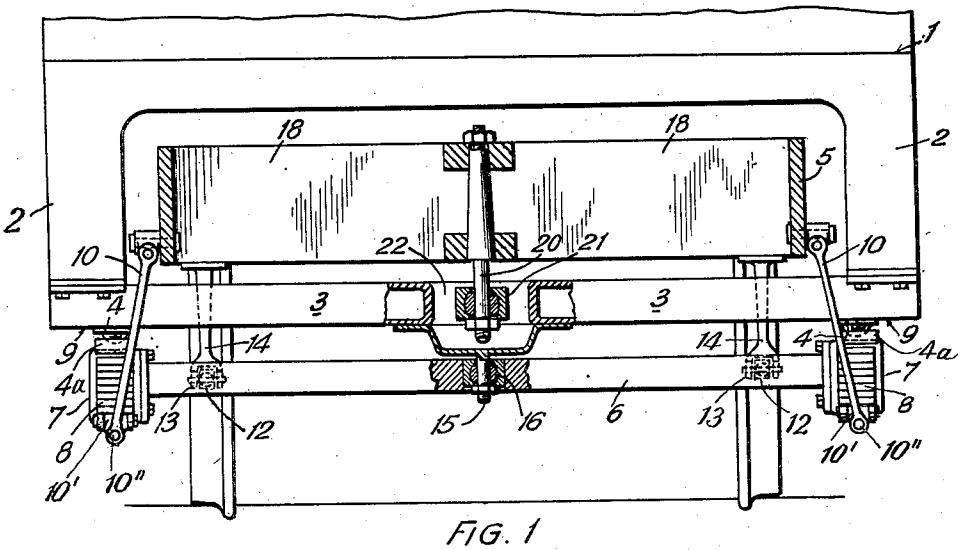


FIG. 1

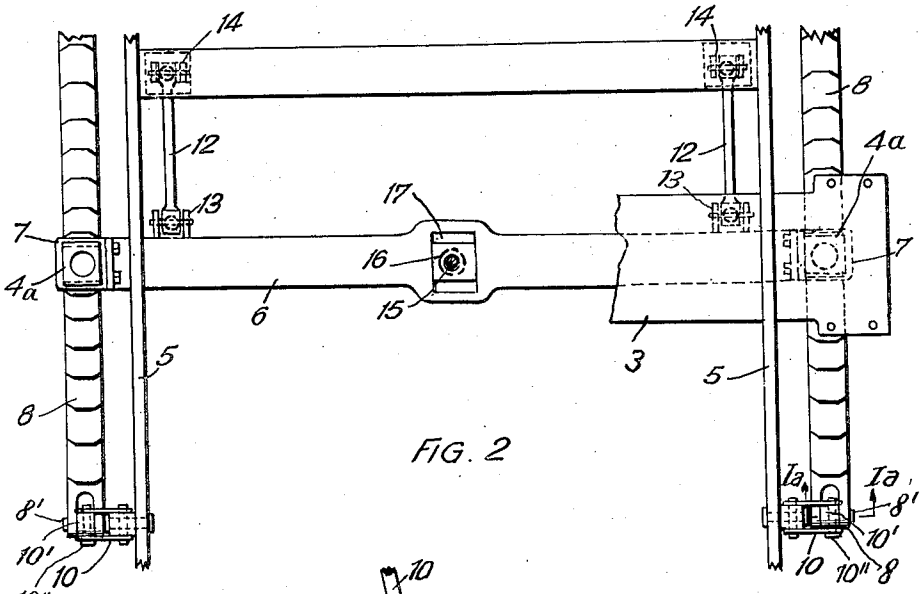


FIG. 2

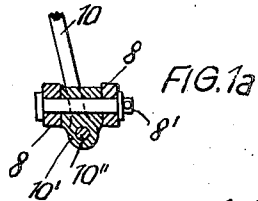


FIG. 1a

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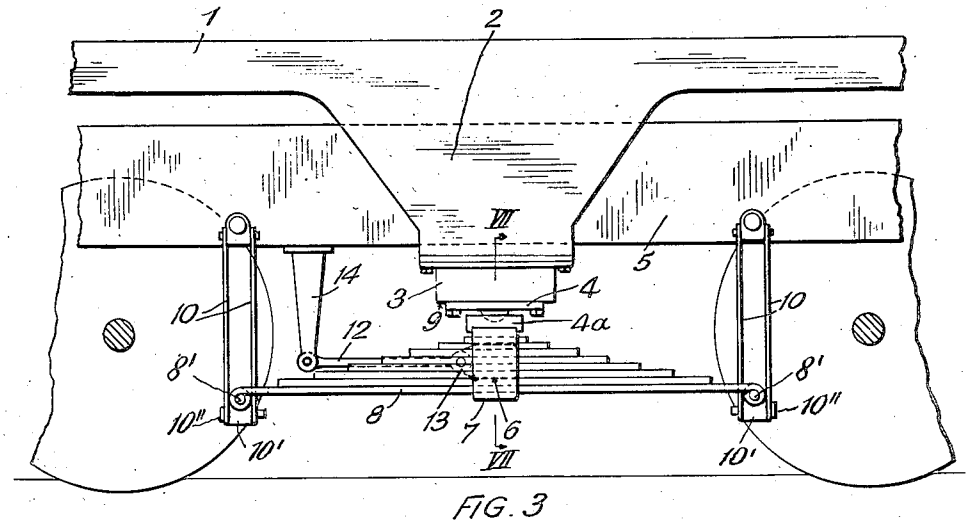


FIG. 3

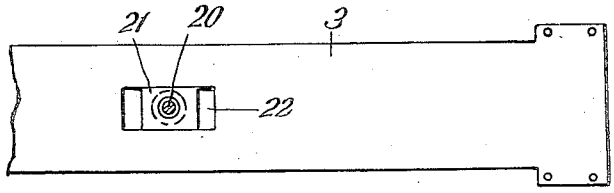


FIG.6

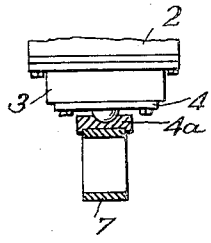


FIG.7

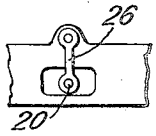


FIG.4

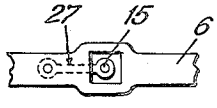


FIG.5

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RAIL-VEHICLE BOGIE WITH DEPRESSED CENTER PIN

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Section 1, Public Law 690, August 8, 1946
Patent expires February 11, 1963

5 Claims. (Cl. 105—199)

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My invention relates to a bogie for rail-vehicles, which is connected to the vehicle body by means of a depressed pin and a transom which is arranged below the bogie sills or passes therethrough, which transom is secured, on both sides and outside the bogie, to correspondingly depressed body posts. In the inventive arrangement, the vehicle body further is supported on the bogie, at the ends of said transom, by means of a spring-supported laterally oscillatable bolster which rocks with the bogie.

In a known bogie structure of this kind, the bolster is pivoted on a pin to the transom which is fixed to the vehicle body. It is not intelligible, however, how the traction forces or brake forces are to be transmitted from the bolster onto the bogie frame, particularly when the bogie is swung about the vertical axis toward the vehicle body. In such known structure, in any case, the bolster is subjected to bending moments due to the transmission of the tractive force.

It is also known, in case of bogies provided with a bolster and for the purpose of directly transmitting the tractive or braking forces, to connect the vehicle body to the bogie frame by means of a pin fixed to the body and vertically and transversely displaceable relative to the bogie. Such pin, further, is connected to the bolster, which does not transmit any tractive forces, by a link which transmits only transverse forces. Such latter bogie construction, however, offers difficulties to the provision of a depressed pin, i. e. a pin disposed approximately at axle elevation, in that the structural design of the bogie frame is hindered by the vehicle-body cross-bracing which carries the pin and which has to be substantially depressed. When, vice-versa, an excessively long pin is fixed to the vehicle body, such pin is excessively stressed, and it becomes very difficult to design the vehicle-body cross-bracing, to which the pin has to be fixed, sufficiently strong.

My present invention permits of providing a depressed pin while avoiding a bolster subjected to bending stresses, in that the transom fixed to the vehicle body serves for directly transmitting tractive and braking forces from the bogie frame onto the vehicle body by means of a king pin which, in a manner known per se, is vertically and transversely displaceable, whereas the bolster, which is arranged underneath the said transom, is coupled to the latter by a separate auxiliary pin, arranged underneath the transom and constructed, as known per se, for resisting transverse forces only.

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Several forms of the present invention are illustrated in the accompanying drawing, by way of example only, in which

Fig. 1 shows a cross section of a bogie according to the present invention;

Fig. 1*a* is a cross-section on line I*a*—I*a* of Fig. 2.

Fig. 2 a staggered plan view;

Fig. 3 a side elevation of the central portion of the bogie,

Fig. 4 a fragmentary plan view of a modified king-pin guiding arrangement,

Fig. 5 a fragmentary plan view of a modified auxiliary-pin guiding arrangement,

Fig. 6 is a top plan view of the transom which is fixed to the vehicle body, and

Fig. 7 is a cross-section on the line VII—VII of Fig. 3, the springs being omitted.

The vehicle body 1 is provided with posts 2 which extend down to a low level laterally of the bogie, and the lower ends of which are secured to a transom 3. The ends of the latter, and thus the vehicle body, are supported on a bolster structure by means of sliding shoes 4 which are adjustable by means of spherical socket joints 4*a*, the said bolster being resiliently and oscillatably suspended from the bogie frame 5. For this purpose, bolster beam 6, which is arranged underneath transom 3, is fixed to the buckles 7 of longitudinal plate springs 8, and the underside of the ends of transom 3 are provided with sufficiently large slide faces 9 for supporting the shoes 4.

The ends of springs 8 are suspended laterally oscillatable from bogie frame 5 by means of the swing links 10. As shown particularly in Fig. 1*a*, a pin 8' traverses each spring eye and a block 10' disposed between the ends of the springs 8. A further pin 10'' disposed underneath the pin 8' at right angles thereto, passes through block 10'. The two hanger rods 10 are pivoted on pin 10'' to block 10' which is pivoted on pin 8' to the springs 8. Bolster beam 6 is held substantially parallel to the horizontal transverse axis of the bogie by means of links 12 which are arranged symmetrically to the longitudinal axis of the bogie. Links 12 are pivoted at one end (13) to bolster beam 6, and at the other end to the lower end of the stays 14 which are fixed to the bogie frame 5. Such parallel arrangement also may be obtained by other means than those shown.

The bolster structure 4, 4*a*, 6—8, 13 and 16 shall, on one hand, partake of the lateral movements of the vehicle body and, on other hand, swing with the bogie. Bolster beam 6, therefore,

is coupled to transom 3 by an auxiliary pin 15 which is arranged underneath the latter and fixed thereto. Pin 15 is engaged in a longitudinal slot 17 of bolster beam 6 by means of a link block 16 which is displaceable in the longitudinal direction of the vehicle. The longitudinal forces, due to such longitudinal play of block 16 in slot 17 are not transmitted from the vehicle body to the bolster. Such transmission rather is effected through the king pin 20 which is fixed to the bogie frame 5 and, extending downwardly, is engaged, by means of a link block 21, in the transverse slot 22 of transom 3. King pin 20 is restrained in the cross bracing 18 of bogie frame 5 over a comparatively great length.

The vehicle body, with respect to the bogie frame, may swing vertically up and down and rock laterally, block 21 of king pin 20 freely moving in slot 22 of transom 3 laterally and vertically without impairing the transmission of the tractive force or braking force in the longitudinal direction. When the vehicle enters a curve, the bolster structure and bogie rotate together, the lateral shoes 4 moving, relative to the vehicle body, on circular arcs about auxiliary pin 15 as center.

The inventive arrangement described affords a positive transmission of the tractive and braking forces respectively, from the bogie onto the vehicle body without using a bolster subjected to bending stresses. By subdividing the pin arrangement into a king pin and an auxiliary pin separate therefrom, one thereof transmitting only the longitudinal and the other only the transverse forces, the designer is given the necessary free hand of so arranging the said pins as to reduce the strains and weights thereof.

The restraining of king pin 20 in the cross-brace 18 of bogie frame 5, in particular, permits of fully utilizing the said brace 18. Due to king pin 20 extending downwardly and being engaged in transom 3 approximately at the latter's cross-sectional center of gravity, the desired pin depression and minimum stressing of transom 3 is attained. The stresses acting on transom 3 solely are defined by a bending moment acting in the horizontal plane thereof.

Instead of the slots 17 and 22, corresponding links may be provided for, as shown in plan in Figs. 4 and 5. In Fig. 4 king pin 20 is connected to transom 3 by a link 26. In Fig. 5, auxiliary pin 15 is connected to bolster beam 6 by a link 27.

What I claim and desire to secure by Letters Patent is:

1. In a rail-vehicle bogie-frame, in combination with a vehicle-body including a transom having a depressed center portion, a bolster structure including at least one longitudinal spring on either side of the bogie frame, said springs having center buckles, and a bolster beam rigidly interconnecting the center buckles of the springs, a vertical auxiliary pin rigidly secured to the depressed transom center portion and secured in a universally tiltable and longitudinally displaceable relationship to the center portion of the bolster beam and substantially at the level thereof, body supporting means disposed between each center buckle of the said springs and the ends of the transom, a portion of said means moving, relative to the vehicle body, on circular arcs about the auxiliary pin as center, hanger means suspending each end of the springs laterally oscillatably from the bogie frame, a king pin interconnecting the bogie frame and vehicle-body transom in a universally tiltable and transversally displaceable relationship and substantially at the level of the transom, and link means disposed horizontally on either side of the bogie frame and interconnecting the latter and the bolster so as to hold the bolster substantially parallel to the transverse bogie axis; whereby bending action on the bolster beam arising from traction forces is avoided, the vehicle body transom directly transmits the traction and braking forces from the bogie frame to the vehicle body through the king pin, and the auxiliary pin is used only for transmitting the transverse forces into the bolster.

2. A bogie frame set out in claim 1, comprising first slot-and-block means adapted to secure the auxiliary to pin to the bolster beam, and second slot-and-block means adapted to secure the king pin to the transom, the slot of the first means being arranged transversely of the bolster beam, and the slot of the second means being arranged lengthwise of the transom.

3. In a bogie frame set out in claim 1, a swing link connecting the auxiliary pin to the bolster beam, said link at one end being pivoted to the bolster beam at a point situated in the longitudinaly axis thereof and at the other end engaged by the auxiliarly pin.

4. In a bogie frame set out in claim 1, a swing link connecting the king pin to the vehicle-body transom, said link at one end being pivoted to the transom at a point situated in the longitudinal axis of the vehicle-body and at the other end engaged by the king pin.

5. A bogie set out in claim 1, in which the king pin at one end is secured to the bogie frame and, at the other end to the transom substantially at the level of the latter in a laterally and vertically movable relationship.

JAKOB WALDVOGEL.

REFERENCES CITED

The following references are of record in the file of this patent:

FOREIGN PATENTS

Number	Country	Date
618,745	Germany	Sept. 14, 1936
812,534	France	May 12, 1937