BOLSTER BANKING DEVICE
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8 Claims. (Cl. 105—187)

This invention relates to railway cars and more particularly to mechanism for supporting the bolster and car bodies from the trucks.

The principal object of the invention is the provision of new and improved means for supporting the bolster and car body so that in rounding curves, the center of gravity of the car will be shifted toward the inner side of the curve.

A further object of the invention is the provision of a new and improved means for supporting the bolster from the truck whereby the bolster will be properly supported without the aid of the conventional spring plank, swing hangers and elliptic or associated semi-elliptic springs.

Further object of the invention is the provision of a new and improved mechanism for supporting railway car bodies from trucks that will automatically bank the body when the car is traveling around curves and will also permit the normal "nosing" of the truck without causing side away of the body while the car is traveling over a straight track.

A further object of the invention is the provision of a new and improved bolster supporting means that is simple in construction, comparatively inexpensive to manufacture, easily assembled and installed, that requires a minimum in existing equipment, and that is effective in operation.

Other and further objects and advantages of the invention will appear from the following description, taken in connection with the accompanying drawings, in which—

Fig. 1 is a plan view of a railway passenger car truck, with parts broken away;
Fig. 2 is a side elevation thereof;
Fig. 3 is a section on the line 3—3 of Fig. 2;
Fig. 4 is a section on the line 4—4 of Fig. 3;
Fig. 5 is a section on the line 5—5 of Fig. 4, with parts broken away and parts omitted for the sake of clearness;
Fig. 6 is a view similar to Fig. 3 but showing a modified construction; and
Fig. 7 is a section on the line 7—7 of Fig. 6.

With the advent of trains of high speeds, numerous problems have arisen in connection therewith. For instance, to change direction at higher speed, the curve should be longer and the outer rail should have an increased elevation and while this has been done to some extent, the net result must, of necessity, be a compromise, because all the trains passing over a certain railroad, even though it be a high speed train road, are not high speed trains—that same curves must also accommodate slow moving trains. Since energy varies as the square of the velocity, this tremendous increase in speeds very materially increases the centrifugal action of the cars on curves with the result that the danger of overturning, as well as the disturbance to passengers and lading due to lateral jerks becomes more pronounced. The present invention seeks to compensate for this centrifugal and oscillating action by automatically banking the car body on curves. Because the elevation of the outer rail on curves must be arranged to handle slow moving trains as well as high speed trains, this banking device is designed to compensate for lack of all the elevation of outer rail that may be required for high speed trains—in other words, positive banking increasing in ratio to lateral forces produced by a particular speed will act to compensate for lack of all the elevation a particular speed should have.

Referring now to the drawings, the reference character 9 designates a railway passenger car having a truck 10 comprising a side frame 11 at each side of the vehicle which are connected together by the end frame members 12 and 13 and the intermediate cross-members or transoms 14 and 15. The side frame members 11 are each provided with conventional pedestals 16 and 17 at each side of the truck and between which are mounted the bearings 18 for the axles 19 on which are rigidly connected the wheels 21, as is usual in such constructions. The truck is provided with equalizer bars 22, Fig. 2, which have their ends engaging the axle boxes 18 and a plurality of springs 23 are provided between the equalizer bars 22 and the side frames 11 for resiliently supporting the truck frame from said equalizer bars. Since the details of the construction thus far described are of the usual or any well known construction, it is not thought necessary to further illustrate or describe the same.

The bolster 24 is mounted between the transoms 14 and 15 and is adapted to be supported from the transoms or side frames. It is common practice to support the bolster from the transoms or side frames by means of a spring plank and swing links carried by the transoms or side frames which support springs, elliptical or semi-elliptical, that in turn support the bolster. In the present invention, these semi-elliptical springs are eliminated and the bolster is supported from the side frame on rockers or rocker members that are oblong in cross-section, as will presently be described.

The transoms 14 and 15 are connected to—
gather at their lower edges by seat members or saddles 25 beneath each end of the bolster. Interposed between the seat members 26 and the bolster 24 at each end thereof is one or more rockers or roller members 26. These rockers or roller members are so constructed that when the bolster moves laterally outwardly, it will elevate the outer end of the bolster and is preferably, though not necessarily, so constructed that the inner end of the bolster will simultaneously be lowered so that the bolster will be banked. These rockers or rocking members 26, or the tracks on which they rock, or both, are so constructed that the bolster may have a limited movement laterally of the truck in both directions in a horizontal plane. This permits the normal zig-zag, “hunting” or “nosing” movement of the truck on the straight-away track without banking or disturbing the car body.

In the form of the device selected to illustrate one embodiment of the invention, the rockers or rocking members extend the full width of the bolster, as shown in Fig. 4. It is desirable that the parts be so constructed that there will be no sliding movement between the bolster and the rocker or rocking member and this is accomplished in the present instance by providing a rack 27 at each side edge of the bolster at each end thereof and providing corresponding teeth 28 on the rockers for engaging said racks. In order to prevent sliding movement between the roller and the seat or saddle 25, the saddle is also provided at each end thereof with a rack 29 which is adapted to be engaged by teeth 31 formed on the rockers, as shown more clearly in Figs. 4 and 5 of the drawings.

Suitable means are also provided for preventing the rocker 26 from moving transversely of the bolster and for preventing the rockers from moving transversely of the truck. Any suitable mechanism may be employed for this purpose. In the form of construction shown, grooves 32 and 33, extending longitudinally of the bolster and transversely of the saddle member 25 are provided for this purpose. The rocker 26 is provided with flanges or radially extending projections 34 and 35 which are adapted to engage the grooves 32 and 33 respectively, for preventing fore and aft movement of the bolster relative to the rocking members and side frames.

The rocking members are of peculiar design but are somewhat elliptical in cross-section with their major axes extending upwardly and inwardly. In other words, the major axes of these members, at opposite sides of the car, converge upwardly so that when the bolster moves to the right a material distance, for instance, in Fig. 3, the right end of the bolster will be elevated and the left end will be lowered. It desired, the rocker engaging surfaces 30 on the saddle 25 at each side of the truck are inclined upwardly and outwardly at their outer ends thereby assisting in banking the bolster and with it the car body in the travel of the car around curves.

The parts are preferably, though not necessarily, so constructed that the normal amount of movement of the bolster laterally of the frame on a straight track, herein referred to as “nosing”, is permitted without affecting the height of either end of the bolster. This is accomplished in the present instance by the contour of the cooperating surfaces on the rocking members, the bolster and the upper surface of the saddles. As shown, the surface at 36 on the under side of the ends of the bolster and the cooperating engaging face at 37 on the rocking member as well as the faces 38 on the lower side of the rocking member and the cooperating faces 39 of the saddle all cooperate to permit a limited lateral movement of the truck without banking the car body. In other words, the surfaces 38 and 39, for a limited distance at each side of the engagement of the rocking member in its neutral position, may be substantially horizontal and the surfaces of the rocking member, for a limited distance at each side of the engagement with said horizontal surfaces, may be on the arcs of circles with the axis of the rocking member as a center. This will permit a limited lateral movement of the truck, without disturbing the car body, in a horizontal plane.

In the form of the device selected to illustrate one embodiment of the invention, the transoms 61 and 62 at each end are provided with supporting or spring plate 53 is adapted to extend into an opening leading into the hollow end of the bolster, as shown more clearly in Fig. 6. The plate 53, see Fig. 7, is provided with rails 54 and 55 similar to the rails 56 shown in Figs. 1 and 5 which are adapted to be engaged by teeth 57 and 58 which engage the teeth of the rails 54 and 55, respectively. Each plate 53 has a guiding flange 59 extending upwardly about its peripheral edge. It is also provided with a groove 60 which is adapted to be engaged by a flange or radial projection 59 on the central portion of each of rockers 51 and 52.

Suitable springs 61 and 62 are adapted to be inserted between the plate 53 and the top wall 63 of the bolster at each end thereof. Any suitable number of springs may be employed. In the form of the construction shown, four sets of springs are used at each end of the bolster. The springs 61 are the conventional helical springs and may be of the single or the double concentric types. In order to prevent harmonic action of the spring assembly, one or more volute springs 52 may be employed and may replace the conventional inner helical spring in the type using the double concentric type. If each spring assembly at each end of the bolster.

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bolster comprises four springs or four sets of springs, one of the inner set of helical springs may be replaced by a volute spring 62a, as shown in Fig. 7. In order to properly balance the bolster, the volute spring may be inserted in one of the front springs at one end of the bolster and in the rear spring at the other end of the bolster so that the volute springs will be positioned at diagonal points on the bolster. The spring plates may have spring positioning lugs 64 thereon which are adapted to engage within the lower ends of the inner springs for positioning the bolster and they in turn will position the outer springs. The flange 10 will also assist in positioning the outer springs.

It will be noted that in each form of construction, the use of a spring plank with swing hangers and elliptic or semi-elliptic springs is eliminated. This is considered an important feature of the invention in the saving of costs in construction and in reducing weight.

It is thought from the foregoing, taken in connection with the accompanying drawings, that the operation and construction of our device will be apparent to those skilled in the art and that changes in size, shape, proportion and details may be made without departing from the spirit and scope of the appended claims.

We claim as our invention:

1. In a railway car, a truck comprising wheeled axles, journal boxes for said axles, equalizer bars supported on said journal boxes, a truck frame, resilient means for supporting said frame from said bars, a truck bolster, said bolster having an opening in each end, a plate slidably mounted in said opening, springs within said opening for supporting said bolster from said plate, and a plurality of rockers members under each plate for engaging the same from said plate, said rocker members being oblong in cross-section and so arranged beneath said plate that they will bank said bolster when said truck travels around curves.

3. In a railway truck, a pair of side frames, transoms connecting said frames, saddle members connected the lower portions of said transoms together adjacent their ends, a bolster between said transoms, a rockable member having a smooth load bearing surface and a portion having teeth on its upper and lower surfaces on each saddle for supporting said bolster therefrom, said saddle and bolster having racks for engaging said teeth, interengaging grooves and radial projections on said rockable members and bolster and saddle members for preventing fore and aft movement of said bolster, said parts being so arranged that when said truck turns curves at high speed, said bolster will move outwards a predetermined distance in a horizontal plane and on further movement the outer end will be elevated by the rocking of said corresponding rockable member.

4. In a railway truck for passenger cars, side frame members having depending pedestals at each end thereof, wheeled axles having bearings slidably mounted between said pedestals, end frame members connecting the ends of said side frame members, transoms connecting the central portions of said side frame members together, saddle members connected to said transoms and having depending portions, a bolster between said transoms, rockers between said bolster and saddle members, said rockers comprising a tooth portion and a smooth load supporting portion spaced laterally from the tooth portion, said bolster and saddle having rack and tracks engaged by said tooth portion and said supporting portions, respectively, said load supporting portions being cam shaped and so constructed that when said bolster is initially moved laterally during the movement of the truck around a curve, said rockers will rotate to initially move the bolster laterally in a horizontal plane and on further movement will elevate the outer end of the bolster and lower the inner end thereof, means spaced from said teeth and rack for preventing movement of said bolster longitudinally of the truck frame, equalizer bars supported on said bearings, and resilient means for supporting said frame from said equalizer bars.

5. In a railway truck, a truck frame, a bolster, a body supported by said bolster, means including rockable members having cam surfaces thereon for supporting said bolster from said frame and for banking the car body on curves, said means being so constructed that said bolster may move laterally in a horizontal plane a predetermined distance during the initial movement of said bolster, means for preventing slippage of said rotatable members transversely of the truck frame, and means, independent of said first-named means, for preventing movement of said rotatable members longitudinally of said frame.

6. In a railway truck, a truck frame, a truck bolster, means including rotatable members for supporting said bolster from said frame, gear and rack means at opposite ends of said members for preventing slippage longitudinally of said bolster between said bolster and said means and between said means and their supports, interengaging means on said rotatable members and said bolster and frame for preventing fore and aft movement of said bolster, said means being between the gear and rack means at each end of the bolster, and cooperating means on said members, bolster, and frame for causing said bolster to move in a horizontal plane during the initial endwise movement of said bolster laterally of the frame and for causing banking of said bolster upon further endwise movement of the bolster.

7. In a railway truck, a truck frame, a bolster for supporting a car body on said frame, and mechanism for movably supporting said bolster on said frame, said mechanism comprising rigid oscillatable members engaging said bolster and frame for normally supporting said bolster in neutral position and providing a limited, horizontal, endwise, initial movement of said bolster.
on said frame, said members being so constructed that when said bolster moves endwise in either direction beyond a predetermined distance when said truck travels around a curve, the bolster will be banked.

8. In a railway truck, a plurality of wheeled axles, a truck frame, means for resiliently supporting said frame from said axles, a bolster, and means including rigid oscillatable members engaging said bolster and frame for supporting said bolster from said frame and for banking the car body on curves, said means being so constructed as to provide a limited initial endwise movement of said bolster in a horizontal plane to either side of its normal position and for elevating the outer end of the bolster upon further endwise movement of the latter.

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CERTIFICATE OF CORRECTION.


CYRUS J. HOLLAND, ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 3, first column, line 66, claim 3, for the word "connected" read --connecting--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 1st day of April, A. D. 1941.

Henry Van Arsdale,
(Seal)
Acting Commissioner of Patents.