

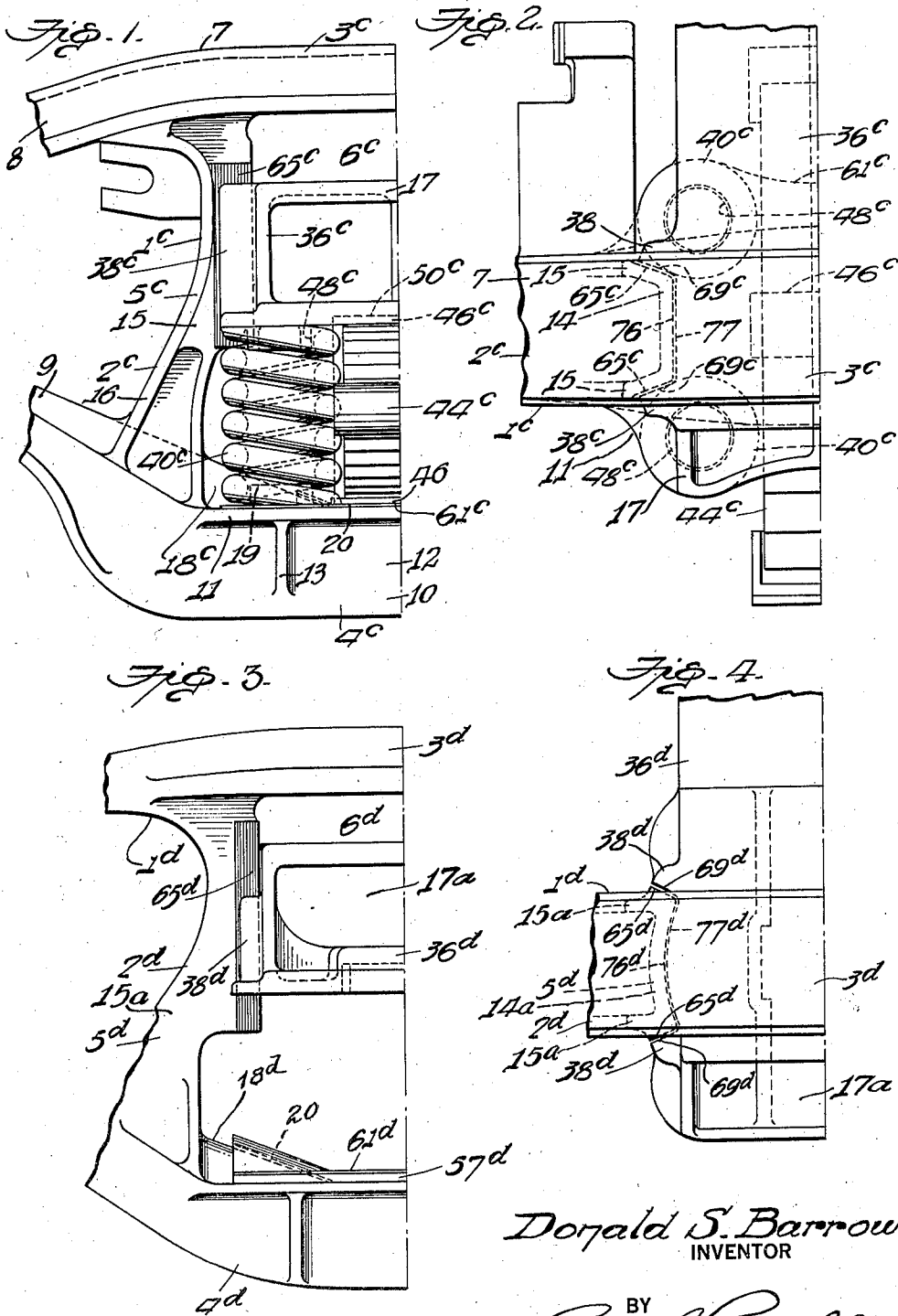
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RAILWAY TRUCK

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RAILWAY TRUCK

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This is a divisional application of my pending application Serial No. 629,953, filed August 22, 1932, and entitled Railway trucks.

This invention relates to railway vehicle trucks and more particularly to the construction of the side frames, bolster, and associated parts.

An object of the present invention is the provision, in a railway truck, of associated coacting surfaces on a side frame and bolster so as to permit the bolster to rotate or angle horizontally with respect to the side frame through a predetermined degree, with the further provision of surfaces adapted to engage for limiting the said horizontal angling movement of said bolster.

Another object of the invention is the provision of a side frame having bolster guide columns spacing upper and lower members thereof, the guiding surfaces of said columns being diagonally disposed and preferably formed on radial planes extending from the intersection of the longitudinal and transverse vertical planes of the side frame.

A further object of the invention is the provision of a side frame having spaced guiding struts connecting a compression and tension member thereof, the said struts having inner guiding surfaces which are formed concave to correspond with the contour of a cylinder whose axis coincides with the vertical axis of the side frame.

A still further object of the invention is the provision, in a railway truck, of a side frame having spaced guide columns forming a window opening therebetween, the guide columns having inner concave surfaces coaxial with the vertical axis of the side frame and outwardly facing plane surfaces forming continuations of the concave surfaces and preferably disposed on radial planes intersecting the vertical axis of the side frame, a bolster having an end portion thereof positioned within said window opening and provided with side convex cylindrical surfaces also coaxial with the concave column surfaces, plane surfaces on said bolster end defining said convex surfaces and angularly spaced from said plane column surfaces, said bolster being adapted to angle horizontally with respect to the side frame through a predetermined degree.

These and other objects of the invention will become apparent from the accompanying drawing which discloses exemplary forms of the present invention and wherein:

Figure 1 is a fragmentary side elevational view of an embodiment of the invention.

Figure 2 is a fragmentary plan view of the embodiment disclosed in Figure 1.

Figure 3 is a fragmentary side elevational view of a modified form of the invention.

Figure 4 is a fragmentary plan view of the modification illustrated in Figure 3. The bolster-supporting springs in Figures 3 and 4 have been omitted, but it will be understood that any desired spring arrangement may employed.

By referring now to the drawing in detail, wherein like reference characters indicate like parts, and initially considering the embodiment of the invention illustrated by Figures 1 and 2, there is shown a portion of a railway truck comprising a pair of spaced side frames, only one of which is fragmentarily illustrated. Each side frame comprises a compression member and a tension member spaced intermediate their end portions by a pair of struts or guide columns to form a window or bolster opening therebetween. The compression member preferably comprises a web and flanges depending therefrom. The ends of the compression member, outwardly of the bolster opening, slope downwardly to unite with correspondingly upwardly directed ends of the tension member to thereby merge into an integrally formed journal box or journal-box-receiving jaws, neither of which are illustrated.

The tension member has an intermediate normally horizontal portion having an upper web which preferably extends laterally of the side frame beyond depending vertical flange portions thereof to provide a spring-seating portion of adequate area. The spring-seating portion of the upper web beyond the flanges is desirably reinforced by vertical and spaced gussets which extend outwardly of the side frame from the flanges.

The upper web of the tension member is formed with longitudinal convolutions or corrugations, only one of which is illustrated in Figure 1 and each of which preferably starts between the guide columns at a position adjacent the transverse vertical plane of the side frame, to extend diagonally upwardly and outwardly through the corresponding guide column, and to finally merge with the normal plane of the web outwardly of the window opening. The convolutions form frame-rigidifying means to strengthen the angle between the horizontal and inclined portion of the tension member, as well as provide intermediate supports for the portion of the tension member between the guide columns. The convolutions may also form position-

ing means for associated spring plates or spring planks.

Each guide column 5^c desirably comprises a substantially vertical web portion 14 terminating in outwardly directed flange portions 15 which extend toward the corresponding end of the side frame with their free edges preferably reinforced by beading 16. The flanges are desirably spaced laterally of the side frame a greater distance than the width of the convolutions 18^c so that they straddle or overlie the convolutions and merge with the tension member on either side of the convolutions.

In a railway truck wherein the bolster is connected to the side frame in a conventional manner the struts or columns have guiding surfaces positioned in and engaging correspondingly formed recesses or surfaces on the end portions of an associated bolster. These recited surfaces have heretofore been disposed in a plane parallel to the transverse vertical plane of the truck structure and in a plane perpendicular to the said transverse vertical plane. With this latter-recited structure and through the omission or flexibility of the spring plank one side frame of the truck structure will tend to lead the other side frame, thereby displacing the bolster from a true perpendicular relation with respect to the side frame. With this condition existing in a structure such as that under immediate consideration it will be apparent that the corresponding corners of the side frame and bolster, formed by the perpendicularly disposed associated surfaces, will form merely line contacts between the bolster and side frame. As the bolster moves vertically with reference to the side frame and consequently the struts or columns under external impulses, causing movement to the bolster-supporting springs, the bolster and column corners above referred to will speedily wear until sufficient bearing area has been developed, so that the continued wear thereof will progress at a slower rate. In this progress of the development of sufficient bearing area between the side frame and bolster, the desired or predetermined clearance therebetween has completely vanished and the actual clearance greatly exceeds the clearance required for correct alignment of parts.

In order to alter and avoid this undesirable condition the flanges 15 of the guide columns are desirably provided with outwardly facing surfaces 65^c formed on planes substantially radial with the intersection between the longitudinal and transverse vertical planes of the side frame, which will be hereinafter termed as the vertical axis of the side frame. The webs 14 of the guide columns 5^c, in the present embodiment, are provided with inwardly facing preferably flat surfaces 76 disposed in a plane spaced from and parallel to the transverse vertical plane of the side frame. The surfaces 76 extend between and connect the radial surfaces 65^c.

Extending between and connecting the side frames 2^c is a load-transmitting member or bolster 36^c having end portions 17 thereof extending into and occupying the upper area of the window opening 6^c. Each bolster end is provided with side recesses formed in part by side surfaces 77 spaced from and preferably coplaner with the column web surfaces 76. Sufficient normal clearance has been provided between the surfaces 76 and 77 so as to permit a desired angling movement between the side frame and bolster.

In the present embodiment, each recess is defined by outwardly extending guide lugs 38^c

adapted to engage the guide columns for retaining each bolster end within the corresponding window opening 6^c. The bolster side surfaces 77 are preferably defined by inwardly facing vertically disposed surfaces 69^c provided on the guide lugs 38^c and which are coradial with the vertical axis of the corresponding side frame. The bolster radial surfaces are positioned adjacent the guide column radial surfaces with the included angle therebetween equal to the permissive or predetermined horizontal angling movement of the bolster with respect to the side frame from one extreme position to the other upon the departure of the bolster from a normal perpendicular relationship with respect to the side frame.

With the radial surfaces on the side frame and bolster positioned as disclosed and described, it will be appreciated that the bolster may freely rotate or angle in a horizontal direction with respect to the side frame through a predetermined degree, and at the extreme allowable angular position of the bolster there will be surface contact between the radial flat surfaces 65^c and 69^c. The particular disposition of the surfaces 65^c and 69^c will provide adequate bearing area between the side frame and bolster, as opposed to the line contact therebetween previously referred to.

In the present embodiment, the bolster is shown supported at each end by means of a spring group comprising four helical springs 40^c, only two of which are illustrated, and an elliptic spring or set 44^c positioned between a pair of helical springs and extending transversely of the truck structure. The spring group is provided with a lower spring plate 61^c constructed so as to interlock with the corrugations 18^c and is provided with upwardly directed spring-positioning lugs or embossments 19, which extend into corresponding helical springs, and a recess 20 serving to receive the lower elliptic spring plate band 46 to form a lower spring-positioning means for the elliptic spring. The bolster end 17 is preferably provided with depending bosses 48^c for positioning the helical springs 40^c and a downwardly opening recess or pocket 50^c serving to form a receptacle for the upper elliptic spring band 46^c.

Referring now to the form of the present invention illustrated in Figures 3 and 4, there is disclosed a modified construction and, as has been previously stated, the spring group is not illustrated, but it will be clearly understood that the spring group of the previously described structure or any other desirable arrangement and type of springs may be employed to support the bolster from the side frame. It is not the present intention to limit the instant invention to any particular type or arrangement of bolster-supporting springs.

The truck 1^d, a portion of which is illustrated, comprises two spaced side frames 2^d, each of which is formed by a compression member 3^d and a tension member 4^d spaced intermediate their ends by longitudinally spaced vertically extending guide columns 5^d to leave a bolster opening 6^d therebetween. In the present embodiment, there is shown a spring plank 57^d which, as in the previous structure, may be omitted. The spring plank has an end portion thereof corrugated, as indicated at 20, so as to nest with the corrugations 18^d extending upwardly from the tension member 4^d and outwardly toward the guide columns 5^d. A lower spring plate 61^d, which may be similar to the previously described spring plate 61^c, is supported by the spring plank 57^d.

In the present embodiment, the guide columns desirably comprise a substantially transverse web portion 14^a terminating in outwardly directed and spaced flanges 15^a which, as in the previous structure, extend toward the corresponding end portion of the side frame. The web portion 14^a of each guide column is provided with a concave surface 76^d which preferably coincides with the contour of a cylinder whose vertical axis is common with the vertical axis of the corresponding side frame. By considering the two guide columns of the side frame, it may be said that the surfaces 76^d are coaxial with respect to one another. Forming continuations of the concave surfaces 76^d are outwardly facing surfaces 65^d formed on the column flanges 15^a. The surfaces 65^d are preferably coradial with the vertical axis of the side frame and consequently coradial with respect to one another.

A load-carrying member or bolster 36^d is provided in the present structure with an end portion 17^a thereof extending into and occupying the upper portion of the window opening 6^d. Each bolster end portion is provided with outwardly facing recesses on the sides thereof, said recesses being formed by cylindrically convex surfaces 77^d positioned adjacent and preferably coaxial with the concave column surfaces 76^d. It will be observed that by forming the adjacent concave and convex surfaces on the side frame and bolster respectively the bearing area between these two members will be increased, as opposed to the plane surfaces of the previously described structure. It will be further observed that by forming the cylindrical concave and convex surfaces about the same axis the normal clearance therebetween may be correspondingly reduced from that required between the surfaces 76 and 77 of the previously described structure, by reason of the fact that by their particular formation there will be no variation in the clearance upon relative angling of the bolster with respect to the side frame.

Each bolster notch or recess is defined by outwardly extending lugs 38^d which function primarily as stop lugs for limiting the transverse movement of the bolster with respect to the side frame, as well as to retain the bolster end within the window opening. The guide lugs are provided with angularly disposed and inwardly facing plane surfaces 69^d which define the convex surfaces 77^d and are preferably coradial with the vertical axis of the side frame as well as with the guide column surfaces 65^d. The bolster lug surfaces 69^d are preferably spaced from the guide column surfaces 65^d an amount sufficient to permit a predetermined horizontal angling movement of the bolster with respect to the side frame. As in the previously described structure, the included angle between the facing surfaces 65^d and 69^d is determinative of the bolster angling movement, and at the extreme limits of the bolster movement adequate bearing area is provided to present surface engagement between the side frame and bolster, as opposed to line engagement previously referred to.

Although preferred embodiments of the present invention have been illustrated and described, it will be clearly understood that various modifications may be made to the particular disclosures without departing from within the spirit and scope of the appended claims.

I claim:

1. A side frame comprising a compression member, a tension member, bolster guide col-

umns spacing intermediate portions of said members and spaced to leave a bolster opening therebetween, a bolster with an end disposed in said bolster opening and formed with notches at its sides for interlocking with said columns, said notches being defined by surfaces disposed on planes substantially radial from the vertical axis of said frame, the adjacent surfaces which cooperate with said radial surfaces for interlocking the bolster with the frame being correspondingly radial and diverging from the radial bolster surfaces as they depart from said axis, said side frame and bolster each having cooperating substantially coaxial curved surfaces connecting said radial surfaces.

2. A side frame comprising a compression member, a tension member, bolster guide columns spacing intermediate portions of said members and spaced to leave a bolster opening therebetween, concavely curved surfaces on said guide columns, a bolster received in said opening and provided with lugs at the sides interlocking it with respect to said frame, and with the surfaces thereof adjacent said columns convexly curved substantially coaxially with respect to each other and adapted to engage said concave surfaces so as to allow for horizontal angling of said bolster with respect to said frame.

3. A side frame comprising a compression member, a tension member, bolster guide columns spacing intermediate portions of said members and spaced to leave a bolster opening therebetween, said guide columns comprising transverse webs and side flanges, said side flanges at the bolster guiding portions thereof having outer surfaces formed on planes substantially radial from the vertical axis of said frame, and the inner surface of said webs being concave and substantially cylindrical about said axis.

4. A side frame comprising a compression member, a tension member, bolster guide columns spacing intermediate portions of said members and spaced to leave a bolster opening therebetween, said guide columns having webs the inner surfaces of which are concavely curved substantially coaxially with respect to each other to allow for horizontal angling of an associated bolster.

5. A railway truck comprising a pair of side frames, each of said frames involving guide columns spaced to leave a bolster opening therebetween, a bolster with its ends received between said guide columns, said columns each comprising a transverse web and side flanges, coaxial concave faces on said webs, said side flanges adjacent the bolster ends having outer surfaces formed on planes substantially radial from the vertical axis of the corresponding frame, said bolster having convex faces for engagement with said concave faces, guiding lugs on said bolster ends cooperating with said flanges, the outer surfaces on said guiding lugs adjacent the guiding surfaces on the column being correspondingly radial with clearance, increasing in proportion to the distance from said vertical axis, provided to permit a limited departure of the bolster from a right-angled relationship with respect to said frames, while insuring that engagement between surfaces of substantial area will be provided at the limits of such movement.

6. A railway truck comprising a side frame, said frame involving guide columns spaced to leave a bolster opening therebetween, a bolster with an end received between said guide columns, said columns each comprising a transverse web and side flanges, said side flanges adjacent the

bolster end having outer surfaces formed on planes substantially radial from the vertical axis of the frame, said bolster having guiding lugs cooperating with said flanges, the surfaces on said guiding lugs adjacent the guiding surfaces on the column being correspondingly radial with the included angle of said guiding lug surfaces greater than the included angle of the column flange guide surfaces an amount sufficient to permit a desired departure of the bolster from a right-angled relationship with respect to said frame, and insure engagement between surfaces of substantial area at the limits of such movement, said side frame and bolster having cooperating curved surfaces disposed between said radial surfaces.

7. A bolster formed with guiding lugs adjacent an end thereof, said lugs having wearing surfaces, the planes of which are substantially radial from the line of intersection of the longitudinal vertical plane and the transverse plane midway between said lugs for cooperation with corresponding surfaces on the guide columns of an associated side frame, the surfaces of said bolster joining the lugs on each side being convex and substantially cylindrical about said line.

8. A bolster with notches on each side adjacent an end thereof, said notches being defined by surfaces extending radially from the intersection of the longitudinal vertical plane and the transverse plane midway therebetween for cooperation with corresponding surfaces of an associated truck, the surfaces in said notches between said radial surfaces being cylindrical about a corresponding axis.

9. A side frame comprising a compression member, portions depending therebelow and formed with normally vertical longitudinally spaced guiding surfaces, said depending portions comprising transverse webs having concave surfaces and side flanges, a load-carrying member received between said depending portions and provided with lugs at its sides interlocking therewith, and with the surfaces adjacent said concave surfaces convexly curved substantially coaxially with respect to each other to allow for horizontal angling with respect to said frame.

10. A side frame comprising a compression member, bolster guiding portions depending therebelow and longitudinally spaced for receiving a load-carrying member therebetween, said guiding portions having parts, the inner surfaces of which are concavely curved substantially coaxially with respect to each other to allow for horizontal angling of said load-carrying member.

11. A railway truck comprising a pair of side frames, each of said frames involving a compression member and a tension member having the intermediate portions thereof spaced by column guides to leave an opening therebetween, a bolster extending between said side frames having end portions received in said openings, said bolster ends being provided with recesses on each side thereof, the end walls of each recess being defined by surfaces extending radially from a

point on the intersection of the longitudinal and transverse axis of each of said side frames, the connecting side wall of each recess being struck from the said intersection point, the column guides being of less width than the said adjacent recess and provided with complementary surfaces adapted to cooperate with the walls of said recess to limit the relative rotation of said bolster with respect to each side frame.

12. A bolster with notches at each side and adjacent an end thereof, said notches having coaxial cylindrically convex surfaces defined by coradial inwardly facing plane surfaces.

13. A bolster with notches on each side and adjacent each end thereof, said notches having cylindrically convex surfaces defined by surfaces radial with respect to the axis of said convex surfaces.

14. A bolster with notches on each side and adjacent an end thereof, said notches having cylindrically convex surfaces defined by surfaces substantially radial with respect to the axis of said convex surfaces, and means formed on said bolster for centering associated springs.

15. In a railway truck, in combination, a side frame having spaced vertically extending guideways, a relatively movable member positioned between said guideways and adapted to move vertically and angle horizontally with respect to said side frame, said guideways having cylindrically concave surfaces and surfaces substantially radial with respect to the axis of said concave surfaces, said movable member having cylindrically convex surfaces substantially coaxial with said concave surfaces, and convex surface defining faces substantially coradial with said radial surfaces of said guideways, the included angle between adjacent radial surfaces and radial faces being substantially equal to the permissible angling movement of said movable member, and spring means interposed between said movable member and side frame for resisting vertical movement of said movable member from normal position.

16. A vertically movable element for a railway truck adapted to angle horizontally with respect to an associated side frame, said movable element being positioned below a compression member of said side frame and between spaced guideways depending from said compression member, said movable element having side convex surfaces substantially coaxial with respect to one another and adapted to engage correspondingly formed concave surfaces on said guideways, lugs outstanding from the sides of said movable member, said lugs having oppositely disposed faces forming continuations of said convex surfaces, said faces being substantially radial with the axis of said convex surfaces, and adapted to engage correspondingly formed surfaces on said guideways for limiting the angling movement of said element, and spring positioning means extending from said element.

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