July 4, 1944. F. E. BACHMAN 2,352,595

CAR TRUCK

Filed Nov. 17, 1941 2 Sheets-Sheet 1

Fig. 1.

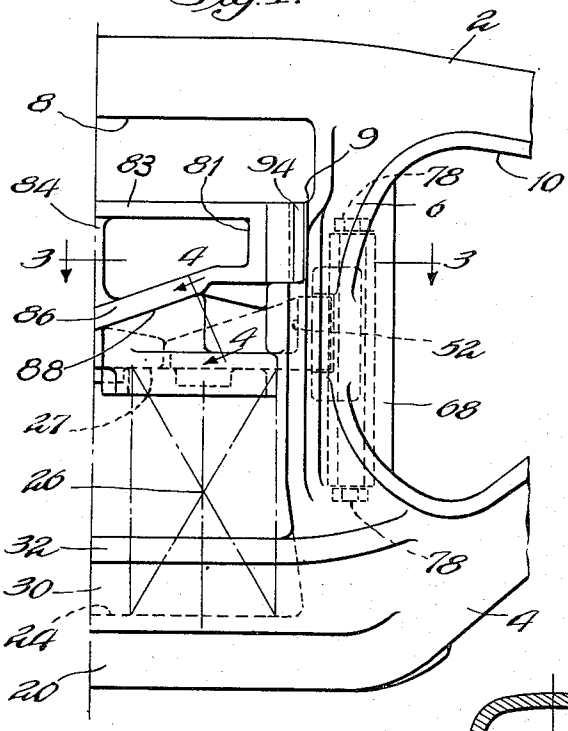


Fig. 4.

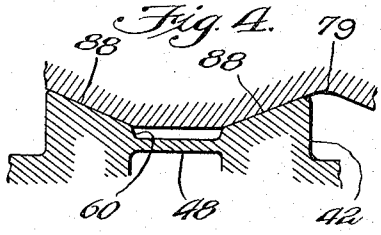


Fig. 9.

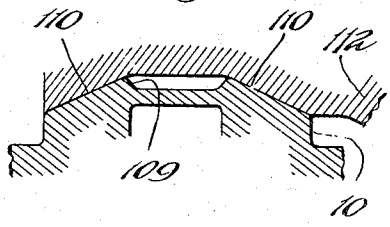
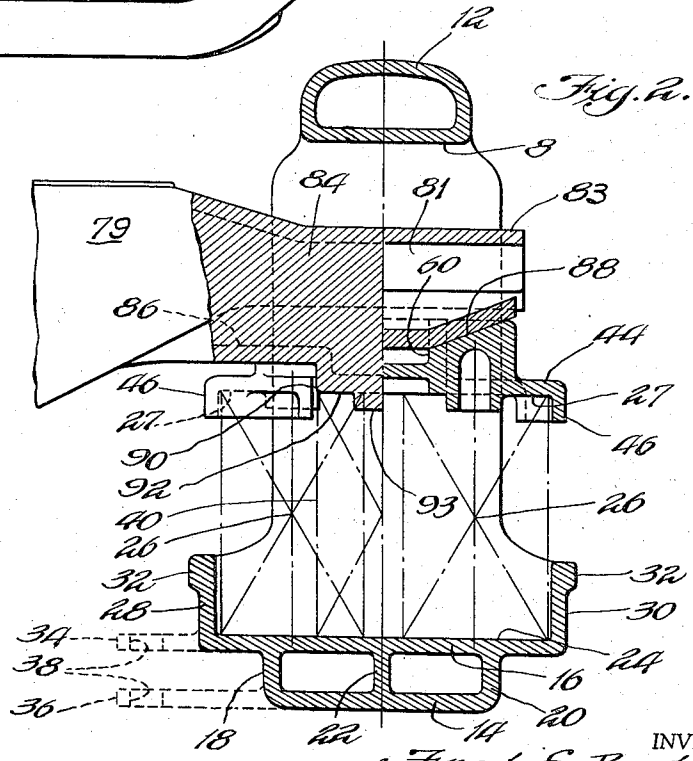


Fig. 2.



INVENTOR.
Fred E. Bachman
BY
Wm O. B. Garner Atty.

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Fig. 3.

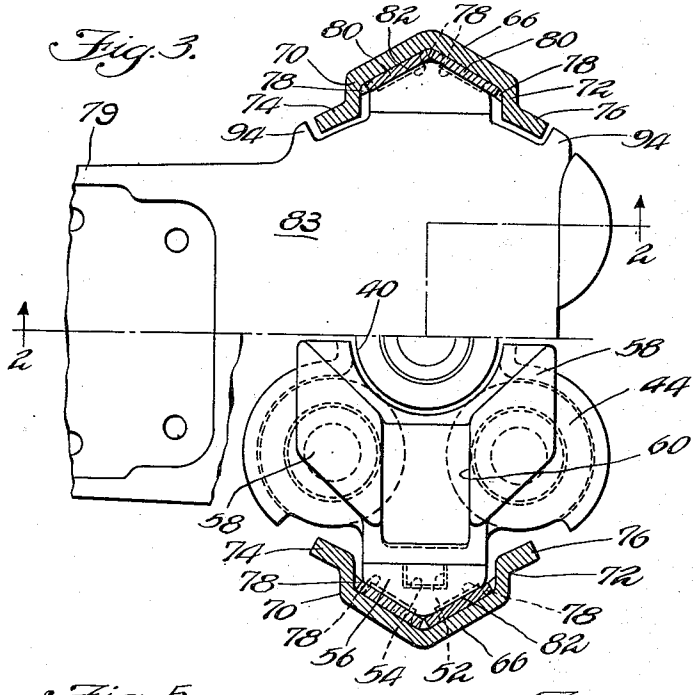


Fig. 5.

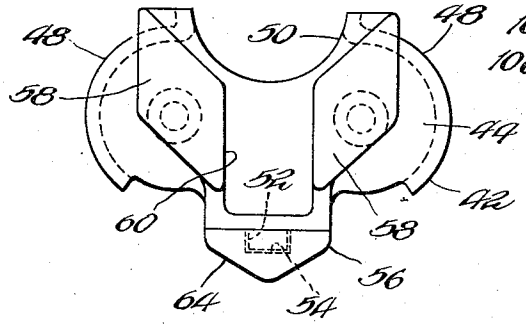


Fig. 8.

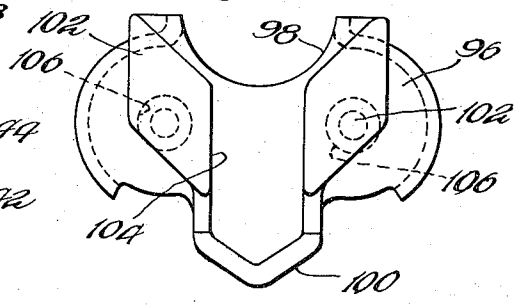


Fig. 7.

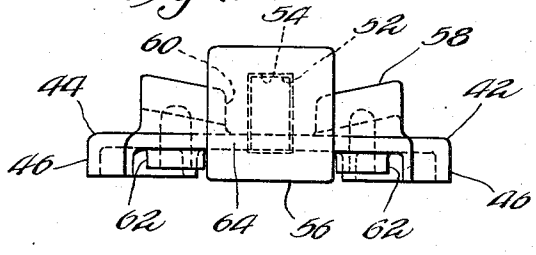
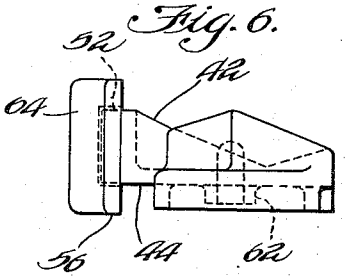


Fig. 6.



INVENTOR.
Fred E. Bachman
BY Orin O. B. Garner
Atty.

Patented July 4, 1944 2,352,595

UNITED STATES PATENT OFFICE

2,352,595

CAR TRUCK

Fred E. Bachman, Chicago, Ill., assignor to American Steel Foundries, Chicago, Ill., a corporation of New Jersey

Application November 17, 1941, Serial No. 419,421

22 Claims. (Cl. 105—197)

My invention relates to a railway car truck and more particularly to a four wheel railway car truck utilizing a novel spring suspension comprising friction elements in engagement with the columns of the frame.

The general object of my invention is to devise a novel form of railway freight car truck of the above type suitable for high speed freight car service and adapted to development of varying amounts of friction as may be required under different operating conditions.

A specific object of my invention is to devise a high speed quick wheel change type of freight car truck utilizing truss side frames with central bolster openings in which the ends of the load carrying member or bolster may be spring supported, the bottom wall of the bolster at each end thereof being engaged with a novel form of separable spring cap comprising friction shoes at the ends thereof, said shoes being urged by the pressure of the bolster against said spring cap into engagement with friction surfaces supported on the adjacent columns.

My invention comprehends a novel spring cap comprising identical separable halves, each of said halves having a diagonal V-shaped surface in complementary engagement with a surface on the bottom of the associated bolster end and also having a friction shoe formed and arranged for frictional engagement with a friction surface on the associated column.

In my novel arrangement each end of the bolster is seated on one of my novel spring caps and comprises a depending lug projecting through an opening in said cap, said lug being seated on one of the bolster supporting coil springs.

In the drawings, Figure 1 is a fragmentary side elevation of a railway car truck embodying my novel friction absorbing device; only one-half of the truck being shown inasmuch as it is similar at opposite ends thereof.

Figure 2 is a sectional view of the structure shown in Figure 1, taken in the transverse vertical planes indicated by the line 2—2 of Figure 3.

Figure 3 is a fragmentary sectional view of the railway car truck shown in Figures 1 and 2, taken in the transverse horizontal plane indicated by the line 3—3 of Figure 1, but extending through both columns, the bolster being shown in plan view and partially cut away to disclose the structure therebeneath.

Figure 4 is a further sectional view, taken in the plane indicated by the line 4—4 of Figure 1.

Figures 5, 6, and 7 show in detail my novel form of spring cap, Figure 5 being a top plan view of one-half thereof, Figure 6 a side elevation taken from the right as seen in Figure 5, and Figure 7 being an end view thereof, taken from the bottom as seen in Figure 5.

Figure 8 is a top plan view of a modified form of one of the identical halves of my novel spring cap.

Figure 9 is a sectional view comparable to the view of Figure 4 and showing a further modification of my novel arrangement.

Describing the structure in detail, my novel truck comprises a truss side frame having the usual outline with a compression member 2, a tension member 4, and integrally formed columns 6, 6 merging therewith and forming a central bolster opening 8, and the adjacent window opening 10, said bolster opening being widened as at 9 adjacent the top thereof. Above the bolster opening 8, the compression member may be of box-section as best seen at 12 in the sectional view of Figure 2, and below the bolster opening the tension member may have a box-section with a bottom chord 14, a top chord 16, inboard and outboard side walls 18 and 20, and a vertical longitudinal reinforcing rib 22, said top chord being widened beneath said bolster opening to form a main spring seat 24 for coil springs seated thereon, said coil springs being diagrammatically indicated at 26, 26. The spring seat 24 comprises the spaced inboard and outboard flanges 28 and 30 beaded as at 32, 32 and serving as positioning means for the springs 26, 26. On the inboard side of the box-section of the tension member 4 may be formed top and bottom lugs 34 and 36 with aligned openings 38, 38 therethrough as means of securing a tie bar between the side frames at opposite sides of the truck. Centrally of the spring seat 24 is positioned the auxiliary spring 40, said spring abutting the bottom wall of the associated bolster end in a manner hereinafter more fully described.

Seated on the springs 26, 26 as at 27, 27 is my novel form of spring cap comprising identical, separable halves generally designated 42, 42, each half as shown in Figures 5 to 7 inclusive comprising a plate-like portion 44 flanged over as at 46 and arcuately formed as at 48 in order conveniently to conform to the shape of the supporting coil springs. The plate-like portion 44 comprises at the inner end thereof a semi-annular recess 50 defining with a complementary recess on the other half of the spring plate an opening serving a purpose hereinafter described, and at the outer end thereof the plate-like portion 44 comprises a lug 52 recessed as at 54 in the associated friction

shoe 56. Atop each plate-like portion 44 of the spring cap and sloping upwardly toward the outer end thereof is formed a diagonal V-shaped surface 58 interrupted as at 60 and in complementary engagement with the associated bolster end in a manner hereinafter more fully described, and on the under surface of the plate-like portion 44 is formed a plurality of positioning means 62, 62 for the associated supporting coil springs 26, 26.

Each friction shoe 56 comprises a V-shaped friction surface 64 on one side thereof and a recess on the other side thereof for reception as at 54 of the lug 52 on the associated plate-like portion 44 of the spring cap as heretofore described.

The column 6 at each end of the truck comprises a vertical V-shaped wall 66 extending into the adjacent window as at 68 (Figure 1) and inboard and outboard vertical webs 70 and 72 flanged as at 74 and 76 respectively. Positioned with respect to the V-shaped wall 66 by means of lugs 78, 78 formed on said walls are wear plates 80, 80 in frictional engagement as at 82 with the friction surface 64 on the associated friction shoe 56.

The bolster generally designated 79 is of box-like form comprising the side walls 81, 81, the top wall 83, the intermediate transverse wall 84 parallel with said side walls, and the bottom wall 86 comprising at each side thereof a diagonal V-shaped surface in complementary frictional engagement as at 88 with the associated surface on the spring cap. Between the V-shaped surfaces at each side of the bottom wall of the bolster end is formed an annular depending lug 90 (Figure 2) projecting through the opening in the spring cap formed by the semi-annular recesses 50, 50 as heretofore described and affording a seat as at 92 for the upper end of the auxiliary spring 40, and centrally of the lug 90 is a smaller depending lug 93 serving as positioning means for said spring. At each side thereof the bolster end is provided with inboard and outboard vertical lugs 94, 94 cooperating with the flanged portions 74 and 76 of the associated column to retain said bolster end within the bolster opening 8, said lugs being of a depth less than that of the widened portion 9 at each side of the bolster opening in order that the bolster may be raised in said opening and removed therefrom while the supporting spring group and my novel friction device remain in normal assembled relationship.

A modification of my novel spring cap is shown in Figure 8, each identical half thereof comprising a plate-like portion 96 having a semi-annular recess 98 at one end thereof and a V-shaped friction surface 100 integrally formed at the opposite end thereof. Atop said plate-like portion 96 is formed a diagonal V-shaped surface 102 interrupted as at 104, and on the bottom of said portion 96 are formed a plurality of positioning means 106, 106 for the supporting coil springs. It will be readily apparent that the modification shown in Figure 8 is identical with that shown in Figures 5 to 7 inclusive except that the ends of the spring cap adjacent the columns are provided with integrally formed V-shaped friction surfaces instead of the removable V-shaped friction shoes as shown in Figures 5 to 7.

A further modification of my novel arrangement is indicated in Figure 9 wherein the side frame, bolster, spring cap, and supporting spring group are identical with those shown in the previous modifications except that each half of the spring cap 108 comprises a diagonal inverted V-shaped friction surface relieved as at 109 and in engagement as at 110 with a complementary diagonal inverted V-shaped surface on the associated bolster end 112. It will be apparent that in both modifications of my novel spring cap shown in Figures 5 to 7 and in Figure 8 respectively, the inverted V-shaped surfaces shown in the modification illustrated in Figure 9 may be utilized. It will also be apparent that in each of the modifications shown varying amounts of friction may be developed as desired by varying the resiliency of the auxiliary spring 40.

It is to be understood that I do not wish to be limited by the exact embodiments of the device shown which are merely by way of illustration and not limitation as various and other forms of the device will, of course, be apparent to those skilled in the art without departing from the spirit of the invention or the scope of the claims.

I claim:

1. In a railway car truck, spaced side frames each comprising a compression member, a tension member, and spaced columns defining therewith a bolster opening and spaced window openings, each of said columns comprising a V-shaped wall extending into the adjacent window opening, wear plates secured to the side of said wall facing said bolster opening, a plurality of coil springs seated on said tension member in said bolster opening, a spring cap seated on certain of said springs and comprising identical separable halves, each of said halves being provided with a V-shaped friction shoe in frictional engagement with the associated wear plates, a semi-annular recess defining with the associated recess on the other half of said cap an opening therethrough, and a diagonal surface on the top thereof sloping upwardly and outwardly toward said friction shoe, and a bolster extending between said frames and comprising ends seated on said caps, each of said ends comprising diagonal surfaces on the bottom thereof cooperating with the diagonal surfaces on the associated spring cap to urge the halves of said spring cap apart and to urge the associated friction shoes into frictional engagement with said wear plates, said bolster comprising a lug projecting downwardly through said opening in the spring cap and seated on the other of said springs.

2. In a railway car truck, a truss side frame comprising tension and compression members and spaced columns defining therewith a bolster opening, a plurality of coil springs seated on said tension member in said bolster opening, a spring cap seated on certain of said springs and comprising identical separable halves, each half comprising a semi-annular recess defining with the associated recess on the other half an opening through said cap, friction surfaces at the ends of the cap in frictional engagement with said columns, a diagonal surface atop each half of said cap, and a bolster end extending into said bolster opening and comprising a bottom wall with diagonal surfaces in complementary engagement with said first-mentioned diagonal surfaces and a lug extending downwardly through said opening in the spring cap and seated on other of said springs.

3. In a railway car truck, a truss side frame comprising tension and compression members and spaced columns defining therewith a bolster opening, said opening comprising a widened portion at the top thereof, resilient means supported

on said tension member in said bolster opening, a two-piece spring cap seated on said resilient means and comprising friction surfaces at the ends thereof and diagonal faces on the top thereof, and a bolster end seated on said cap in complementary engagement with said faces and urging said friction surfaces into engagement with the associated columns, said bolster end having inboard and outboard guide lugs abutting said columns, said lugs having less depth than the widened portion of said bolster opening in order to permit the removal therethrough of said bolster while the spring group and spring cap remain in normal assembled relationship.

4. In a railway car truck, a truss side frame comprising tension and compression members and spaced columns defining therewith a bolster opening, resilient means seated on said tension member in said bolster opening, a spring cap seated on said means and comprising identical separable halves comprising positioning means on the remote portions thereof and diagonal V-shaped surfaces atop thereof, friction shoes removably supported on said positioning means, and a bolster end received in said bolster opening and comprising a bottom wall having diagonal V-shaped faces in complementary engagement with said surfaces and urging said shoes into frictional engagement with the adjacent columns.

5. In a railway car truck, a truss side frame comprising tension and compression members and spaced columns defining therewith a bolster opening, a group of coil springs seated on said tension member in said opening, a spring cap supported on said springs and comprising identical separable halves, each seated on a plurality of transversely aligned of said springs and having a friction face on the end abutting the associated column and a diagonal inverted V-shaped surface on the top thereof, and a bolster end seated on said cap comprising diagonal inverted V-shaped surfaces in complementary engagement with said first-mentioned V-shaped surfaces and urging said halves apart and said friction faces into frictional engagement with the associated columns.

6. In a railway car truck, a truss side frame comprising tension and compression members and spaced columns defining therewith a bolster opening, a plurality of coil springs seated on said tension member, a spring cap comprising identical halves each seated on a plurality of transversely aligned of said springs, each of said halves comprising a V-shaped friction face at one end thereof and a diagonal surface on the top thereof, and a bolster end seated on said spring cap and comprising a diagonal surface in complementary engagement with the diagonal surface on each half of said cap.

7. In a railway car truck, a side frame comprising spaced columns and an intervening bolster opening, a group of coil springs seated on said frame in said bolster opening, a spring cap seated on certain of said springs and comprising identical separable halves, each half comprising a recess defining with the associated recess on the other half an opening through said cap, friction surfaces on the ends of the cap in frictional engagement with said columns, and a bolster end extending into said bolster opening and comprising a bottom wall having wedge means cooperating with means on said cap to urge said friction surfaces into said engagement, and a lug on said bolster end extending downwardly through the opening in the spring cap and seated on other of said springs, the wedge means on the bolster and the cap extending at inboard and outboard sides of said lug.

8. In a railway car truck, a side frame comprising spaced columns and an intervening bolster opening, a plurality of resilient means on said frame in said bolster opening, a spring cap seated on and confining certain of said means and comprising identical separable halves, each half comprising a semi-annular recess defining with the associated recess on the other half an opening through said cap, friction surfaces on the ends of said cap in frictional engagement with said columns, and a bolster end extending into said bolster opening and comprising wedge means cooperating with complementary means on said cap for urging said friction surfaces into said engagement, said bolster comprising a lug extending downwardly through the opening in the spring cap and seated on other of said resilient means, the wedge means on the bolster and on the cap extending at inboard and outboard sides of said lug.

9. In a railway car truck, spaced side frames each comprising a pair of spaced columns partially defining an intervening bolster opening and spaced window openings, each of said columns comprising a V-shaped wall extending into the adjacent window opening, wear plates secured to the side of said wall facing said bolster opening, a plurality of resilient means seated on said tension member in said bolster opening, a spring cap seated on certain of said resilient means and comprising identical separable halves, each of said halves being provided with a V-shaped friction shoe in frictional engagement with the associated wear plates, a recess defining with the associated recess on the other half of said cap an opening therethrough, and a diagonal surface on the top thereof sloping upwardly and outwardly toward said friction shoe, and a bolster extending between said frames and comprising ends seated on said caps, each of said ends comprising diagonal surfaces on the bottom thereof cooperating with the diagonal surfaces on the associated spring cap to urge the halves of said cap apart and to urge the associated friction shoes into frictional engagement with said wear plates, said bolster comprising a lug projecting downwardly through said opening in the spring cap and seated on other of said resilient means.

10. In a railway car truck, a truss side frame comprising tension and compression members and spaced columns defining therewith a bolster opening, resilient means seated on said tension member in said bolster opening, a spring cap seated on said means and comprising identical separable halves comprising positioning means on the remote portions thereof and diagonal V-shaped surfaces atop thereof, friction shoes supported on said positioning means, and a bolster end received in said bolster opening and comprising a bottom wall having diagonal V-shaped faces in complementary engagement with said surfaces and urging said shoes into frictional engagement with the adjacent columns.

11. In a railway car truck, a side frame comprising spaced columns and an intervening bolster opening, resilient means on said frame in said opening, a spring cap seated on said means and comprising a pair of members having friction means on the remote portions thereof and diagonal V-shaped wedge surfaces atop thereof,

and a bolster end received within said bolster opening and comprising a bottom wall having diagonal V-shaped faces in complementary engagement with said surfaces and urging said friction means into frictional engagement with the adjacent columns.

12. In a railway car truck, a side frame comprising spaced columns and an intervening bolster opening, a group of coil springs seated on said frame in said opening, a spring cap supported on said springs and comprising a pair of members each seated on a plurality of transversely aligned of said springs and having a friction face on the end abutting the associated column and a diagonal inverted V-shaped surface on the top thereof, and a bolster end seated on said cap and comprising diagonal inverted V-shaped surfaces in complementary engagement with the first-mentioned surfaces and urging said members apart and said friction faces into frictional engagement with the associated columns.

13. In a railway car truck, a truss side frame comprising spaced columns and an intervening bolster opening, resilient means seated on said tension member in said opening, a spring cap seated on said means and comprising identical separable halves having positioning means on the remote portions thereof and diagonal V-shaped surfaces atop thereof, friction shoes supported on said positioning means, and a bolster end received within said bolster opening and comprising a bottom wall having diagonal V-shaped faces in complementary engagement with said surfaces for urging said shoes into frictional engagement with the adjacent columns, said bolster end having a depending lug extending between said halves and seated upon certain of said resilient means.

14. In a railway car truck, a side frame having spaced columns and an intervening bolster opening, a plurality of coil springs seated on said tension member in said opening, a spring cap seated on certain of said springs and comprising identical separable halves comprising positioning means on the remote portions thereof and diagonal V-shaped wedge surfaces atop thereof, friction shoes removably mounted on said positioning means, and a bolster end received within said bolster opening and comprising a bottom wall having diagonal V-shaped faces in complementary wedge engagement with said surfaces for urging said shoes into frictional engagement with the adjacent columns, said bolster having a depending lug extending between said halves and seated on other of said springs.

15. In a railway car truck, a truss side frame having spaced columns and an intervening bolster opening, a plurality of coil springs seated on said tension member in said opening, a spring cap comprising identical halves each seated on a plurality of transversely aligned of said springs and each comprising a V-shaped friction face at one end thereof for complementary engagement with the adjacent column, each of said halves comprising a diagonal wedge surface on the top thereof, and a bolster end seated on said spring cap and comprising a diagonal surface in complementary engagement with the diagonal surface on each half of said cap, said bolster end having a depending lug extending between said halves and supported on certain of said springs, said wedge surfaces extending at inboard and outboard sides of said lug.

16. In a railway car truck, a truss side frame comprising tension and compression members and spaced columns defining therewith a bolster opening, said opening comprising a widened upper portion, a plurality of coil springs seated on said tension member in said opening, a spring cap comprising identical halves each seated on a plurality of transversely aligned of said springs and each comprising a V-shaped friction face at one end thereof for complementary engagement with the adjacent column, each of said halves comprising a diagonal wedge surface on the top thereof, and a bolster end seated on said spring cap and comprising a diagonal surface in complementary engagement with the wedge surface on each half of said cap, said bolster end having means guidably engaged with said columns and of less depth than the widened portion of said bolster opening, whereby said bolster may be elevated and removed therefrom while the coil springs and spring cap remain in normal assembled relationship.

17. In a railway car truck, a side frame having spaced columns and an intervening bolster opening, said opening comprising a widened upper portion, resilient means seated on said frame in said opening, a spring cap seated on said means and comprising identical separable halves having friction means on the remote portions thereof and diagonal V-shaped surfaces atop thereof, and a bolster received within said bolster opening and comprising a bottom wall having diagonal V-shaped faces in complementary engagement with said surfaces for urging said friction means into frictional engagement with the adjacent columns, said bolster having means guidably engaged with said columns and of less depth than the widened portion of said bolster opening, whereby said bolster may be elevated and removed therefrom while said resilient means and spring cap remain in normal assembled relationship.

18. A composite spring cap for a railway car truck, comprising spaced members having spring seats on their bottom surfaces, recesses in the adjacent portions of said members defining an opening through said cap, and wedge surfaces on the top of each of said members sloping upwardly toward the end thereof remote from the other of said members, said wedge surfaces extending at inboard and outboard sides of said opening.

19. In a railway car truck, a side frame having spaced columns defining a bolster opening, a plurality of resilient means on said frame in said opening, a spring cap comprising a pair of members, each seated on certain of said means and each frictionally engaging one only of said columns, wedge surfaces on respective members sloping upwardly toward respective columns, a bolster having wedge faces seated on said surfaces for urging said members into engagement with said columns, and a depending lug on said bolster seated on other of said resilient means, said wedge faces and wedge surfaces extending at inboard and outboard sides of said lug.

20. In a railway car truck, a side frame having spaced columns defining a bolster opening, a plurality of springs on said frame in said opening, a spring cap comprising a pair of members, each seated on certain of said springs and each frictionally engaging one only of said columns, wedge surfaces on respective members sloping upward toward respective columns, a bolster having wedge faces seated on said surfaces for urging

said members into engagement with said columns, and a depending lug on said bolster seated on other of said springs, the wedge surfaces on each of said members and the cooperating wedge faces on said bolster being disposed at inboard and outboard sides of said lug.

21. In a railway car truck, a side frame having spaced columns defining a bolster opening with a widened upper portion, a plurality of resilient means on said frame in said opening, a spring cap comprising a pair of members, each seated on certain of said resilient means and each frictionally engaging one only of said columns, wedge surfaces on respective members sloping upwardly toward respective columns, a bolster having wedge faces seated on said surfaces for urging said members into said engagement, interlocking means on said bolster cooperating with said columns to interlock said bolster therewith, certain of said interlocking means being of less depth than the widened upper portion of said bolster opening, and a depending lug on said bolster seated on other of said resilient means, said wedge faces and wedge surfaces extending at inboard and outboard sides of said lug.

22. In a railway car truck, a side frame having spaced columns defining a bolster opening, a plurality of resilient means on said frame in said opening, a pair of members each supported on certain of said means and each frictionally engaging one only of said columns, wedge means on respective members, a bolster having complementary wedge means engaging said first-mentioned wedge means for urging said members into engagement with said columns, and a depending lug on said bolster extending between said members and seated on other of said resilient means, said first and second-mentioned wedge means extending at inboard and outboard sides of said lug.

FRED E. BACHMAN.