April 27, 1943. F. E. BACHMAN 2,317,352

TRUCK

Filed Dec. 19, 1940 4 Sheets-Sheet 1

Fig. 1

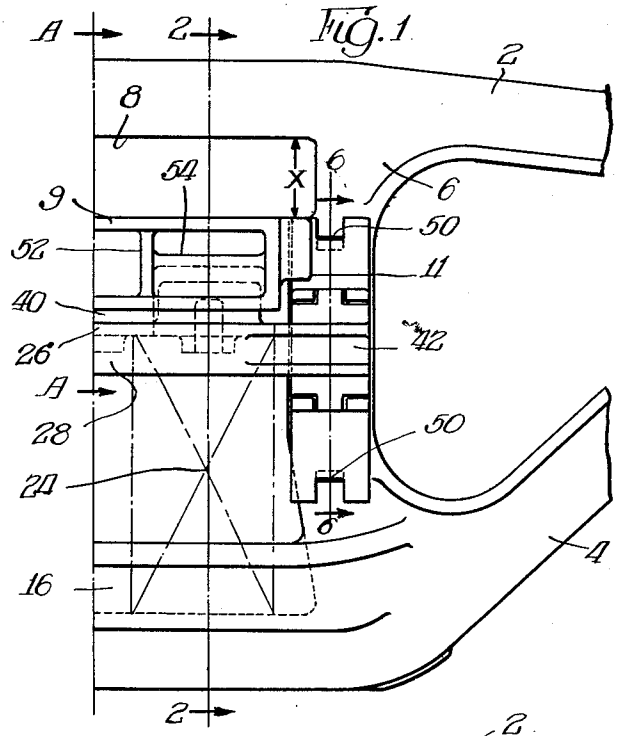
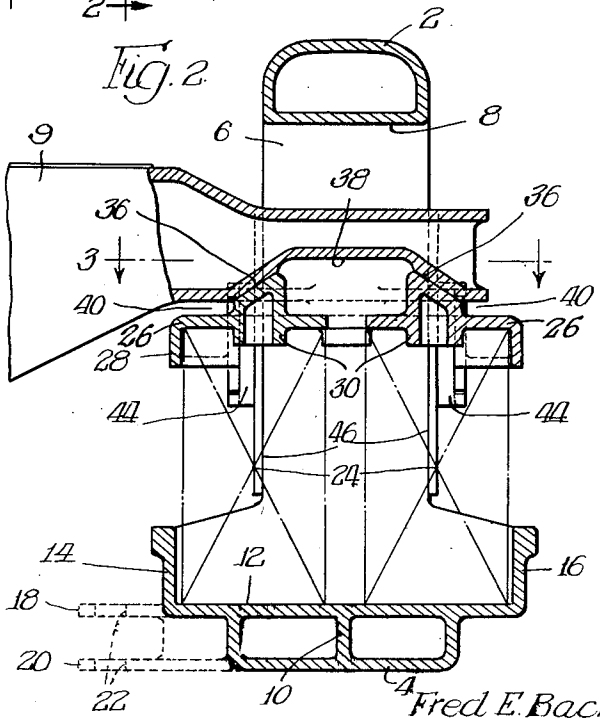


Fig. 2



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Fig. 3

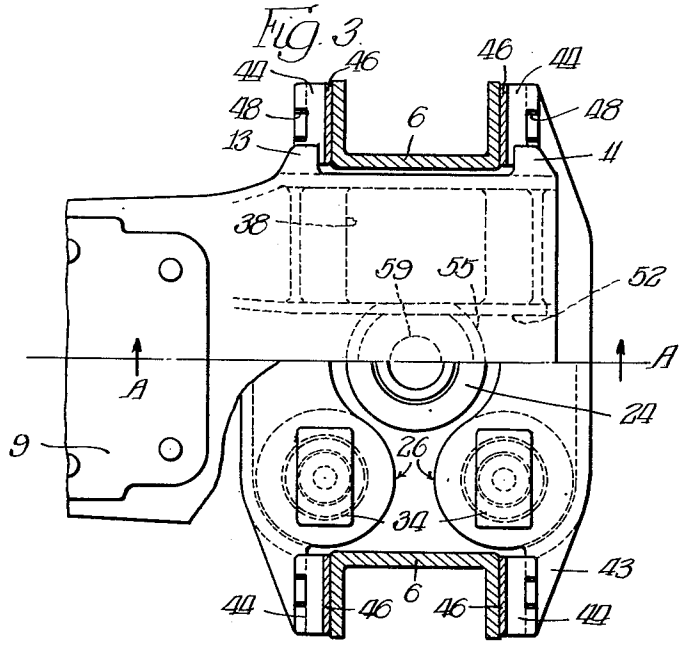


Fig. 3A

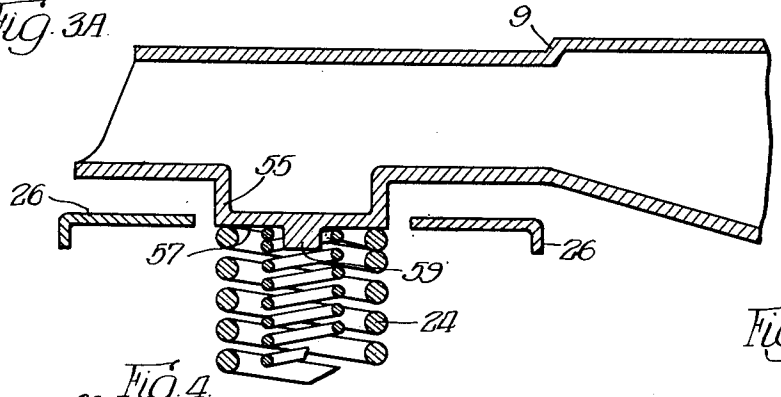


Fig. 4

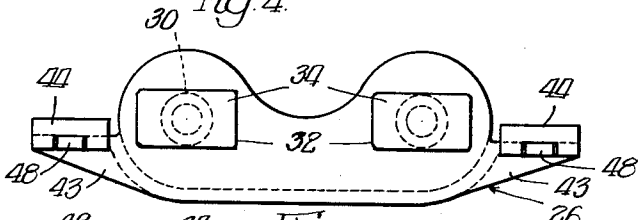


Fig. 5

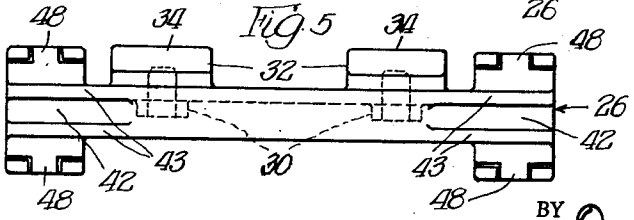
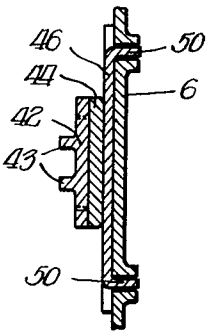


Fig. 6



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Fig. 7

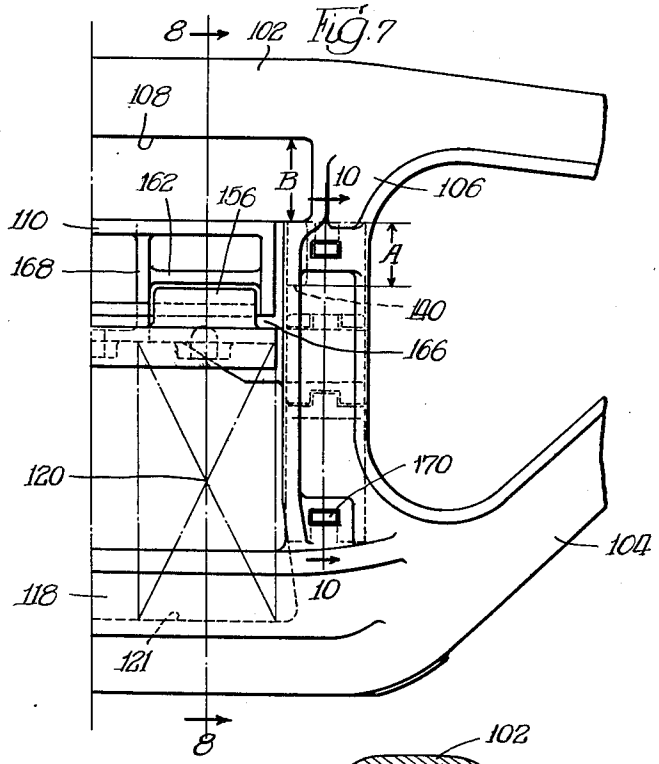
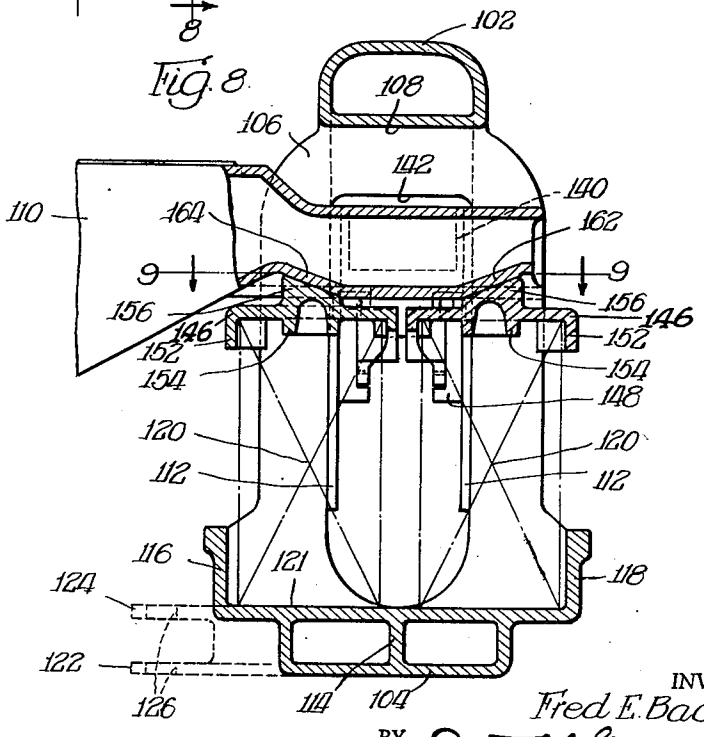


Fig. 8



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TRUCK

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Fig. 9

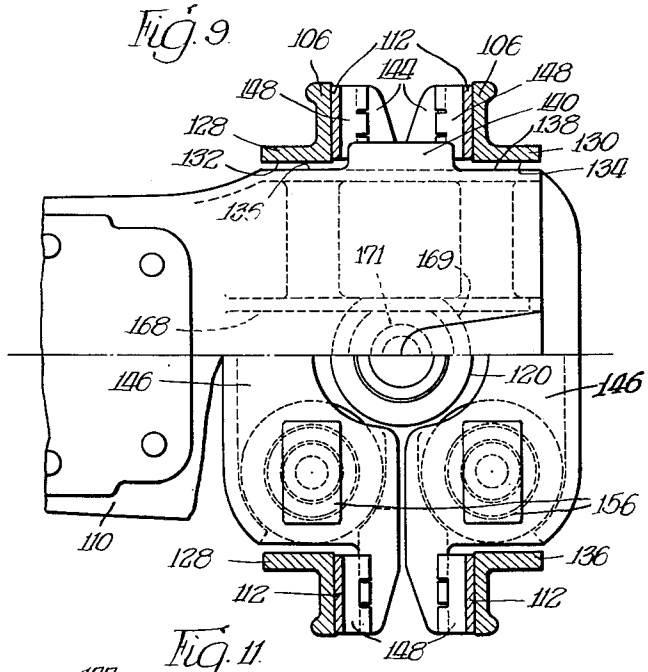


Fig. 10

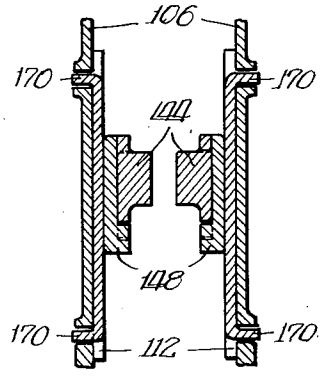


Fig. 11

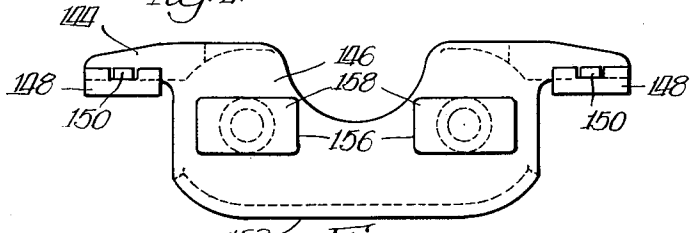


Fig. 12

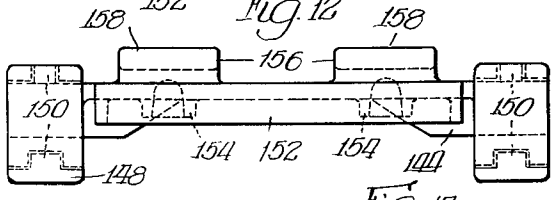


Fig. 13

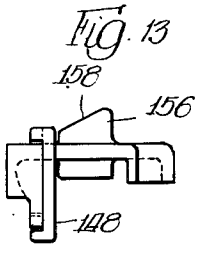


Fig. 14

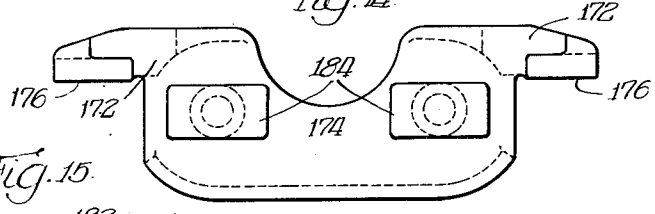
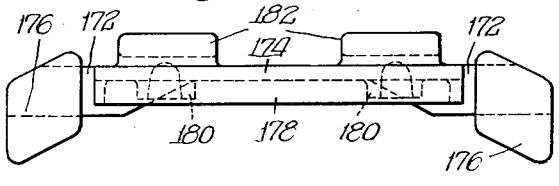


Fig. 15



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Patented Apr. 27, 1943 2,317,352

UNITED STATES PATENT OFFICE

2,317,352

TRUCK

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

Application December 19, 1940, Serial No. 370,768

16 Claims. (Cl. 105—197)

My invention relates to a railway car truck and more particularly to a novel form of guiding and interlocking arrangement for a side frame for a four wheel railway car truck.

It is well recognized at the present time that some form of snubbing or damping means is required in connection with the ordinary group of coil springs which are seated on the side frames and form the resilient supporting means for transverse load carrying members in a four wheel railway car truck.

An object of my invention is to devise a novel form of connection between a side frame and bolster incorporating a method of damping the spring group on which the end of the bolster is normally supported.

A more specific object of my invention is to devise a method of supporting the bolster end in the bolster opening of the side frame, said novel means of support comprising a special form of spring cap or plate formed in identical halves, said spring plate being formed with frictional portions for engagement with the side frame columns or, in a modification, serving as means of support for frictional shoes urged thereby into engagement with the friction surfaces on the adjacent columns.

A desirable object of my invention is to provide a practical means of damping the oscillations of a bolster supporting spring group while obtaining frictional absorption proportionate to the load carrier and to maintain this condition substantially without variation until ultimate wear has occurred between the engaging surfaces.

Another object of my invention is to provide a novel car truck construction wherein the attachment of the bolster to the side frame will have a positive resilient tendency to maintain the truck parts in square relationship while permitting slight misalignment when such becomes necessary because of track irregularities or other conditions.

My invention comprehends a two-piece spring cap formed with oppositely converging or diverging bearing pads or friction surfaces upon which may be seated the superposed bolster, said bolster being formed with complementary surfaces and being operative to urge the two halves of the spring cap into positions to tightly engage friction surfaces thereon against friction faces on the adjacent columns of the side frame.

My invention contemplates a novel form of spring cap made in similar halves and suitable as a means of support for a superposed bolster while also adapted to afford frictional engagement with the columns of the side frame.

My invention contemplates such an arrangement as that described wherein the friction surfaces on the columns may be formed on the opposite walls thereof either outboard and inboard said walls or on opposite faces thereof within the column. In the novel arrangement I have provided, the bearing of the bolster upon the spring caps is of such form that the force transmitted to the opposite portions of the spring cap and effective to urge them into frictional engagement with the columns will be maintained over a long period of wear and will vary in proportion to the superposed load.

Figure 1 is a fragmentary side elevation of a truck structure embodying my invention.

Figure 2 is a sectional view through the truck structure shown in Figure 1, the section being taken substantially in the transverse vertical plane indicated by the line 2—2 of Figure 1 and the bolster being shown partly in elevation.

Figure 3 is a fragmentary top plan view of the truck structure shown in Figures 1 and 2, partly in section, the section being taken substantially in the horizontal plane indicated by the line 3—3 of Figure 2. Figure 3A is a fragmentary sectional view through the bolster and spring group showing the manner in which the bolster end is superposed on the spring plate assembly and on the center coil of the spring group.

Figure 4 is a top plan view of one of the spring plate members used in the truck structure shown in Figures 1 to 3, and Figure 5 is a side elevation thereof.

Figure 6 is a sectional view through a column friction surface, the view being taken substantially in the transverse vertical plane indicated by the line 6—6 of Figure 1.

Figure 7 is a fragmentary side elevation of a further modification of my invention embodied in a truck structure.

Figure 8 is a sectional view through the truck structure shown in Figure 7, the section being taken substantially in the transverse vertical plane indicated by the line 8—8 of Figure 7.

Figure 9 is a fragmentary top plan view, partly in section, the section being taken approximately in the horizontal plane indicated by the line 9—9 of Figure 8.

Figure 10 is a sectional view through the friction surfaces of one column substantially in the transverse vertical plane indicated by the line 10—10 of Figure 7.

Figures 11, 12, and 13 are views of one-half of the spring plate assembly, Figure 11 being a top

plan thereof, Figure 12 a side elevation, and Figure 13 an end elevation.

Figures 14 and 15 show a modified form of spring plate, Figure 14 being a top plan thereof and Figure 15 a side elevation.

Describing my novel truck arrangement in greater detail and referring first to the modification shown in Figures 1 to 6 inclusive, the truck comprises a truss side frame of generally well-known form including the compression member 2, the tension member 4 with integral spaced columns 6, 6 of U-section merging with said members to form the central bolster opening 8 within which may be received the end of the bolster 9. The bolster opening 8 is relatively wide at the top portion thereof for a depth (indicated at X, Figure 1) somewhat greater than the depth of the outboard guide lugs 11, 11 formed on the extremity of the bolster, thus enabling the bolster to be applied or removed from said bolster opening to facilitate wheel change. Each inboard guide lug 13 on each side wall of the bolster may be of any convenient depth. Said compression member may have a box-section above said opening and said tension member likewise may have beneath said opening a box-section as most clearly seen in the view of Figure 2. The box-section of the tension member beneath the bolster opening is reinforced by the longitudinal flange 10 and the top web of said tension member is widened beneath said bolster opening to form the spring seat 12 reinforced and defined by upstanding inboard and outboard lateral flanges 14 and 16. Adjacent the transverse center line of the truck and on the inboard side of the tension member may be formed spaced lugs 18 and 20 with aligned openings 22, 22 serving as a means of connection to a tie bar (not shown) extending between side frames at opposite sides of the truck. Positioned on the spring seat 12 of the tension member in the bolster opening is the spring group diagrammatically indicated at 24 and on said spring group may bear my novel top spring plate comprising two identical halves 26, 26 the detailed form of which is shown in Figures 4 and 5. Each portion of said spring plate is an integral casting having at one edge a downturned flange 28 serving to confine the enclosed coil springs, and centrally of said spring plate may be formed positioning lugs 30, 30 for said coil springs. The configuration of each spring plate half is best seen in the top plan view of Figure 4. It may be noted that a spaced points on the top surface of the plate are formed raised portions designated 32, 32 similar in form, the top surfaces of said raised portions being formed as diagonally arranged flat friction areas designated 34, 34 and on the spaced areas 34, 34 may be seated the superposed bolster as indicated at 36, 36 (Figure 2), the bottom wall of said bolster being relieved around the bearing areas thereon as indicated at 38. As shown, four bearing areas are formed on the bottom wall of the bolster at angles complementary to those of the bearing areas 34, 34 on the raised portions of the spring plate and when in normal position the bolster is otherwise clear of engagement with said spring caps, said clearance being indicated at 40. By this means the bolster is effective to urge the two halves 26, 26 of the spring plates in opposite directions and the resultant force will depend upon the degree of angularity of the engaging surfaces on the bolster and on the spring plates as will readily be recognized. At the same time for any given load this force will be constant as long as the engaging surfaces on the spring cap and the bolster have not been worn sufficiently to permit the bolster to seat on said cap at the areas indicated at 40, 40. Each spring plate member 26 has integral end portions in the form of shoe carriers 42, 42, the junctures of said carriers with the main body of said plates being reinforced by the parallel horizontal gussets or flanges 43, 43, said carriers extending along the outboard and inboard webs of each column. On said shoe carriers may be mounted friction shoes 44, 44 for engagement with the wear plates 46, 46 formed on the adjacent faces of the columns. Each shoe 44 may have a key engagement at the top and bottom edges of the supporting carrier as indicated at 48, 48 and each wear plate 46 may be keyed to the web of the column on which it is supported as indicated at 50, 50 (Figure 1).

At spaced points between the side walls of the bolster end are formed parallel vertical webs or walls 52, 52, and the spring plate engaging surfaces indicated at 36, 36 may be formed as diagonal webs extending between each wall 52 and the adjacent side wall of the bolster as best seen at 54 in the end view of the bolster of Figure 1. The manner in which the bolster is seated on the spring group is clarified by the sectional view shown in Figure 3A in which it may be noted that the bottom wall of the bolster at the middle thereof is formed with a downwardly offset portion 55 forming a seat at 57 for coil springs which may be further positioned by the downwardly projecting lug 59.

Referring now to the modification shown in Figures 7 to 15 inclusive, the truck structure is generally similar to that of the previous modification including the truss type side frame with the compression member 102 and the tension member 104 and integral spaced columns 106, 106 forming therewith a central bolster opening 108 into which may project in usual manner the end of the bolster 110. Each column is formed of inboard and outboard portions of L-section as best seen in the view of Figure 9, and on the opposite internal faces of each L-section may be secured wear plates 112, 112. The compression member 102 may be of box-section above the bolster opening and likewise the tension member 104 may have a box-section beneath said opening, said box-section being reinforced by the longitudinal web 114, and the top chord of the tension member box-section may be widened and formed with inboard and outboard upstanding flanges 116 and 118 defining the spring seat 121 on which may be positioned the spring group diagrammatically indicated at 120, 120. On the inboard face of the tension member adjacent the spring seat portion and at the transverse center line of the truck may be integrally formed the spaced lugs 122 and 124 with aligned openings 126, 126 serving as a means of connection for a tie bear when desired to secure together the side frames at opposite sides of the truck.

Each column 106 comprises L-shaped inboard and outboard portions, the transversely arranged inboard and outboard webs 128 and 130 (Figure 9) thereof presenting guide surfaces 132 and 134 of relatively large area for abutment with lateral guide faces 136 and 138 formed on the lateral walls of the bolster. On each lateral wall of the bolster may also be formed a guide pad 140 of generally rectangular form, said guide pad projecting into the rectangular opening 142 defined by the spaced inboard and outboard portions of each column. By this means, the guide

pad 140 prevents the disengagement of the side frame from the bolster. It may be noted that the guide pad 140 has a vertical depth A (Figure 7) slightly less than the vertical depth B between the top of the bolster and the bottom of the compression member above the boltser opening so that when it is desired the bolster may be elevated to a position at the top of the bolster opening and removed therefrom, thus facilitating a quick wheel change.

On the transversely arranged leg or web of each L-section of each column is mounted a wear plate 112, already referred to, and projecting between the inboard and outboard L-section of each column is the end shoe carrier portion 144 of each spring plate member 146, said spring plate members being identical in construction and each forming one-half of the top spring plate which is normally seated on the before-mentioned spring group 120. On each shoe carrier 144 may be mounted a friction shoe 148 arranged for engagement with the before-mentioned friction surfaces 112, 112. Each shoe 148 may be interlocked as at 150 with the associated carrier 144 as best seen from the side elevation and plan views of Figures 11 and 12. The general arrangement of these parts is somewhat similar to that of the modification previously described except that the shoes are applied to the inner opposite surfaces of the inboard and outboard portions of the column instead of being applied on the outer faces thereof.

The detailed structure and form of each spring plate member 146 is shown in Figures 11 to 13 inclusive. It may be noted that each member 146 is a plate-like structure having at one edge the downturned flange 152 serving as retaining means for the included springs 120, said plate member also presenting downwardly projecting spring positioning lugs 154, 154. On the top of each plate member 146 are formed spaced raised pads 156, 156 with diagonally arranged top friction surfaces 158, 158, the two members 146, 146 thus affording spaced oppositely inclined friction surfaces on which may be seated the complementary friction faces formed on the diagonal webs 162 and 164 defining portions of the bottom wall of the superposed bolster 110. The friction faces on the surfaces 162 and 164 are oppositely inclined with respect to each other, being as aforesaid, complementary in arrangement to the friction surfaces 158, 158 on the raised pads of the spring plate members 146, 146 so that each bolster end is supported at four spaced points, two on each spring plate member 146. In this manner, the weight of the bolster and the load superposed thereon serves to urge apart the spring plate members 146, 146 at each end of the bolster, thus bringing the friction shoes 148, 148 tightly into engagement against the longitudinally disposed webs or legs of the inboard and outboard portions of each side frame column. By this manner, friction is developed between the shoes mounted on the carriers of each spring plate member and the adjacent wear plates on the side frame columns and the amount of this friction may be controlled by varying the angularity of the engaging surface on the spring plates 146, 146 and the bottom wall of the bolster in order to secure the amount of such friction desired. It may be noted that except for the bearing of the bolster at spaced points on the raised pads 156, 156 of the spring plates 146, 146 the bolster is otherwise free of engagement with the spring plate members on which it rests and clearance is afforded therebetween as may be noted at 166 in the side elevation of Figure 7.

The bolster end structure is reinforced by spaced longitudinal vertical walls 168, 168 parallel with the side walls of said bolster with the diagonal webs 162 and 164 extending between said spaced vertical walls.

Between the spaced longitudinal walls 168, 168 and centrally of the bolster end is formed the downwardly offset portion 169 (Figure 9) affording a seat for the central coil spring and carrying the downwardly projecting lug 171 as positioning means for the central inner coil in an arrangement similar to that described for the previous modification.

Figure 10 is a sectional view through the friction surfaces of one of the columns and shows clearly the manner in which each wear plate 112 may be interlocked as at 170, 170 into the supporting web of the column. This view also shows the manner in which the friction shoes 148, 148 bear against said wear plates and the manner in which said shoes are supported on the end carriers 144, 144 of the spring plate members 146, 146.

A modified form of spring plate member is shown in Figures 14 and 15, the structure thereof being generally similar to that of the spring plate member 146 previously described but differing therefrom in that the friction arms 172, 172, carried at respective ends of each plate member 174, have integrally formed friction pads 176, 176, each of said pads taking the rhomboid form indicated in order to facilitate the assembly and dismantling of each spring plate member 174. In this modification the spring plate member 174 is formed at one edge with the downturned spring retaining flange 178, also with spaced spring positioning means 180, 180, as likewise with the raised pads 182, 182 on which may be formed the tapering bolster support surfaces 184, 184.

It will be understood that I may make use of this form of spring plate 174, having integral friction pads at each end thereof, in either modification described whether they bear against the outer faces of the columns or against the inner faces thereof as shown in the last described modification.

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, a side frame having tension and compression members and spaced columns forming therewith a bolster opening, said columns having rectangular openings aligned longitudinally of the frame and comprising an L-section at each side of said rectangular openings, one leg of each L affording a friction surface, the other leg of said L forming a bolster guide area, a spring group seated on said tension member, said spring group comprising a central spring and a plurality of springs disposed thereabout, a spring cap assembly seated on certain springs of said spring group and comprising opposite plate members, each presenting raised pads with diagonal bolster supporting surfaces, a bolster projecting into said bolster opening with complementary faces in engagement with said surfaces, and guide lugs on the side walls of said bolster extending into the rectangular openings

of said columns, said bolster having a centrally arranged spring seat engaging said central spring independently of said plate members.

2. In a railway car truck, a side frame comprising tension and compression members and spaced columns forming a bolster opening, each of said columns having an opening with opposed friction surfaces, a spring group on said tension member, spaced spring plate members seated on said spring group, each of said plate members having a plurality of integral raised pads presenting diagonal top surfaces with said surfaces on respective pads reversely arranged, and a bolster projecting into said bolster opening with diagonally arranged faces seated on said top surfaces respectively and operative to urge said plate members in reverse directions for engagement with respective friction surfaces on said columns, said bolster having means engaging certain springs of said group independently of said plate members.

3. In a railway car truck, a side frame having tension and compression members and spaced columns forming therewith a bolster opening, said columns having rectangular openings aligned longitudinally of the frame and comprising an L-section at each side of said rectangular openings, one leg of each L affording a friction surface, the other leg of said L forming a bolster guide area, a spring group seated on said tension member and including a central coil and other coils therearound, a spring cap assembly seated on said other coils and comprising opposite plate members engaging said friction surfaces, each of said members presenting raised pads with diagonal bolster supporting surfaces, and a bolster projecting into said bolster opening with complementary faces in engagement with said last-mentioned surfaces, said pads being aligned over respective coils other than said central coil.

4. In a railway car truck, a side frame having tension and compression members and spaced columns forming therewith a bolster opening, said columns having rectangular openings aligned longitudinally of the frame and comprising an L-section at each side of said rectangular openings, one leg of each L affording a friction surface, the other leg of said L forming a bolster guide area, a spring group comprising a central coil and inboard and outboard coils, and a spring cap assembly seated on said inboard and outboard coils and comprising opposite plate members, each of said plate members having at its extremities friction arms for engagement with the friction surfaces of said columns, and each of said plate members having a plurality of diagonally arranged bolster engaging surfaces each disposed substantially over a supporting coil.

5. In a railway car truck, a side frame having tension and compression members and spaced columns forming therewith a bolster opening, said columns having rectangular openings aligned longitudinally of the frame and comprising an L-section at each side of said rectangular openings, one leg of each L affording a friction surface, the other leg of said L forming a bolster guide area, a spring group comprising a central spring and inboard and outboard springs, a spring cap assembly comprising opposite plate members seated respectively on said inboard and outboard springs, each of said plate members having at its extremities friction shoe carriers, and friction shoes supported on said carriers for frictional engagement with said columns, each of said plate members having a plurality of diagonally arranged bolster supporting pads each disposed approximately over one of said springs.

6. In a railway car truck, a side frame having tension and compression members and spaced columns forming therewith a bolster opening, each of said columns comprising spaced inboard and outboard portions of L-section, a spring group seated on said tension member and comprising a central spring and inboard and outboard springs, spaced spring cap members seated respectively on said inboard and outboard springs and presenting reversely arranged top diagonal surfaces, and a bolster projecting into said opening with complementary faces in engagement with said surfaces, each of said spring cap members presenting at its extremities friction arms for frictional engagement with one portion of each of the adjacent columns, and said bolster having means projecting between said spring cap members for engagement with said central spring.

7. In a railway car truck, a side frame having top and bottom members and spaced columns forming therewith a bolster opening, a spring group comprising a central spring and other springs, a spring cap comprising a plurality of spaced identical members seated on said other springs, a bolster extending into said opening and seated on said members and having reverse diagonal face engagement therewith to urge said members apart, each of said members having a friction arm extending between the inboard and outboard walls of each column, friction shoes mounted on said arms for frictional engagement with said column walls, and means on said bolster projecting between said identical members for direct engagement with said central spring.

8. In a railway car truck of quick wheel change type, a side frame having top and bottom members and spaced columns forming a bolster opening, each of said columns having a vertical slot with opposite friction surfaces, a spring seat on said bottom member, a spring group on said seat comprising a central coil and inboard and outboard coils, a top spring plate formed in spaced identical halves with said halves seated respectively on said inboard and outboard coils, and a bolster projecting into said opening and having oppositely arranged diagonal face engagement with said respective halves, each of said halves having integral friction arms engaging friction surfaces on the respective columns for frictional engagement therewith.

9. In a railway car truck of quick wheel change type, a side frame having top and bottom members and spaced columns forming a bolster opening, each of said columns having a vertical slot with opposite friction surfaces, a spring seat on said bottom member, a spring group on said seat comprising a central coil and inboard and outboard coils, a top spring plate formed in spaced identical halves with said halves seated respectively on said inboard and outboard coils, and a bolster projecting into said opening and having oppositely arranged diagonal face engagement with said respective halves, each of said halves having integral friction arms engaging friction surfaces on the respective columns for frictional engagement therewith, said bolster having means engaging said central spring intermediate the respective halves of said plate.

10. 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 plurality of spring plates on said

means, openings in said columns in substantial alignment longitudinally of said frame and each being defined in part by inboard and outboard friction surfaces, friction means on said plates in engagement with respective surfaces, and a bolster supported on said plates and comprising wedge means cooperating with complementary means thereon to urge said friction means into said engagement.

11. In a railway car truck, a side frame having a bolster opening and vertical columns at opposite sides of said opening, windows in said columns aligned longitudinally of the truck, and inboard and outboard friction surfaces at opposite sides of each window, a spring group in said opening, a two-piece spring plate seated on certain springs of said group with diagonal bolster support pads aligned with the respective supporting springs, and a bolster supported on said pads, said bolster having a spring seat interposed between the respective pieces of said plate for engagement with certain springs of said group, said spring plate pieces having frictional engagement with both of said columns along said inboard and outboard friction surfaces respectively.

12. In a railway car truck, a side frame having top and bottom members and spaced columns defining a bolster opening, each of said columns having a window with opposed friction faces and having bolster guide surfaces, a spring group on said bottom member in said opening, a spring cap supported on certain springs of said group and comprising spaced reversely arranged identical halves, each of said halves having a plurality of diagonally arranged bolster support pads aligned respectively with the supporting springs, and a bolster seated on said pads with means interposed between said halves for engagement with other springs of said group, said identical halves engaging friction faces on both columns at respective sides of said windows.

13. In a railway car truck, a side frame having top and bottom members and spaced columns defining a bolster opening, each of said columns having a window with opposed friction faces and having bolster guide surfaces, a spring group on said bottom member in said opening, a spring cap supported on certain springs of said group and comprising spaced reversely arranged identical halves, each of said halves having a plurality of diagonally arranged bolster support pads aligned respectively with the supporting springs, and a bolster seated on said pads with means interposed between said halves for engagement with other springs of said group, each of said spring plate halves having friction arms supporting shoes in engagement with a friction face on each of said windows, one of said halves engaging outboard faces and the other of said halves engaging inboard faces.

14. In a railway car truck, a side frame having top and bottom members and spaced columns defining a bolster opening, each of said columns having a window with opposed friction faces and having bolster guide surfaces, a spring group on said bottom member in said opening, a spring cap supported on certain springs of said group and comprising spaced reversely arranged identical halves, each of said halves having a plurality of diagonally arranged bolster support pads aligned respectively with the supporting springs, and a bolster seated on said pads with means interposed between said halves for engagement with other springs of said group, each half of said spring plate having friction arms at opposite ends thereof supporting integral friction pads of rhomboid form for engagement with friction faces on respective columns, the diagonal engagement of said bolster with the respective halves of said spring cap being operative to urge said halves apart and into engagement with the friction faces of said columns.

15. A bolster supporting spring plate assembly for a railway car truck comprising spaced identical reversely arranged spring caps, each of said caps having on its bottom surface a plurality of spring seats with spring positioning means thereon, and having on its opposite surface integrally formed raised bolster supporting pads aligned with said spring seats, each of said caps having at opposite ends thereof means for interlocking engagement with associated friction shoes.

16. A bolster supporting spring plate assembly for a railway car truck comprising spaced identical reversely arranged spring caps, each of said caps having on its bottom surface a plurality of spring seats with spring positioning means thereon, and having on its opposite surface integral raised bolster supporting pads aligned with said spring seats, the pads of respective caps having reversely arranged diagonal bolster engaging surfaces, and friction means of rhomboid form at opposite ends of each cap.

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