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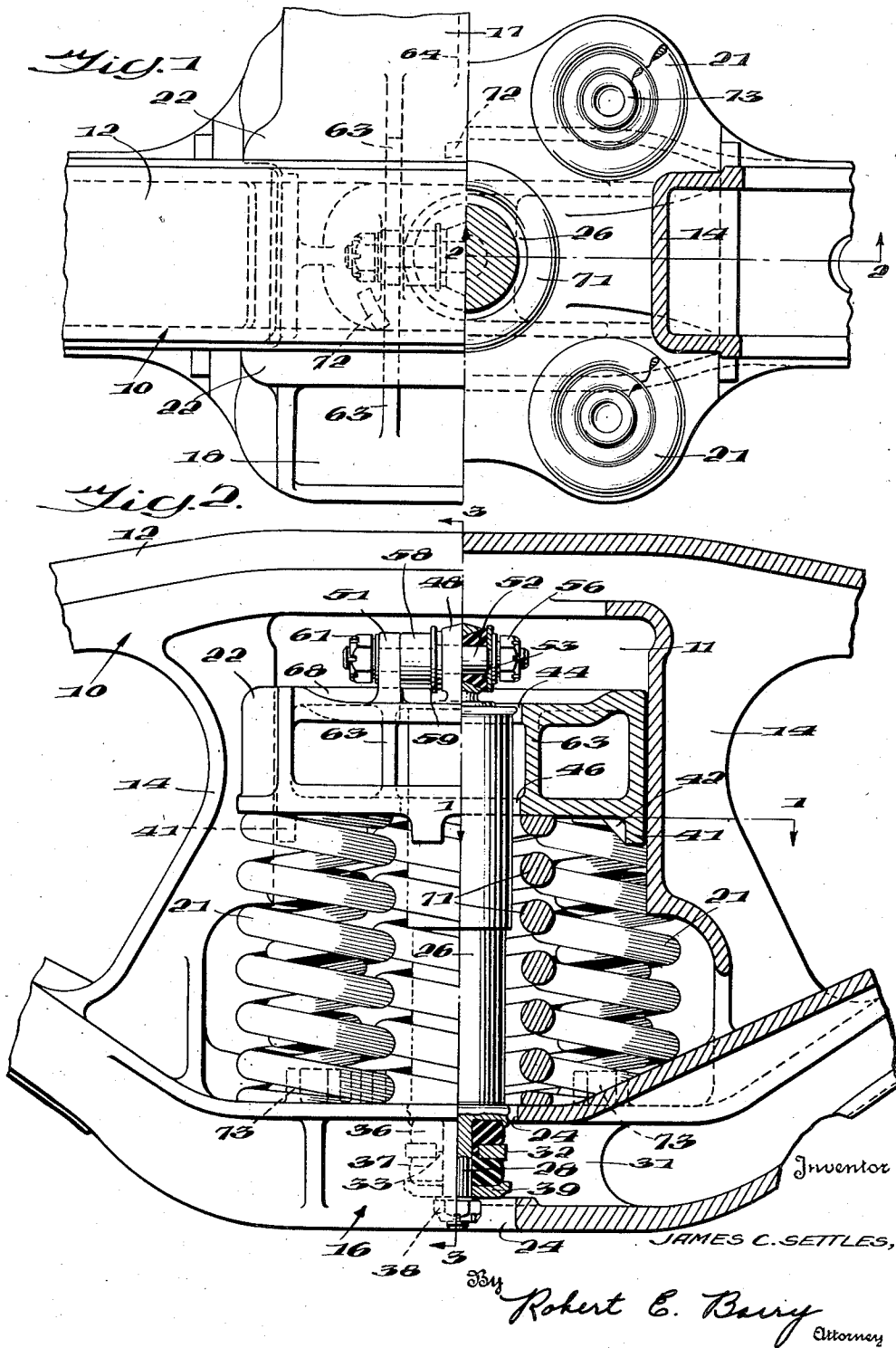
J. C. SETTLES

2,573,165

DAMPING MEANS FOR RAILWAY TRUCKS

Filed Feb. 16, 1948

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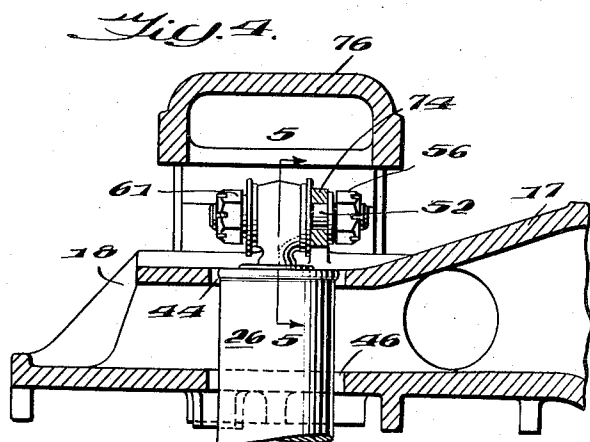
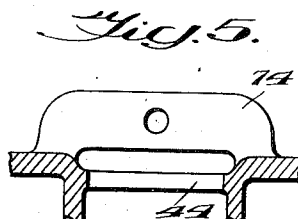
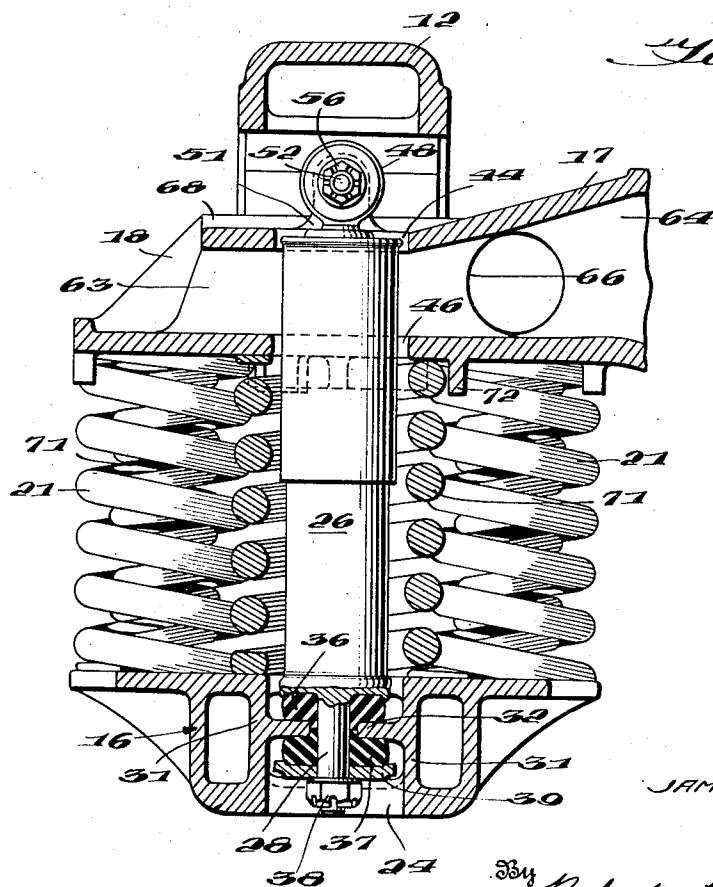
J. C. SETTLES

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DAMPING MEANS FOR RAILWAY TRUCKS

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4 Sheets-Sheet 2



Inventor

JAMES C. SETTLES,

By *Robert C. Barry*
Attorney

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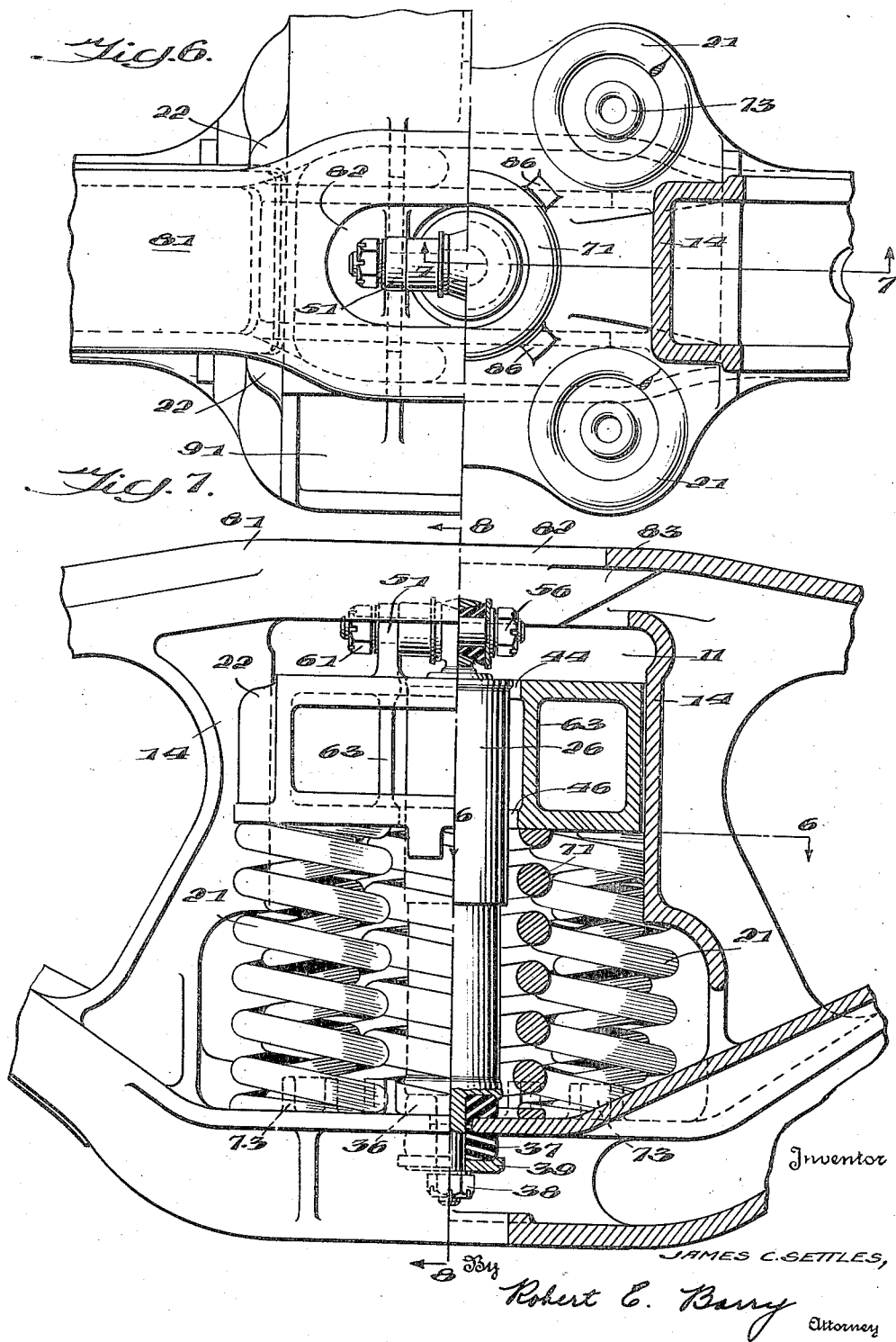
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DAMPING MEANS FOR RAILWAY TRUCKS

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J. C. SETTLES

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DAMPING MEANS FOR RAILWAY TRUCKS

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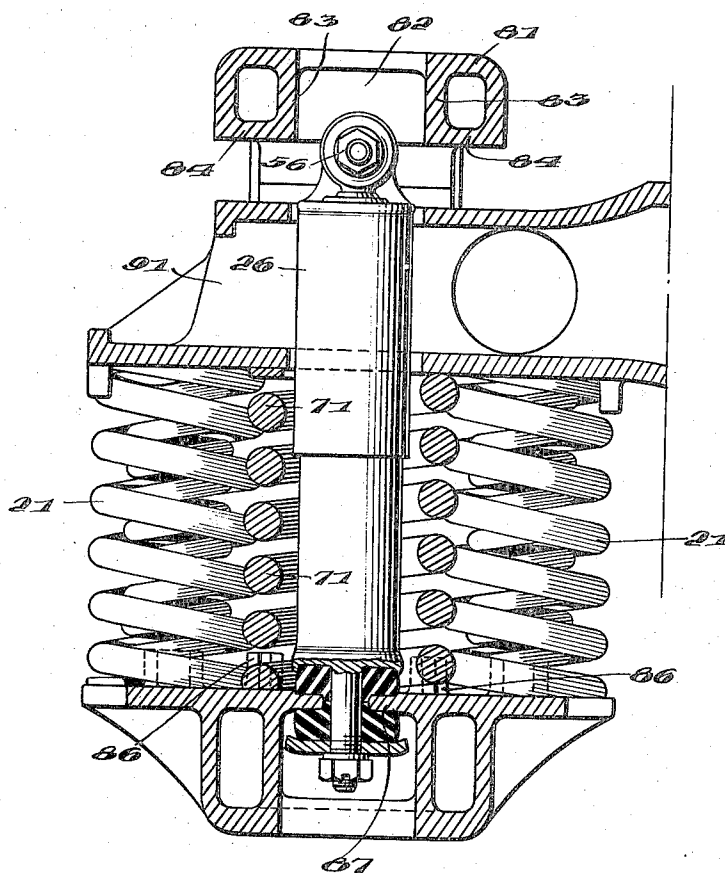


Fig. 8.

Inventor

JAMES C. SETTLES,

By *Robert E. Barry*
Attorney

UNITED STATES PATENT OFFICE

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DAMPING MEANS FOR RAILWAY TRUCKS

James C. Settles, Columbus, Ohio, assignor to
The Buckeye Steel Castings Company, Colum-
bus, Ohio

Application February 16, 1948, Serial No. 8,701

9 Claims. (Cl. 105—197)

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The present invention relates to railway car trucks and particularly pertains to means for damping movement of the bolster. The invention is more specifically directed to the position of a hydraulic shock absorber relative to each side frame and the bolster.

In a known damping mechanism, a hydraulic shock absorber has been mounted at the outboard side of the side frame and attached to the end of the bolster by means of a bracket. The spring seat has been constructed to accommodate the lower end of the shock absorber which is then positioned at the outboard side of the bolster supporting springs. Such a construction and position of the shock absorber creates difficulties in the construction of the bolster and side frame and does not provide an assembly which is economical to manufacture and assemble. This prior arrangement of the hydraulic shock absorber also encroached upon the clearance outline defined by the Association of American Railroads. The mounting of the shock absorber in an unprotected position at the outboard side of the side frame also places the damping element in a position to be subject to damage due to flying track ballast in normal operation. The damping assembly further provides a projecting assembly which is disadvantageous in case of accidents.

In such an outboard position of the shock absorber, the damping forces are applied to the side frame at a considerable distance outwardly of the center line of the supports of the frame on the journals. These forces produce moments which tend to rotate the side frame about its supports on the axle journals. This condition is more pronounced and undesirable in spring plankless type trucks wherein the opposite side frames are not joined at the spring seat level by a spring plank and are accordingly free to rotate under the action of the shock absorber forces.

It is an object of the present invention to remove such disadvantages by positioning the hydraulic shock absorber at the intersection of the longitudinal center line of the side frame with the longitudinal center line of the bolster.

A further object of the invention resides in providing side frame and bolster constructions which are adaptable for mounting the shock absorber on the side frame and attaching it to the

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bolster and facilitating the removal of the shock absorber in dismantling the truck assembly and at the same time providing a railway truck having adequate strength for carrying the loads imposed on these portions of the truck.

Other objects and features of the invention will be more apparent to those skilled in the art as the present disclosure proceeds and upon consideration of the following detailed description and the accompanying drawings wherein several exemplary embodiments of the invention are disclosed.

In the drawings:

Fig. 1 is a plan view in the left hand portion showing a railway car truck exhibiting the invention while the right hand portion is a section taken on the line 1—1 of Fig. 2.

Fig. 2 in the left hand portion is a side elevational view of a part of the railway truck with the right hand portion depicting a section taken on the line 2—2 of Fig. 1.

Fig. 3 is a vertical section of the bolster and the side frame taken on the line 3—3 of Fig. 2.

Fig. 4 is a fragmentary vertical section of the bolster end and a portion of the side frame showing a modification.

Fig. 5 is a fragmentary sectional view taken on the line 5—5 of Fig. 4 with parts of the shock absorber omitted.

Fig. 6 in the left hand portion is a plan view of another modification while the right hand portion is a sectional view taken on the line 6—6 of Fig. 7.

Fig. 7 in the left hand portion is a side elevational view while the right hand portion is a section taken on the line 7—7 of Fig. 6.

Fig. 8 is a sectional view taken on the line 8—8 of Fig. 7.

The present invention is directed to an arrangement of a shock absorber of the liquid or hydraulic type in a general vertical plane defined substantially by the intersection of the longitudinal center line of the side frame with the longitudinal center line of the bolster. This position of the shock absorber removes the tendency of any turning moments resulting from the forces produced by the shock absorber tending to rotate the side frame about its supports on the journals and also applies the damping forces to the center line of the bolster.

Referring to the drawings, there is shown at 10, a side frame of usual construction having a central bolster opening 11 and a top compression member 12. The side frame includes bolster guide columns 14 and a spring seat 16 forming a part of the tension member of the side frame. The spring seat may be of box construction, as shown particularly in Fig. 3.

A bolster 17 is provided with an end portion 18 which extends into the bolster opening 11 and is supported on a plurality of helical springs 21. These springs rest at their lower ends on the spring seat 16 and the load carried by the bolster is thereby supported by the springs 21. The end portion of the bolster may be provided with lugs 22 as shown in Figs. 1 and 2, which embrace the bolster guide columns 14 at each side of the bolster opening in the usual manner.

The spring seat portion of the tension member is provided with an opening 24 arranged midway between the bolster guide columns 14 and with the axis of this opening aligned with the center line of the side frame. This opening 24 extends through the box section of the spring seat member. The opening 24 is provided for receiving the lower end portion of a liquid or hydraulic type shock absorber of a well-known construction represented at 26 in the drawings. The lower end portion of the shock absorber 26 is provided with a stem 28. A pair of spaced walls 31 extend longitudinally of the spring seat member and define the inboard and outboard dimensions of the opening 24. These walls join the top and bottom webs of the box-shaped spring seat member for reinforcing this portion of the side frame and in the region of the opening 24. A horizontal web 32 having a central opening 33 extends between the spaced walls 31 to form part of means for the attachment of the stem 28 of the shock absorber to the tension member of the side frame. The vertical location of the web 32 with reference to the spring seat member may be varied to accommodate the particular shock absorber and the springs employed in the car truck. The lower end of the shock absorber is attached to the tension member by means of resilient bushings 36 and 37 which are arranged on opposite sides of the horizontal web 32 and by means of a nut 38 threaded onto the stem 28. A washer 39 may be interposed between the nut 38 and the resilient bushing 37.

The end portion 18 of the bolster 17 is desirably of box section and may be provided with side wall extensions 41 braced by ribs 42 to increase the column bearing area, as shown in Fig. 2. An opening 44 is provided in the top wall of the bolster aligned with an opening 46 in the bottom wall of the bolster. The axis of these two aligned openings is arranged in a vertical plane coinciding with the longitudinal center of the bolster 17. These openings 44 and 46 are provided for the upper end portion of the hydraulic shock absorber 26. The upper end of the hydraulic shock absorber carries a loop 48 and this loop is of sufficiently small overall dimensions to pass through the openings 44 and 46.

The upper end of the shock absorber 26 is attached to the bolster 17 by means of a bracket 51 rigidly attached to, or forming a part of, the bolster and arranged at one side of the aligned openings 44 and 46, as shown in Fig. 2. The loop 48 is attached to the bracket 51 by means of a bolt 52 which extends through the loop

48 and an aperture in the bracket 51. A resilient bushing 53 may be provided between the nut 56 and the loop 48. A spacer element 58 may be provided between the bracket 51 and the loop 48. Another resilient bushing 59 may be interposed between the loop 48 and the spacer element 58. Another nut 61 completes one type of means for attaching the shock absorber to the bolster.

The bracket 51 is positioned at one side of the openings 44 and 46 in the bolster to facilitate assembly of the parts and this bracket is then positioned so that the attachment assembly at the top of the bolster including the bracket 51 may enter the inverted channel in the compression member 12 of the side frame when the bolster is raised in the bolster opening 11 to apply or remove the springs 21 or for other purposes such as in shimming the assembly. The bolster in the region of the openings 44 and 46 may be reinforced by a plurality of longitudinal ribs 63 which connect the top and bottom walls of the bolster. One of these ribs 63 is provided on each side of the openings 44 and 46. The ribs 63 extend inwardly beyond the openings 44 and 46 and terminate at 66 adjacent a point where the central bolster rib 64 starts.

The bracket 51 is arranged to extend upwardly from the top wall of the bolster and is positioned at the side of the opening 44, as hereinabove described. If necessary, the top wall of the bolster may be depressed, as indicated at 68 to provide additional clearance for applying and removing the nuts 56 and 61. This depressed portion of the top wall of the bolster extends through the central portion as will be evident upon consideration of Fig. 2. This arrangement does not, therefore, reduce the column bearing areas of the bolster.

If desirable, and if required for carrying the load imposed on the bolster, a helical spring 71 may be positioned around the shock absorber 26. The spring 71 is maintained in a spaced relationship around the shock absorber by means of a plurality of lugs 72 which depend from the bolster and prevent lateral displacement of the spring 71. This arrangement of the lugs 72 facilitates assembly of the shock absorber and the spring 71 on the truck. The other load supporting springs 21 may be maintained in proper position by central circular spuds 73 projecting upwardly from the spring seat, as shown in Fig. 2. If desired, the usual spring plates may be used at the top and the bottom of the load supporting springs in which case the spring positioning means would be formed on the spring plates rather than carried by the bolster and the side frame castings.

In assembling the shock absorber and the bolster in proper position on each side frame, the bolster is first raised to the top of the bolster opening 11. Thereafter the shock absorber 26 is compressed to its minimum length. The shock absorber is then arranged within the spring 71 and this spring and the shock absorber is tilted or arranged at an angle and moved in this position into the bolster opening. Thereafter, the top portion of the shock absorber or the loop 48 is passed upwardly through the openings 46 and 44 in the end portion 18 of the bolster. The top portion of the shock absorber is raised until the loop 48 extends into the inverted channel of the compression member 12. With the parts in this position, the lower end of the shock absorber is then swung into the bolster opening. During this

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operation, the stem 28 arranged on the lower end of the shock absorber is lowered to pass through the opening in the horizontal web 32. The resilient bushing 36 is preferably applied on the stem 28 before the introduction of this part into the opening in the spring seat. The resilient bushing 37 may then be applied and the nut 38 is then threaded onto the stem 28. The resilient bushing 37 and the washer 39 and the nut 38 can be arranged on the stem 28 through the opening 24. The bolt 52 and the associated parts may then be applied to the loop 48 to connect the upper end of the shock absorber to the bracket 51.

The coil springs 21 at the inward positions or those toward the inboard side of the side frame may be applied before the shock absorber is arranged in position. The coil springs 21 at the outboard side of the side frame are preferably arranged in position after the shock absorber is positioned within the bolster opening. The upper end of the spring 71 will swing into position between the positioning lugs 72 as the shock absorber is applied in the manner as hereinabove described.

It will be observed that the hydraulic shock absorber 26 is arranged at the intersection of the center line of the bolster 17 with the center line of the side frame. Accordingly, the damping forces of the shock absorber do not set up any reaction moments tending to shift or twist the side frame from its proper position with respect to the journals. The shock absorber is, furthermore, located within the nest of springs so as to be protected from flying ballast and the assembly does not create any problems with reference to clearance in that the damping means is located within the side frame and does not project beyond the normal position of the side frame parts.

In the modification shown in Figs. 4 and 5, a bracket 74 is positioned on the inboard side of the openings 44 and 46 in the bolster. The attachment of the shock absorber to the bracket 74 is made in the same manner as that described with reference to the embodiments shown in Figs. 1 to 3, except that the bolt 52 extends longitudinally of the bolster instead of transversely thereto. Under some conditions of clearance, this construction and arrangement of the bracket 74 may be preferred for facilitating the application of the nuts 56 and 61 to the bolt 52. In this form of the invention, the compression member 76 is wider than that of the previous construction to permit the bracket 74 and the attaching means to enter the inverted channel in the compression member 76 when the bolster is raised to the top of the bolster opening.

In the embodiment illustrated in Figs. 6, 7 and 8, the compression member 81 of the side frame is widened over the bolster opening 11 and is provided with an aperture 82 through which the shock absorber 26 may be applied and removed from the side frame. The compression member is provided with spaced longitudinal walls 83 at each side of the opening 82 to reinforce the top member of the side frame in the vicinity of the opening 82. Horizontal webs 84 are provided between the lower ends of the walls 83 and the side walls of the compression member to further reinforce this portion of the side frame. In this modification, the coil spring 71 is maintained in proper spaced relationship around the shock absorber 26 by means of a plurality of lugs 86 which extend upwardly from the spring seat member.

As shown in Figs. 7 and 8, the horizontal web provided on the spring seat member is raised to

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the level of the top wall of the spring seat member and is indicated at 87 in Fig. 8. A deeper bolster end 91 may be used in this structure than that of the previous embodiments and it may not be necessary to extend the side walls below the box section to obtain adequate column bearing area.

While the invention has been described with reference to specific structural details, it will be understood that changes may be made in the assembly and in the elements thereof such as the type of hydraulic shock absorber and the manner in which the absorber is attached to the side frame and the bolster. Such changes and others may be made without departing from the spirit and scope of the invention, as set forth in the appended claims.

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

1. In a railway car truck, a side frame including a compression member having an intermediate portion of inverted channel-shape, said side frame having a centrally arranged bolster opening therein, a spring seat box-shaped in cross section forming a part of the side frame and having top and bottom walls, said bottom wall having an opening therein, ribs arranged longitudinally of the side frame within the spring seat joining the top and bottom walls defining the sides of the opening in the bottom wall, a bolster having a box-shaped end portion extending into the bolster opening, springs supporting the bolster on said spring seat, an elongated hydraulic shock absorber, a stem carried by the lower end of said shock absorber, means securing the stem to the spring seat including a nut accessible through the opening in the bottom wall of the spring seat, said bolster having an opening in the bottom wall thereof and an aligned opening in its top wall both of diameters large enough to receive an upper end portion of the shock absorber, a loop member carried by the upper end of the shock absorber, a bracket above and rigid with the top wall of the bolster and arranged at one side of the openings in the bolster, means extending through the bracket and the loop member connecting the upper end of the shock absorber to said bracket, ribs joining the top and bottom walls of the bolster extending longitudinally therein and arranged at opposite sides of the openings in the top and bottom walls, a centrally disposed rib joining the top and bottom walls of the bolster positioned inwardly of the inner ends of the first ribs, and said bracket and loop member being of such lateral dimensions as to be accommodated within the channel of the compression member when the bolster is raised in the bolster opening.

2. In a railway car truck, a side frame, said side frame having a bolster opening therein, a spring seat box-shaped in cross-section forming a part of the side frame and having top and bottom walls, said bottom wall having an opening therein, ribs arranged longitudinally of the side frame within the spring seat joining the top and bottom walls at an inboard and outboard side of the opening in the bottom wall, a horizontal web joining said ribs below the top wall of the spring seat, said web having an opening therein, a bolster having a box-shaped end portion extending into the bolster opening, helical springs supporting the bolster on said spring seat, an elongated hydraulic shock absorber, a stem carried by the lower end of the shock absorber extending through the opening in said web, means accessi-

ble through the opening in the bottom wall of the spring seat for securing the stem to said web, said bolster having an opening in the bottom wall thereof and an aligned opening in the top wall both of a diameter large enough to receive the upper end portion of the shock absorber, a loop member carried by the upper end of the shock absorber, a bracket rigid with the top wall of the bolster, means extending through the bracket and the loop member connecting the upper end of the shock absorber to said bracket, means within and reinforcing the bolster in the vicinity of the openings in the top and bottom walls, and the top wall of the bolster having a depressed portion in the region of the bracket and upper end of the shock absorber.

3. In a railway car truck, a side frame including a compression member, said side frame having a bolster opening, a spring seat box-shaped in cross section including top and bottom walls, said bottom wall having an opening therein, ribs arranged longitudinally of the spring seat joining the top and bottom walls and providing inboard and outboard walls for the opening in the bottom wall of the spring seat, a bolster having a box-shaped end portion including top and bottom walls extending into the bolster opening, springs supporting the bolster on said spring seat, an elongated hydraulic shock absorber, means for securing a lower end of the shock absorber to the spring seat including a nut accessible through the opening in the bottom wall of the spring seat, said bolster having an opening in the bottom wall thereof and an aligned opening in the top wall both large enough to receive the upper end of the shock absorber, a loop member carried by the upper end of the shock absorber, a bracket rigid with the top wall of the bolster, means connecting the loop member to the bracket to secure the upper end of the shock absorber to the bolster, means reinforcing the bolster in the vicinity of the bracket, and said compression member having an opening vertically therethrough of larger area than the cross section of the shock absorber.

4. In a bolster for a railway car truck, a top wall, a bottom wall, side walls connecting the top and bottom walls, said top wall having an opening therethrough, said bottom wall having an opening therethrough vertically aligned with and of substantially the same size as the opening in the top wall, vertically disposed ribs extending longitudinally within the bolster joining the top and bottom walls at opposite sides of said openings, and a bracket carried by the top wall at one side of the opening therein for attachment to a bolster damping means extending through said openings.

5. In a bolster for a railway car truck, a top wall, a bottom wall, side walls connecting the top and bottom walls, said top wall having an opening therethrough, said bottom wall having an opening therethrough vertically aligned with and of substantially the same size as the opening in the top wall, vertically disposed ribs extending longitudinally within the bolster joining the top and bottom walls at opposite sides of said openings, a bracket carried by the top wall at one side of the opening therein for attachment to a bolster damping device extending through said openings, and said bracket being vertically aligned with one of said ribs.

6. In a bolster for a railway car truck, a top wall, a bottom wall, side walls connecting the top and bottom walls, said top wall having an opening therethrough, said bottom wall having an opening therethrough vertically aligned with

and of substantially the same size as the opening in the top wall, vertically disposed ribs extending longitudinally within the bolster joining the top and bottom walls at opposite sides of said openings, a bracket carried by the top wall at one side of the opening therein for attachment to bolster damping means extending through said openings, and said top wall having a depressed area in the upper surface in a region surrounding the bracket and the opening in the top wall.

7. In a railway car truck, a side frame, said side frame having a bolster opening therein, a spring seat box-shaped in cross section forming a part of the side frame and having top and bottom walls, said bottom wall having an opening therein, ribs arranged longitudinally of the side frame within the spring seat joining the top and bottom walls at the inboard and outboard sides of the opening in the bottom wall, a bolster having a box-shaped end portion extending into the bolster opening, springs supporting the bolster on said spring seat, an elongated hydraulic shock absorber, means securing a lower end of the shock absorber to the spring seat including a nut accessible through the opening in the bottom wall of the spring seat, said bolster having an opening in the bottom wall thereof of a diameter large enough to receive an upper end portion of the shock absorber, a bracket rigid with the top wall of the bolster, means connecting the upper end of the shock absorber to said bracket to secure the upper end of the shock absorber to the bolster, and means within and reinforcing the bolster in the vicinity of said bracket.

8. A side frame for a railway car truck comprising, a compression member, a tension member including a spring seat of box-shaped section throughout the length of the spring seat and having top and bottom walls, said bottom wall of the spring seat having an opening therein, vertically disposed ribs within the box-shaped spring seat extending longitudinally thereof throughout a major portion of the length of the spring seat joining the top and bottom walls and providing two spaced box-shaped sections throughout a central portion of the spring seat, said ribs defining the inboard and outboard boundaries of the opening in the bottom wall, and said top wall of the spring seat having an opening therein with the axis thereof aligned with the axis of the opening in the bottom wall of the spring seat.

9. A side frame for a railway car truck comprising, a compression member including depending side walls throughout an intermediate portion thereof, a tension member including a spring seat of box-shaped section throughout the length of the spring seat and having top and bottom walls, guide columns connecting the tension member and the compression member defining a bolster opening, said bottom wall having an opening therein, vertically disposed ribs within the box-shaped spring seat extending longitudinally thereof throughout a major portion of the length of the spring seat joining the top and bottom walls thereof and providing two spaced box-shaped sections throughout a central portion of the spring seat, said ribs defining inboard and outboard boundaries of the opening in the bottom wall, said top wall of the spring seat having an opening therein with the axis thereof aligned with the axis of the opening in the bottom wall of the spring seat, said compression member having an opening vertically disposed therethrough in a portion over the bolster open-

ing, and a vertically disposed wall depending from the compression member at each side of the opening therein and extending lengthwise of the frame between the guide columns.

JAMES C. SETTLES. 5

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