Aug. 20, 1946. C. J. W. CLASEN 2,406,199

CAR TRUCK

Filed Nov. 4, 1943 2 Sheets-Sheet 1

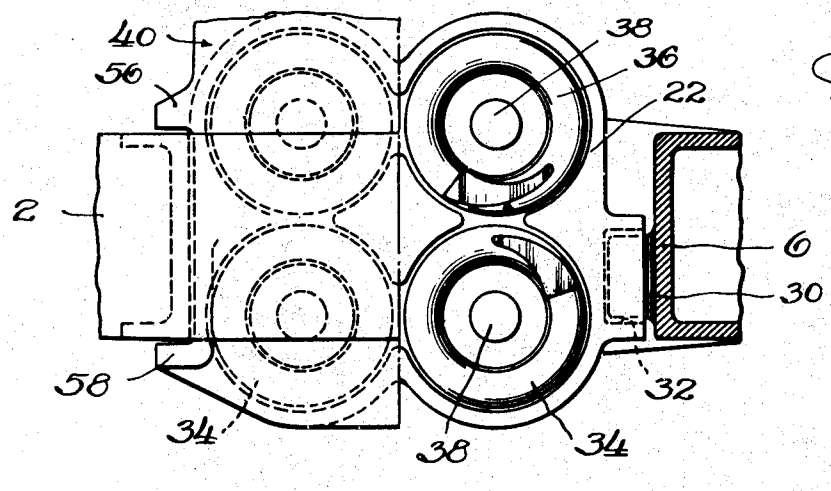
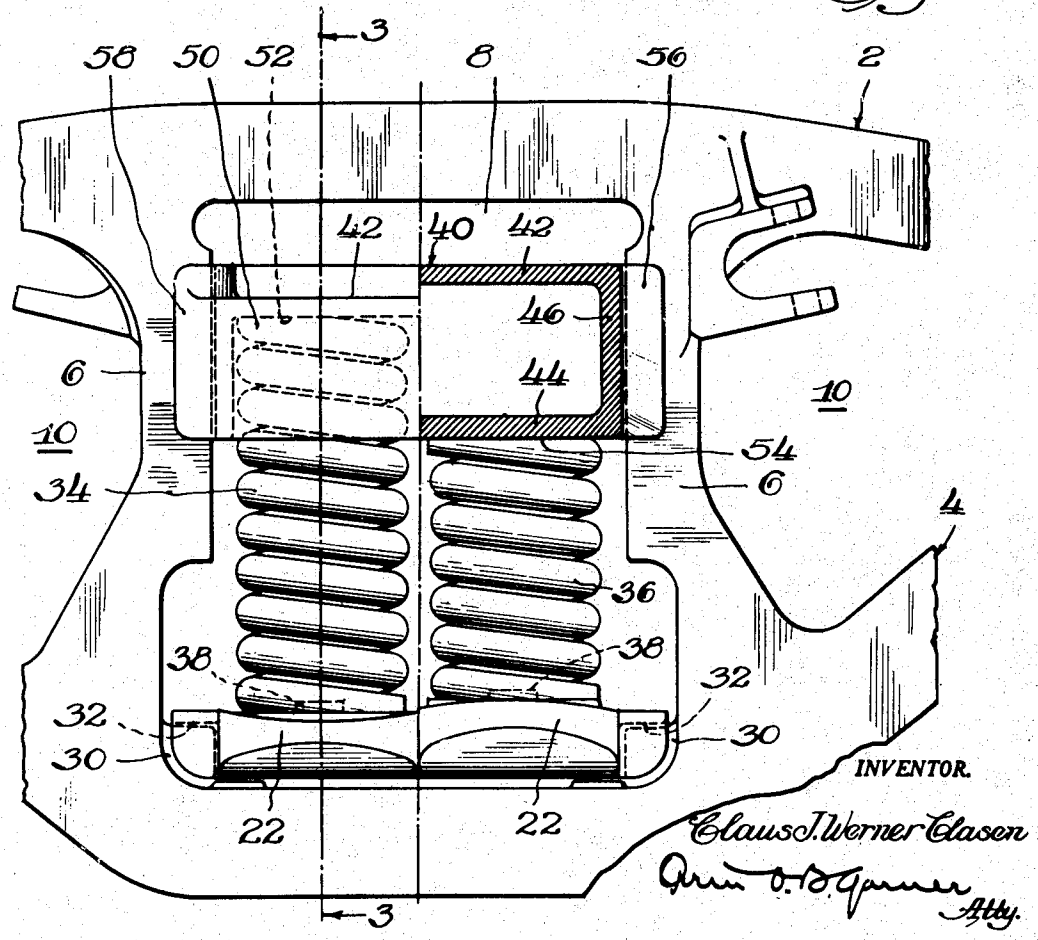


Fig. 2

Fig. 1



INVENTOR.

Claus J. Werner Clasen

Orin O. B. Garner Atty.

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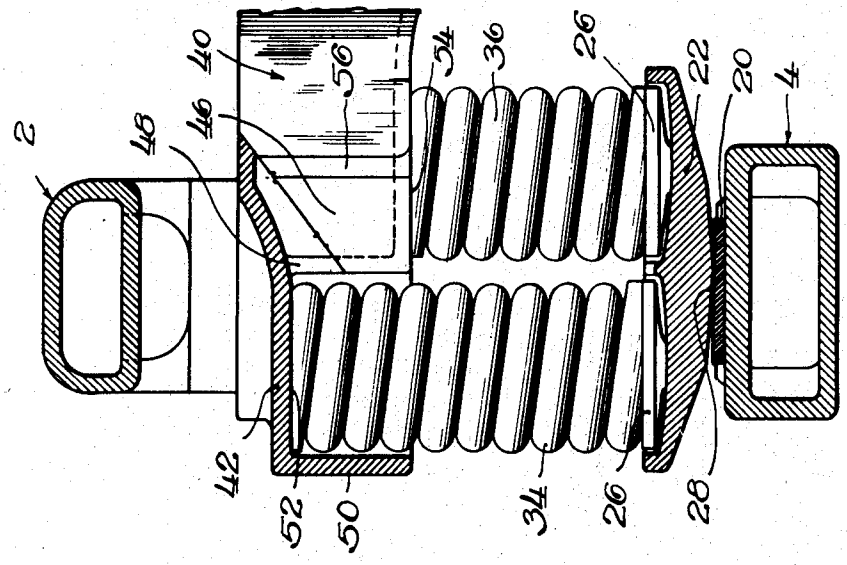


Fig. 4

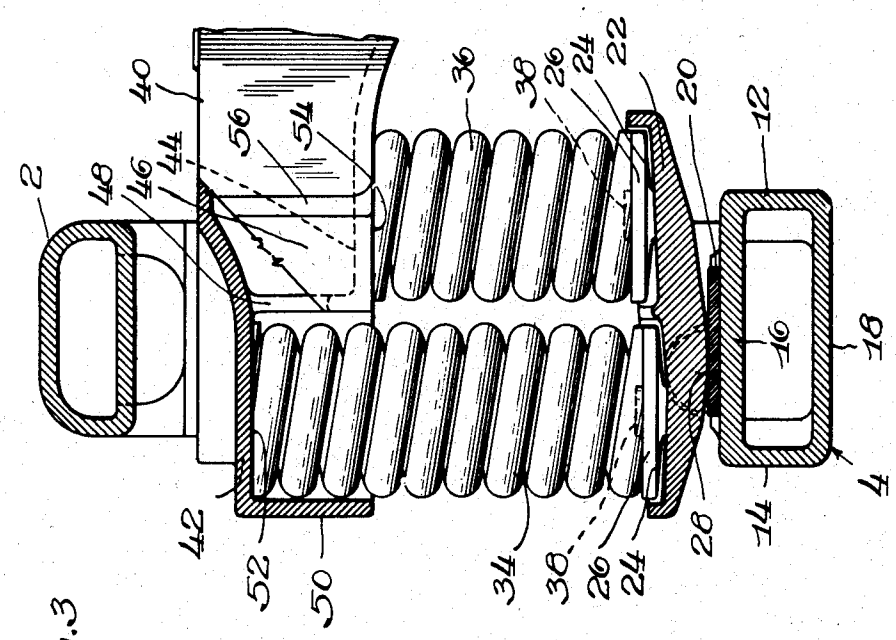


Fig. 3

INVENTOR.

Claus J. Werner Clasen

Chas. O. B. Garner Atty

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UNITED STATES PATENT OFFICE

2,406,199

CAR TRUCK

Claus J. Werner Clasen, Chicago, Ill., assignor to American Steel Foundries, Chicago, Ill., a corporation of New Jersey

Application November 4, 1943, Serial No. 508,878

26 Claims. (Cl. 105—197)

1

My invention relates to a railway car truck and more particularly to a novel spring support for the truck bolster.

The principal object of my invention is to prevent harmonious oscillations of the bolster supporting spring group by supporting the springs in such a manner that the compression load is "out of ratio" to the vertical movement of the bolster for the entire range of bolster loads.

Another object of my invention is to provide a truck such as above described, in which certain springs of the bolster supporting group have a relatively great length of travel with respect to other springs of the group, means being interposed between the spring group and the side frame for causing a greater rate of deflection in the long travel springs than in the other springs.

My invention comprehends a side frame of novel form comprising tension and compression members and spaced columns defining therewith a bolster opening, and a spring seat rocker rockably seated on the tension member in said opening and having means cooperating with means on the side frame at opposite sides of the bolster opening for maintaining the side frame and rocker in assembled relationship.

In my novel side frame the rocker is so arranged that its contact point with the side frame under empty car conditions is close to the center line of the long travel springs, whereby the lighter bolster loads are carried mostly by the long travel springs, and as the bolster loads are increased, an increasing proportion of the load is placed upon the short travel springs.

In the drawings,

Figure 1 is a composite view of a railway car truck embodying my invention, the left half of Figure 1 being a side elevation taken from the outboard side of the frame and the right half of this figure being a side elevation taken from the inboard side of the frame with the bolster shown in section.

Figure 2 is a fragmentary top view of my novel truck, the left of Figure 2 being a top plan view and the right half thereof being a sectional view through one of the side frame columns with the bolster removed.

Figure 3 is a sectional view taken in the transverse vertical plane indicated by the line 3—3 of Figure 1, with the spring group and a portion of the bolster shown in elevation, and Figure 4 is a sectional view comparable to Figure 3 but illustrating my novel truck under loaded car.

Describing my invention in detail, the side frame comprises the tension and compression

2

members 2 and 4 and the spaced columns 6, 6, defining therewith a bolster opening 8, and spaced window openings 10, 10.

As best seen in Figures 3 and 4, the compression member 2 is of box-section above the bolster opening, and the tension member 4 is of box-section therebelow with the inboard and outboard webs 12 and 14 and the top and bottom chords 16 and 18. A wear plate 20 is seated on the top chord 16 and secured thereto by any convenient means, such as welding. Seated on the plate 20 is a rocker 22 comprising concave bearing surfaces 24, 24 for slidable engagement with spring caps or plates 26, 26, the lower surface of the rocker 22 being arcuate for rocking engagement as at 28 (Figures 3 and 4) with the wear plate 20. At opposite sides of the bolster opening, the side frame is formed with lugs 30, 30 received within complementary recesses 32, 32 in the rocker for maintaining the latter in assembled relationship with the side frame while, at the same time, accommodating the rocking or tilting action of the rocker upon the plate 20 as hereinafter described.

Supported on the spring plates 26, 26 are a pair of outboard coil springs 34, 34 and a pair of inboard springs 36, 36, the plates 26, 26 being provided with suitable positoning means 38, 38 for said springs. As illustrated, each spring 34 and 36 is a composite spring comprising a pair of telescoped coils, but it will be understood that, if desired, each of these springs may be a single coil spring.

Supported on the springs 34 and 36 is a bolster generally designated 40, said bolster being of generally box-like form and comprising top and bottom chords 42 and 44 and the spaced side walls 46, 46, the bottom chord 44 terminating adjacent the longitudinal center line of the side frame and merging with the web 48 extending transversely of the bolster and substantially parallel to the outboard web 50 thereof.

As clearly illustrated in Figures 3 and 4, the outboard springs 34, 34 are considerably longer than the inboard springs 36, 36 and seat as at 52 against the top chord 42 of the bolster, the inboard springs 36, 36 being seated at 54 against the bottom chord 44 of the bolster, the outboard springs 34, 34 having a relatively great length of travel with respect to the inboard springs 36, 36. It will be understood that this differential in the length of travel may be achieved, if desired, by providing outboard springs 34, 34 of relatively small capacity with respect to the inboard springs 36, 36, with the bolster and springs so arranged

that all of the springs are of the same length. However, I have preferred to utilize springs of the same capacity but of different lengths with compression ratios proportionate to their length. Each side wall **46** of the bolster is provided with inboard and outboard guide lugs **56** and **58** for cooperation with the adjacent column **6** to maintain the side frame and bolster in assembled relationship.

Referring now to Figures 3 and 4, it will be seen that these figures are similar except that Figure **3** illustrates the bolster under light car loads, under which conditions the contact between the rocker and the plate **20** is adjacent the vertical center lines of the outboard springs **34, 34.**

It will thus be understood that under light car most of the bolster load is carried by the outboard springs, whereas under loaded car, as illustrated in Figure 4, the inboard short travel springs **36 36** will cause the rocker to tilt, whereby its contact with the side frame is at approximately the longitudinal center line thereof.

Thus it will be understood that as the bolster loads increase, a greater proportion of the load is transferred to the inboard short travel springs **36, 36.** By means of this novel arrangement the rate of deflection for the long travel springs **34, 34** is greater than the rate of deflection for the short travel springs **36, 36.** It may be noted that bending of the springs as a result of the tilting movement of the rocker on the tension member is substantially prevented by the slidable engagement of the spring plates **26, 26** with the concave bearing surfaces **24, 24** on the top of the rocker, and it will be understood that sliding of the plates **26, 26** on the surfaces **24, 24** may be expedited by any suitable lubricant. A comparison of Figures 3 and 4 clearly illustrate the manner in which the spring plates **26, 26** slide on the rocker surfaces **24, 24** as the rocker tilts inboardly and outboardly during vertical oscillations of the bolster.

It is to be understood that I do not wish to be limited by the exact embodiment of the device shown which is 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 comprising spaced columns and an intervening bolster opening, a rocker rockably seated on said frame in said opening, spring plates slidably mounted on concave surfaces atop said rocker, a pair of inboard and a pair of outboard springs seated on respective caps, said outboard springs having a greater length of travel than said inboard springs, means on said frame at opposite sides of said opening cooperating with means on said rocker to maintain the latter in assembled relationship with said frame, and a bolster supported from said springs and having guide means cooperating with said columns, said rocker being formed and arranged so that its point of contact with said frame is at approximately the longitudinal center line thereof under full static bolster load.

2. In a railway car truck, a side frame comprising spaced columns and an intervening bolster opening with a flat surface at the bottom thereof, a rocker tiltably supported in said frame on said surface, a pair of inboard and a pair of outboard springs supported from said rocker, one of said pairs having a greater length of travel than the other thereof, means on said frame co-

operating with means on said rocker to maintain the latter in assembled relationship with said frame, and a bolster supported from said springs and having guide means cooperating with said columns, and means interposed between said springs and said rocker for preventing bending of said springs during relative tilting movement of the rocker with respect to the frame, said last-mentioned means comprising spring plates slidably mounted on concave surfaces atop said rocker, the axes of the springs of one of said pairs being disposed at one side of the rocking axis of said rocker and the axes of the springs of the other pair being disposed at the opposite side of said rocking axis.

3. In a railway car truck, a side frame comprising spaced columns and an intervening bolster opening with a flat face at the bottom thereof, a rocker having an arcuate surface rockably seated on said face in said opening, a pair of inboard and a pair of outboard springs supported on said rocker, said outboard springs having a greater length of travel than said inboard springs, means on said frame cooperating with means on said rocker to maintain the latter in assembled relationship with said frame, and a bolster supported from said springs and having guide means cooperating with said columns, said rocker being formed and arranged so that its point of contact with said frame is at approximately the longitudinal center line thereof under full static bolster load.

4. In a railway car truck, a side frame comprising spaced columns and an intervening bolster opening with a flat face at the bottom thereof, a rocker having an arcuate surface tiltably seated on said face in said opening, the upper ends of said surface being disposed at the inboard and outboard sides of said rocker, a pair of inboard and a pair of outboard springs supported from said rocker, one of said pairs having a greater length of travel than the other thereof, means on said frame cooperating with means on said rocker to maintain the latter in assembled relationship with said frame, and a bolster supported from said springs and having guide means cooperating with said columns, and means interposed between said springs and said rocker for preventing bending of said springs during relative tilting movement of the rocker with respect to the frame.

5. In a railway car truck, a side frame comprising spaced columns and an intervening bolster opening, a rocker rockably seated on said frame in said opening, said rocker being rockable on an axis extending longitudinally of said frame, spring plates slidably mounted on concave surfaces atop said rocker, a pair of inboard and a pair of outboard springs seated on respective caps, said outboard springs having a greater length of travel than said inboard springs, means on said frame at opposite sides of said opening cooperating with means on said rocker to maintain the latter in assembled relationship with said frame, and a bolster supported from said springs and having guide means cooperating with said columns.

6. In a railway car truck, a side frame comprising spaced columns and an intervening bolster opening, a rocker having a substantially convex surface curved transversely of said frame and rockably seated on said frame in said opening, spring plates slidably mounted on concave surfaces atop said rocker, a pair of inboard and a pair of outboard springs seated on respective caps,

said outboard springs having a greater length of travel than said inboard springs, lugs formed on said frame at the lower extremities of said columns, said lugs being received within complementary openings in said rocker for maintaining the latter in assembled relationship with said frame, and a bolster supported from said springs.

7. In a railway car truck, a side frame comprising spaced columns and an intervening bolster opening, a rocker having an arcuate surface curved transversely of said frame and rockably seated thereon in said opening, a pair of inboard and a pair of outboard springs supported on said rocker, said outboard springs having a greater length of travel than said inboard springs, means on said frame at opposite sides of said opening cooperating with means on said rocker to maintain the latter in assembled relationship with said frame, and a bolster supported from said springs and having guide means cooperating with said columns.

8. In a railway car truck, a side frame comprising spaced columns and an intervening bolster opening, a flat surface on said frame between said columns, a rocker rockably mounted on said surface in said opening for rocking movement about an axis extending longitudinally of said frame, spring plates slidably mounted on concave surfaces atop said rocker, a pair of inboard and a pair of outboard springs seated on respective caps, said outboard springs having a greater length of travel than said inboard springs, means on said frame and said rocker for maintaining the latter in assembled relationship with said frame, and a bolster supported from said springs.

9. In a railway car truck, a side frame comprising spaced columns and an intervening bolster opening, a flat surface on said frame between said columns, a rocker having an arcuate surface rockably seated on said first-mentioned surface in said opening, a pair of inboard and a pair of outboard springs supported on said rocker, said outboard springs having a greater length of travel than said inboard springs, means on said frame cooperating with means on said rocker to maintain the latter in assembled relationship with said frame, and a bolster supported from said springs and having guide means cooperating with said columns, the longitudinal axis of the respective pairs of springs intersecting said frame at opposite sides of the point at which it engages said rocker.

10. In a railway car truck, a side frame comprising spaced columns and an intervening bolster opening, a flat surface on said frame between said columns, a rocker tiltably supported on said surface in said opening for tilting movement about an axis extending longitudinally of said frame, a pair of inboard and a pair of outboard springs supported from said rocker, one of said pairs having a greater length of travel than the other thereof, means on said frame cooperating with means on said rocker to maintain the latter in assembled relationship with said frame, and a bolster supported from said springs and having guide means cooperating with said columns.

11. In a railway car truck, a side frame, a spring group supported from said frame and comprising inboard and outboard springs, one of which is a long travel spring and the other of which is a short travel spring, a bolster supported on said group, and rocker means interposed between said group and said frame, said rocker means comprising a member having an arcuate surface seated on a flat surface of said frame, said member being formed and arranged so that its point of contact with said flat surface is at approximately the longitudinal center line thereof under full static bolster load, and means for interlocking said frame and said rocker means while permitting a rocking action of the latter against said flat surface.

12. In a railway car truck, a side frame, a spring group supported from said frame and comprising a long travel spring and a short travel spring, a bolster supported on said group, and rocker means interposed between said group and said frame, said rocker means comprising a rocker tiltably seated on a flat surface of said frame, means for interlocking said frame and said rocker means while permitting a rocking action of the latter, and spring caps slidably mounted on concave surfaces atop said rocker, said caps affording seats for respective of said springs, the vertical axis of the respective springs intersecting said frame at opposite sides of the point at which it engages said rocker.

13. In a railway car truck, a side frame, a spring group supported from said frame and comprising a long travel spring and a short travel spring, a bolster supported from said group, and rocker means interposed between said group and said frame, said rocker means being tiltably seated on said frame and interlocked therewith by means of spaced lugs on said frame received within complementary recesses in said rocker, said springs being so arranged that their vertical axes are disposed at opposite sides of the tilting axis of said rocker means.

14. In a railway car truck, a side frame member comprising spaced columns and an intervening bolster opening, a rocker member interlocked with said columns, an arcuate surface on one of said members bearing against a flat surface on the other member to afford a rocking action of said rocker member, spring means comprising springs of different capacity supported by said rocker member and having their longitudinal axes disposed respectively at opposite sides of the rocking axis of said rocker member, a bolster supported by said spring means, and means for interlocking said bolster and said columns.

15. In a railway car truck, a side frame member, a rocker member, one of said members having an arcuate surface bearing against a substantially flat surface of the other member to afford a rocking action for said rocker member, spaced spring means mounted on said rocker member, one of said spring means being of greater capacity than the other, a bolster supported by said spring means, the respective spring means being so formed and arranged that their vertical axes are disposed at opposite sides of the rocking axis of said rocker member, and means for interlocking said frame and rocker members while accommodating said rocking action.

16. In a railway car truck, a side frame member, a spring group supported therefrom and comprising a pair of springs, one having greater capacity than the other, a bolster member supported by said group, and means interposed between said group and one of said members for accommodating under certain conditions a greater rate of deflection in one of said springs than in the other, said means comprising a rocker in abutment with said one member along arcuate and flat interengaged surfaces, one of said surfaces being disposed on said one member and the other of said surfaces being disposed on the rocker, and spaced

means at opposite sides of said surfaces respectively and spaced therefrom for maintaining said rocker in assembled relationship with said one member while accommodating a rocking action of said rocker upon said surfaces, each of said spaced means comprising interengaged lug and recess means.

17. In a railway car truck, a side frame member, a spring group supported therefrom and comprising a plurality of springs, certain of which have greater capacity than others thereof a bolster supported from said springs, and means entirely spaced from the bolster and operatively associated with said springs for accommodating a greater rate of deflection for said greater capacity springs than for said other springs, said means comprising a rocker member interposed between said springs and said frame member, an arcuate surface on one of said members bearing against a flat surface on the other member to accommodate a rocking action of said rocker member, and means for interlocking said members with each other while permitting a rocking action of said rocker member.

18. In a railway car truck, a side frame, a spring group supported from said frame and comprising a long travel spring and a short travel spring, a bolster supported from said group, a rocker interposed between said group and said frame, said rocker comprising an arcuate bottom surface bearing against a flat surface on the frame and curving upwardly toward the ends of said rocker, each of said springs being seated on said rocker adjacent one of said ends thereof, whereby compression and expansion of said group causes said rocker to tilt on said arcuate surface, and means for interlocking said frame and said rocker while permitting said tilting of the rocker.

19. In a railway car truck, a side frame, a spring group supported from said frame and comprising a long travel spring and a short travel spring, a bolster supported from said group, a rocker interposed between said group and said frame, said rocker comprising an arcuate bottom surface bearing against a flat surface on the frame and curving upwardly toward the ends of said rocker, each of said springs being seated on said rocker adjacent one of said ends thereof, whereby compression and expansion of said group causes said rocker to tilt on said arcuate surface thereof, said rocker being so formed and arranged that its point of contact with said frame is at approximately the longitudinal center line thereof under full static bolster load, and means for interlocking said frame and said rocker against relative movement inboardly and outboardly of the frame, said means accommodating a rocking action of said rocker on said arcuate surface thereof.

20. In a side frame for a railway car truck, a frame member comprising a flat seat, a rocker with an arcuate bottom surface bearing against said seat, said surface curving upwardly toward the ends of said rocker, a bolster-supporting spring mounted atop said rocker adjacent each of said ends thereof, one of said springs having greater capacity than the other thereof, whereby loading of said springs causes said rocker to rock on said surface, and means for interlocking said rocker with said frame member against relative inboard and outboard movement other than the rocking movement of said rocker.

21. In a railway car truck, a side frame comprising spaced columns and an intervening bolster opening, a member interlocked with said columns and having an arcuate surface tiltably seated on said frame at the bottom of said opening, said surface curving upwardly toward opposite ends of said member, a spring seated on said member adjacent each of said ends thereof, one of said springs being of greater capacity than the other thereof, whereby compression of said springs causes said member to tilt on said surface, and a bolster supported by said springs and interlocked with said columns.

22. In a railway car truck, a side frame comprising spaced columns and an intervening bolster opening, a member interlocked with said columns and having an arcuate surface tiltably seated on said frame at the bottom of said opening, said surface curving upwardly toward opposite ends of said member, a spring seated on said member adjacent each of said ends thereof, and a bolster supported by said springs and interlocked with said columns, one of said springs being of greater length than the other and being housed at its upper end within said bolster.

23. In a railway car truck, a side frame comprising a flat rocker seat, a rocker member with a substantially convex surface bearing against said seat, spring means comprising two coil springs mounted on said member, one of said springs being of relatively great capacity, a bolster supported by said springs, said member being so formed and arranged that its point of contact with said seat is entirely disposed intermediate the points at which the vertical axes of respective springs intersect said frame, and means for interlocking said frame and said rocker while permitting a rocking action of the latter against said seat.

24. In a railway car truck, a side frame with a flat seat, a member having a substantially convex surface bearing against said seat, said surface being curved transversely of said frame, inboard and outboard spring means supported by said member, one of said spring means being of greater capacity than the other, a bolster supported by said spring means, and means interlocking said frame and said member while accommodating tilting movement of the latter against said seat.

25. In a railway car truck, a side frame having a flat surface, a member rockably seated on said surface, spaced spring means mounted on said member, one of said spring means being of greater capacity than the other, a bolster supported by said spring means, the respective spring means being so formed and arranged that their vertical axes are disposed at opposite sides of the rocking axis of said member, and means for interlocking said frame and said member while permitting a rocking action of the latter.

26. In a railway car truck, a side frame having a flat surface, a member rockably seated on said surface, spaced spring means mounted on said member, one of said spring means being of greater capacity than the other, a bolster supported by said spring means, the respective spring means being so formed and arranged that their vertical axes are disposed at opposite sides of the rocking axis of said member, said member being so formed and arranged that its point of contact with said frame is at approximately the longitudinal center line thereof under full static bolster load, and means for interlocking said frame and said member while permitting a rocking movement of the latter.

CLAUS J. WERNER CLASEN.