

March 3, 1953

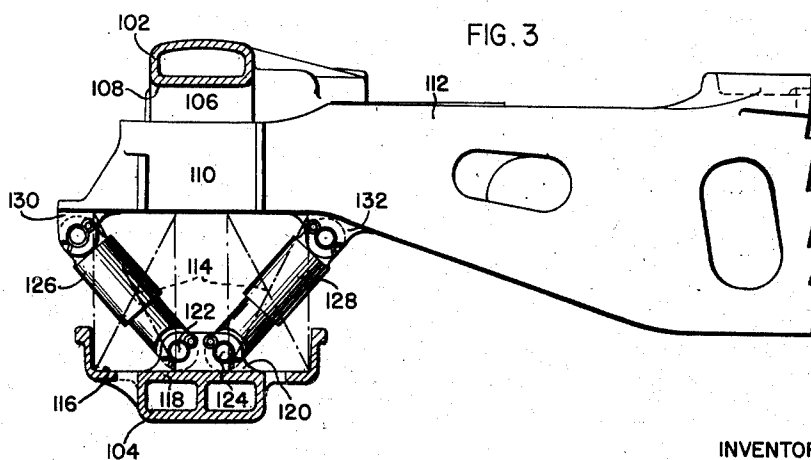
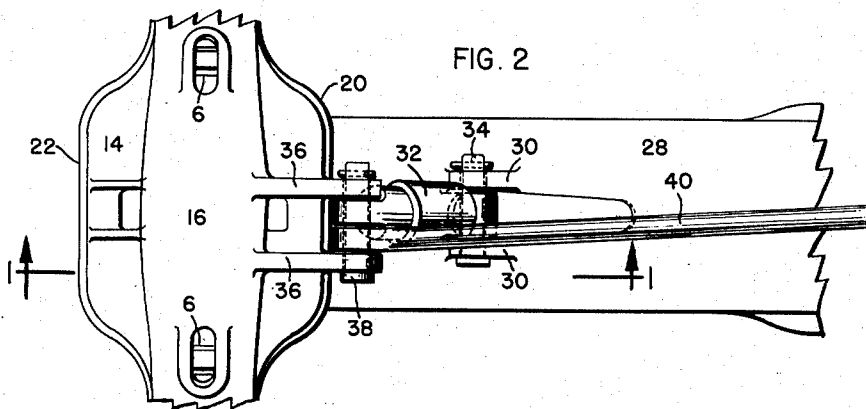
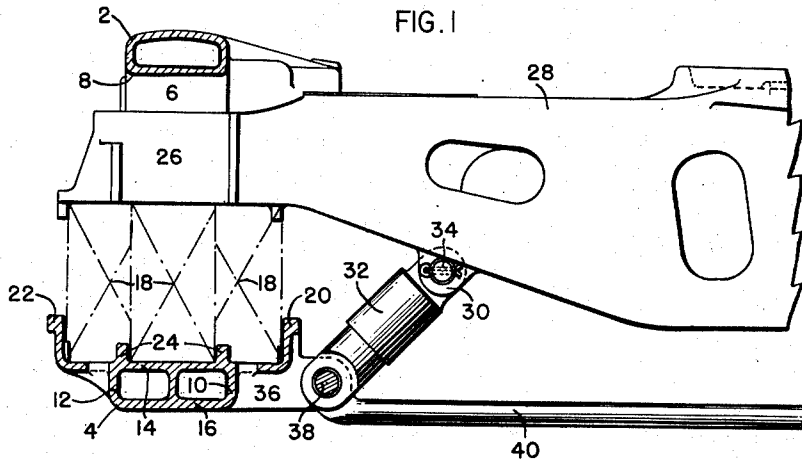
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2,630,079

CAR TRUCK

Filed Oct. 19, 1946

2 SHEETS—SHEET 1



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2 SHEETS—SHEET 2

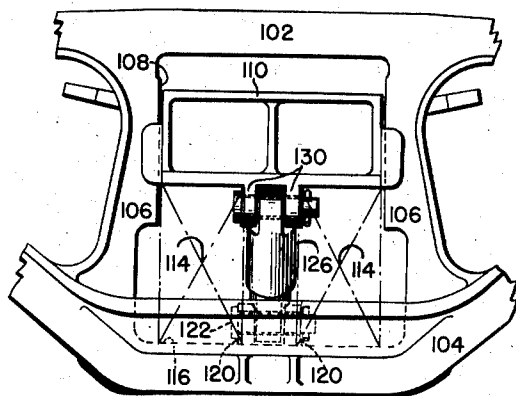


FIG. 4

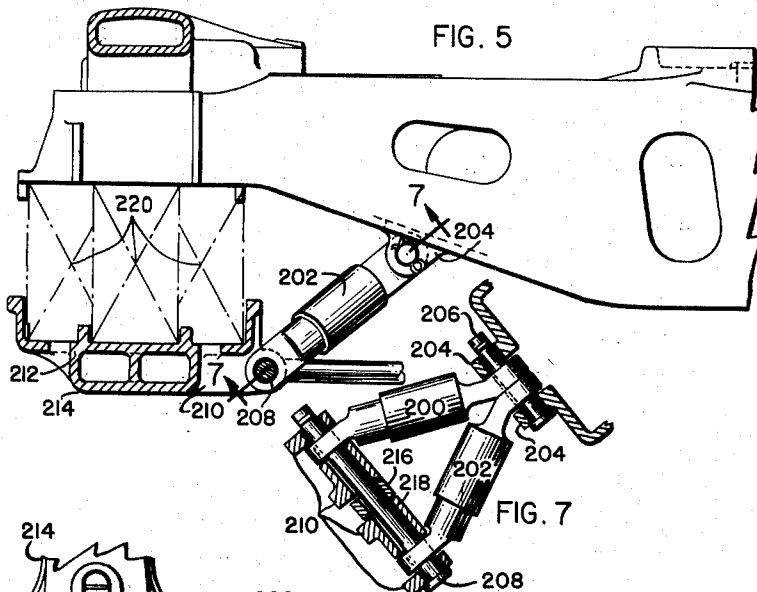


FIG. 5

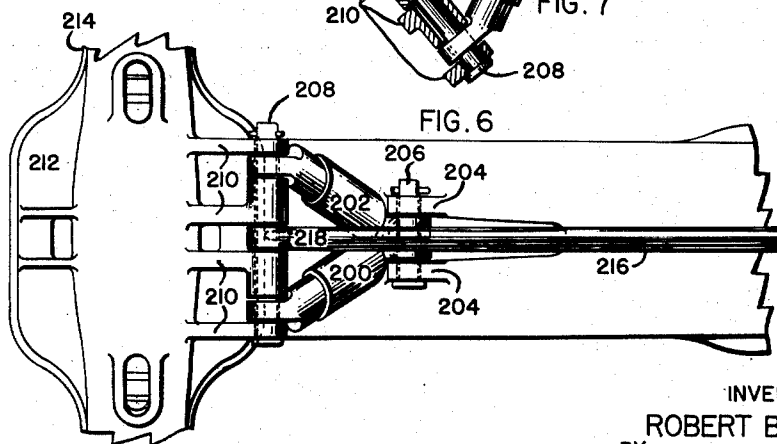


FIG. 6

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2,630,079

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24 Claims. (Cl. 105—197.2)

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My invention relates to hydraulic shock absorber control in railway cars and more particularly to the novel arrangement of hydraulic snubbers or other fluid type of energy absorbing devices to control the movements of the bolster relative to the truck frame.

The present invention contemplates the provision of a self-aligning, spring-plankless railway freight car truck of the type in which the side frames are free within controlled limits to adjust themselves to track conditions with the minimum of frictional control and resistance between wheel flanges and rails. On entering curves, trucks of this type yield slightly to the external force tending to pull it out-of-square against the resistance of the bolster springs to angular distortion, and on reentering tangent track, the resistance of the springs to temporary distortion restores the truck to its normal square position.

One object of my invention is to provide various methods of arranging and fastening hydraulic snubbers between the bolster and the relatively movable side frames of a railway car truck to control the different movements of said bolster relative to said side frames and of the side frames relative to each other and at the same time effectively snub any synchronous oscillations of the bolster-supporting springs.

Another object of my invention is to provide for curbing the "nosing" and the "rolling" actions of a railway vehicle.

A further object of my invention is to provide for mounting energy-absorbing devices between the bolster and side frames of a self-aligning, spring-plankless railway car truck that are responsive not only to curb the "rolling" or "nosing" movements between the car and the car truck but are also responsive to dampen any synchronous vertical oscillations of the springs supporting the car on said truck.

These and other objects of my invention will be apparent from the specification and the drawings wherein,

Figure 1 is a fragmentary sectional view of a self-aligning, spring-plankless railway freight car truck embodying one form of my invention, the section being taken substantially in the transverse vertical plane indicated by line 1—1 of Figure 2 with the bolster being shown in elevation.

Figure 2 is a fragmentary bottom plan view of the spring seat portion of the side frame shown in Figure 1 and showing the connection

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of the snubbing means to said portion and the bolster.

Figure 3 is a view similar to that shown in Figure 1 and showing an embodiment of another form of my invention.

Figure 4 is a fragmentary side elevation of a railway car truck illustrating the position of the snubbing means shown in Figure 3 relative to the bolster-supporting springs.

Figure 5 is a view similar to that illustrated in Figure 1 and showing an embodiment of another form of my invention, Figure 6 being a bottom plan view thereof and Figure 7 being a fragmentary sectional view taken in the diagonal plane substantially as indicated by line 7—7 of Figure 5, the snubbing means, however, being shown in elevation.

Describing my invention in detail and referring first to the embodiment thereof as illustrated in Figures 1 and 2, the railway freight car truck comprises a truss type side frame having the compression member 2 of box section and the tension member 4 with the integrally formed spaced columns 6, 6 defining with said members the bolster opening 8.

Beneath the bolster opening the box section tension member 4 may have the inboard and outboard walls 10 and 12 and the top and bottom chords 14 and 16. The top chord 14 may be widened to provide a spring seat for the springs 18, 18 diagrammatically indicated in Figure 1, said springs being held in position on said seat by means of the upstanding inboard and outboard flanges 20 and 22 and the upstanding studs 24, 24 as may be observed in Figure 1. On top of these springs may be seated in the usual manner the relatively shallow end portion 26 of the bolster 28. On the underside of the bolster intermediate the ends and center thereof may be provided the spaced central depending lugs 30, 30, said lugs loosely receiving therebetween one end of the telescoping fluid type shock absorbing devices 32, said end being pivoted to said lugs by means of the pin 34 extending there-through.

The other end of the device may be similarly pivoted to the spaced lugs 36, 36 by means of the pin 38 on which may also be pivoted the rod 40 interconnecting the side frames.

It may readily be observed in Figure 2 that the lugs 36, 36 are integrally formed on the spring seat portion of the side frame centrally thereof.

It will be understood that the other end of the bolster and the other side frame are simi-

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larly arranged to that described and are interconnected by a shock absorbing device and that these devices lie in upwardly converging planes and are inboard of the side frame.

From the arrangement described, it will be appreciated that any synchronous oscillations of the bolster-supporting springs will be effectively dampened, the lateral movement of the bolster effectively controlled, and to some extent the longitudinal movement thereof relative to said side frames restrained.

Referring now to Figures 3 and 4, it will be seen that the embodiment thereof is generally similar to that of Figures 1 and 2. The railway freight car truck comprises a truss type side frame having a compression member 102, a tension member 104, and spaced columns 106, 106 joining said members and forming the bolster opening 108 therewith in which is received the bolster end 110 of the bolster 112, said end being supported by the spring 114, 114 diagrammatically illustrated and seated as at 116 on the top chord 118 of the truck frame box section tension member 104.

Centrally of the seating face of the top chord 118 and integrally formed therewith are the transverse spaced lugs 120, 120, said lugs affording a pivotal connection as at 122 and 124 for the corresponding ends in telescoping energy absorbing devices or snubbing means 126 and 128 respectively. It may be noted that the devices are arranged in a V, the apex of which is at the lugs 120, 120 and lie in the vertical plane, bisecting the bolster longitudinally. The other end of the device 126 is pivoted to the lugs 130, 130 formed centrally on the underside of the bolster adjacent the end thereof and the other corresponding end of the device 128 is pivoted to the set of lugs 132 formed centrally on the underside of the bolster intermediate the center and end thereof, as may best be seen in Figure 3. It will be noted that the arrangement of the other half of the truck (not shown) is the same as described.

As compared with the arrangement shown in Figures 1 and 2, the arrangement of the snubbing means shown in Figures 3 and 4 provides a greater amount of snubbing action for dampening synchronous oscillations of the bolster-supporting springs; greater control of the lateral movement and "nosing" of the bolster is provided to control "rolling" and "nosing" of the car, and to some extent the longitudinal movement of the bolster is restrained.

Figures 5 to 7 illustrate another modification of my invention. The snubbing means 200 and 202 are identical to those already described and are arranged in an inclined inverted V, the apex of which terminates at the lugs 204, 204, a set of such lugs being disposed centrally on the underside of the bolster intermediate the center and the ends thereof, as may be seen in Figure 7, wherein only one set of such lugs are shown inasmuch as the construction of the bolster and truck is similar at the opposite side of the center lines thereof. It may also be observed that the snubbing means are inboard of the side frames.

A pin 206 extending through aligned openings in the lugs 204, 204 and in the upper ends of the snubbing means 200 and 202 provides a pivotal connection between said means and lugs.

The lower ends of the snubbing means 200 and 202, which are spaced from each other, pivot on the pin 208 adjacent the opposite ends thereof,

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said pin extending through the spaced parallel lugs 210, 210 integrally formed on the inboard side of the spring seat portion 212 of the tension member 214. A tie rod 216 interconnecting the frames may also be pivoted on the pin 208 as at 218.

By the arrangement just described, it may be observed that the snubbing means 200 and 202 and that the identical means at the other end of the bolster (not shown) being similarly arranged, lie in upwardly converging planes and effectively hold the bolster against lateral movement relative to the side frames and also serve to dampen the vertical oscillations of the bolster-supporting springs 220 diagrammatically illustrated in Figure 5 and, in addition, control the horizontal torsional forces that cause "nosing," twisting, and out-of-squareness of the bolster relative to the side frames.

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. An arrangement of shock absorbing means in a railway car truck comprising spaced longitudinal supporting members, a transverse movable member having the opposite ends thereof spring-supported on said supporting members, a set of securing lugs at each end of said movable member disposed on the underside thereof adjacent its longitudinal vertical center plane, a pair of shock absorbing devices at each end of said movable member arranged in a V with the apex of said V pointing downwardly and having their corresponding upper ends secured to the adjacent set of lugs, and means on portions of said supporting members beneath said supported member pivotally connected to the corresponding lower ends of the adjacent of said devices, all of said devices lying in a vertical plane substantially bisecting said movable member longitudinally.

2. In a railway car truck, a side frame having compression and tension members and spaced columns defining therewith a bolster opening, a bolster end projecting into said opening in co-operative relationship with said columns, said tension member having a widened top chord defining a spring seat, springs on said seat for support of said bolster end, a plurality of telescoping energy absorbing devices between said end and said seat, a pair of transverse lugs centrally formed on said seat pivotally connected to the lower ends of said devices, other spaced sets of lugs on the underside of said end and lying in a vertical plane substantially bisecting said end longitudinally, one set of said lugs being positioned adjacent the outboard extremity of said end and the other set of said lugs being disposed inboardly of said one set of lugs, and means connecting the other ends of said devices to said other set of lugs.

3. An arrangement of shock absorbing means in a railway car truck comprising spaced relatively movable longitudinal supporting members, a transverse movable member having the opposite ends thereof spring-supported on said supporting members, spaced sets of securing lugs centrally disposed on the underside adjacent the ends of said movable member, a pair of shock absorbing

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devices at each end of said movable member and arranged in a V with the apex of said V pointing downwardly and having the corresponding upper ends secured to respective of said lugs, and lugs on portions of said supporting members beneath said movable member pivotally connected to the corresponding lower ends of said devices and holding them approximately together.

4. In a railway car truck comprising truss type side frames movable relative to each other and each having tension and compression members, spaced columns joining said members, a bolster extending between said frames intermediate said columns, a pair of shock absorbing devices at each end of said bolster and pivoted thereto and to the respective side frame and lying in a vertical plane substantially bisecting said bolster longitudinally, each pair of said devices lying in upwardly diverging planes.

5. In a railway car truck, a bolster, a frame structure comprising spaced relatively movable side frames associated with the opposite ends of said bolster, springs on said structure supporting said bolster, shock absorbing means interconnecting the ends of said bolster with said structure, said means being diagonally arranged and lying in downwardly converging planes and cooperating with each other for controlling relative movements of said side frames and movements of said bolster relative to said side frames.

6. In a railway car truck, a frame structure including a pair of relatively movable side frames each comprising spaced columns and an intervening bolster opening, a bolster end resiliently supported from each frame in its opening, and diagonally disposed energy absorbing means interconnecting each bolster end with the structure, the longitudinal axes of said means lying in the vertical plane bisecting said frame transversely and said bolster longitudinally.

7. In a railway freight car truck, a pair of side frames each having a spring seat portion, a bolster extending transversely of the frames and having its ends disposed above the seat portions, springs supporting the bolster at said ends from said portions, a pair of shock absorbers adjacent each end of the bolster disposed between said frames, each pair of shock absorbers being arranged in upwardly converging relationship and disposed in a plane extending longitudinally of the truck and sloping upwardly toward the vertical longitudinal center plane of the truck, each pair of shock absorbers being connected at their upper ends to the bolster on an axis extending transversely of the bolster at a point adjacent the end thereof disposed approximately in the longitudinal vertical center plane of the bolster, and a tie bar extending at opposite ends between the shock absorbers of said pairs, each end of said bar being connected by a common pin with the lower ends of the adjacent pair of shock absorbers to the inboard side of the adjacent spring seat portion.

8. In a railway freight car truck, a side frame comprising tension and compression members and spaced columns defining a bolster opening, a spring seat portion at the bottom of the opening, springs on said portion, a bolster extending transversely of the frame having an end within the opening supported on the springs, a pair of shock absorbers disposed at the inboard side of the frame and arranged in upwardly converging relationship and lying in a plane sloping upwardly away from the frame, a common pin connecting the lower ends of said absorbers to the inboard

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side of said portion, and a common pin connecting the upper ends of said absorbers to the bottom of the bolster at a point disposed substantially in a central vertical longitudinal plane of the bolster.

9. In a railway freight car truck, a pair of side frames each comprising a tension member with a widened spring seat intermediate its ends, a bolster extending between the frames and spring-supported at its ends from the seats, a tie bar extending between the frames and pivotally connected to inboard sides of the frames at points centrally of the frames on axes extending longitudinally of the frames, and a pair of shock absorbers at the inboard side of each frame, the absorbers of each pair being connected at their lower ends to the adjacent seat coaxially with the adjacent connection of the tie bar to the seat, the upper ends of the absorbers of each pair being connected together to the underside of the bolster at a point spaced inboardly of the adjacent side frame and being disposed substantially in the vertical longitudinal center plane of the bolster.

10. In a railway freight car truck, a side frame comprising tension and compression members and spaced columns defining a bolster opening, said tension member being widened between the columns to provide a spring seat, a bolster spring-supported on the seat, inboard and outboard flanges on said seat merging with the columns, two outer and two intermediate spaced lugs on the inboard side of the tension member formed integral with the same and with the bottom of the seat and projecting inboardly therefrom, a tie bar having an end extending between the intermediate lugs, a pair of shock absorbers at the inboard side of the frame, one of said absorbers having its lower end extending between one of the end lugs and adjacent intermediate lug, the other absorber having an end extending between the other outer lug and the adjacent intermediate lug, and a pin extending through all of the lugs and said end of the bar and lower ends of said absorbers affording a connection on an axis extending longitudinally of the frame, the upper end of said absorbers being connected together inboardly of the lower ends to the bottom of the bolster at a point located substantially on the vertical longitudinal center plane of the bolster.

11. In a railway freight car truck, a pair of relatively movable side frames each comprising tension and compression members and spaced columns defining a bolster opening, springs in each opening, a bolster on the springs, and damping means including a shock absorber adjacent each frame and diagonally arranged and connected at its upper end to the underside of the bolster at a point disposed in the longitudinal vertical center plane of the bolster and connected at its lower end with the frame whereby a triangular arrangement of forces is afforded wherein the bolster affords one force leg, the springs another and the shock absorber the third.

12. In a railway car truck, a bolster member, spaced side frame members movable relative to each other and associated with opposite ends of said bolster member, resilient means on said side frame members supporting said bolster member, and shock absorbing means interconnecting each end of said bolster member with the associated side frame member, said shock absorbing means being centrally disposed between said members and diagonally arranged and lying in planes converging toward one of said members and co-

operating with each other to control the movements of said bolster member relative to said side members and said side members relative to each other.

13. In a railway car truck, spaced side frames movable relative to each other, a bolster extending transversely between said side frames and spring-supported therefrom, snubbing means interconnecting each end of said bolster to the adjacent side frame and lying in converging planes for operative cooperation with each other for controlling various movements of said bolster relative to said side frames and for controlling movements of the side frames relative to each other, said snubbing means being connected to said bolster adjacent a vertical plane bisecting the latter longitudinally.

14. In a railway car truck, side frames movable relative to each other, each frame having a compression member, a tension member, and spaced columns defining a bolster opening, a bolster extending between said frames and having its ends disposed in said openings, springs in said openings seated on said tension members and supporting the bolster at its ends, diagonally positioned shock absorbing means between said bolster and tension members, means on said tension members for pivotally fastening the lower ends of said shock absorber means thereto and securing means on said bolster for pivotally connecting the upper ends of said shock absorbing means to said bolster, said shock absorbing means being operative to control movements of said bolster relative to said side frames and to control movements of said side frames relative to each other.

15. In a railway car truck, a pair of side frames movable relative to each other and including seat portions, a spring group on the seat portion of each frame, a bolster resiliently supported upon said spring groups, and an energy absorbing means disposed diagonally adjacent each spring group and connected to its related frame adjacent the seat portion thereof beneath the bolster and connected to the underside of the bolster.

16. In a railway car truck, a pair of side frames movable relative to each other and each having a spring seat portion, a bolster above said portions, a spring group between each portion and the bolster, and energy absorbing means acting diagonally of each spring group and each being connected to and depending downwardly from the underside of the bolster adjacent the longitudinal vertical center plane thereof and connected at their other ends to their related seat portions to control movements of the side frames relative to each other and relative to the bolster.

17. In a railway car truck, a pair of side frames movable relative to each other and each including a member having a chord providing a spring seat, springs on said seats, a bolster resiliently supported on said springs, connecting means integral with each chord, fastening means on the underside of opposite ends of the bolster vertically misaligned with respect to their related connecting means, and diagonally disposed shock absorbing means between each chord and the underside of said bolster arranged to act in parallel with said springs and connected to their respective fastening means and connecting means.

18. In a railway car truck, a pair of relatively movable side frame members, a spring group on each member, a bolster member on said spring groups, and energy absorbing means connected to each frame member beneath the bolster member and to the underside of said bolster member,

said means including a pair of shock absorbing devices arranged angularly to each other and lying in a plane disposed angularly to the plane of said side frame members.

19. In a railway car truck, spaced side frames movable relative to each other, a bolster spring-supported from said frames, a set of independent energy absorbing devices adjacent each end of the bolster, the devices of each set being connected at a common point to the underside of the bolster and at spaced points to the adjacent frame beneath the bolster on a common axis, and a tie bar extending between said frames and pivotally connected to respective frames adjacent said devices.

20. In a railway car truck, a pair of relatively movable side frame members, a bolster member spring-supported therefrom, shock absorbing means connected to the underside of the bolster member and to said frame members therebeneath, said shock absorbing means comprising pairs of telescoping shock absorbing devices each arranged in a V with the apex of the V directed toward one of said members.

21. In a railway car truck, spaced relatively movable side frames, a bolster spring-supported therefrom, a plurality of energy absorbing devices connected to the underside of the bolster at substantially the longitudinal center line thereof and each connected to the adjacent frame beneath the bolster, each of said devices being arranged to act angularly to the major and minor axes of said bolster for resisting relative movements of the side frames and torsional, longitudinal and lateral movements of the bolster relative to the side frames, and a tie bar pivotally connected at opposite ends to respective frames adjacent said devices.

22. In a railway car truck, spaced relatively movable side frames, a bolster spring-supported therefrom, each of said side frames comprising a seat portion disposed beneath the bolster, spaced lugs on the seat portion, a pivot element extending through said lugs, a shock absorbing means pivoted on said element and pivotally connected to said bolster, and a tie bar extending between said frames and at opposite ends thereof pivoted on respective elements.

23. In a railway car truck, spaced relatively movable side frames, a bolster resiliently supported therefrom, each of said frames comprising a member beneath said bolster, lugs on the inboard side of said member spaced transversely of the bolster, a pivot element extending axially transverse of said bolster connected to said lugs, a pair of shock absorbers each received between a pair of said lugs and connected at spaced points to said element and at a common point to said bolster, and a tie bar between said frames connected at opposite ends to respective elements intermediate said spaced points.

24. In a railway car truck, spaced relatively movable side frames, a bolster, springs on said frames supporting said bolster at the ends thereof, a pair of shock absorbing devices connected to said bolster at a common point intermediate the center and one end thereof, another pair of shock absorbing devices connected to said bolster at a point intermediate the center and the opposite end thereof, each pair of said devices being arranged in a V and pivotally secured beneath the bolster to the inboard side of the associated frame, said devices cooperating with each other for controlling relative movements of the frames.

and various movements of said bolster relative to said frames.

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