Nov. 8, 1932. L. J. DAVIS 1,886,533

SWINGING LINK ARRANGEMENT FOR RAILWAY TRUCKS

Filed March 16, 1931 3 Sheets-Sheet 1

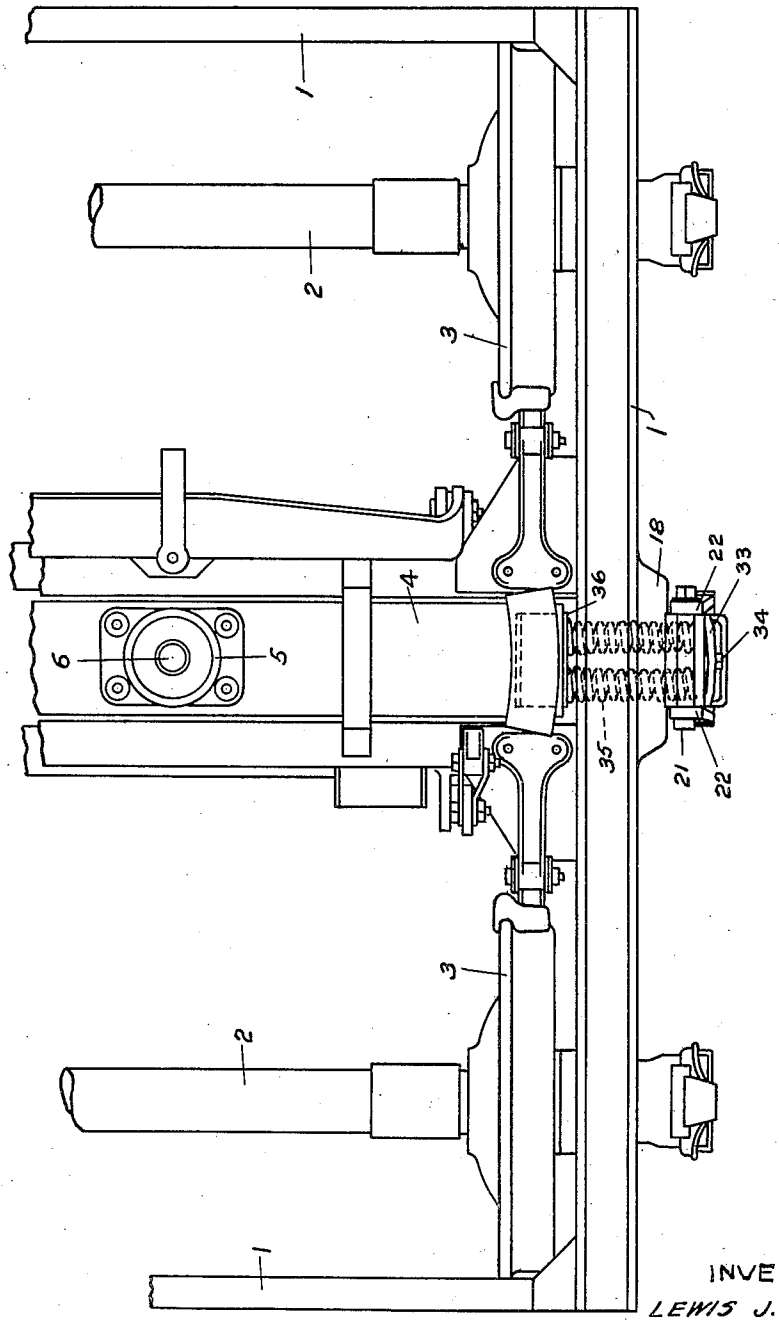


FIG. 1

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SWINGING LINK ARRANGEMENT FOR RAILWAY TRUCKS

Filed March 16, 1931 3 Sheets-Sheet 2

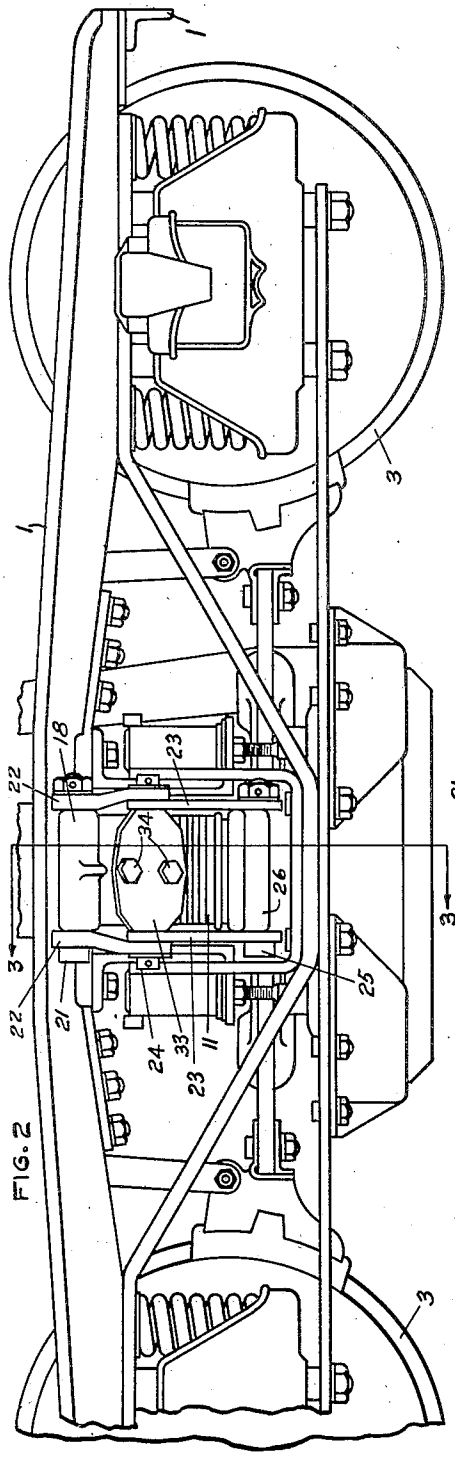


FIG. 2

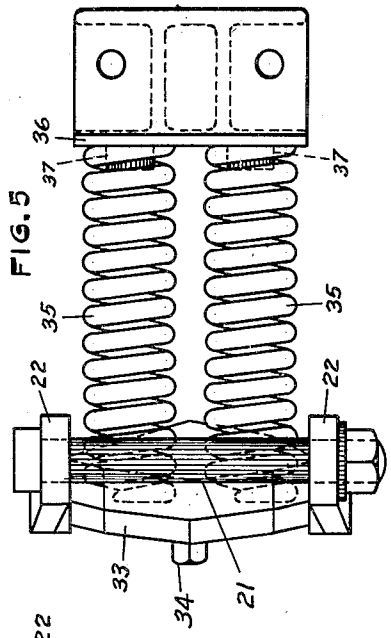


FIG. 5

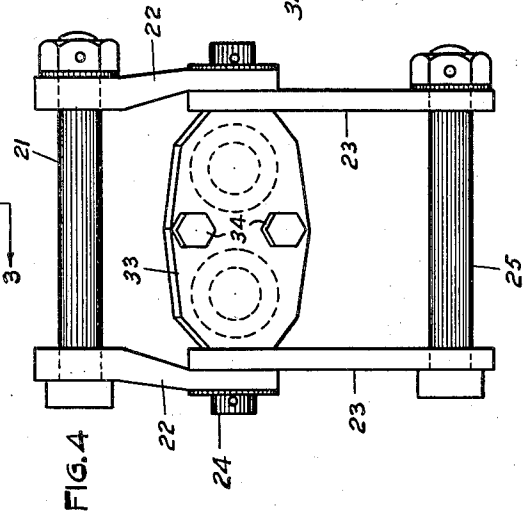


FIG. 4

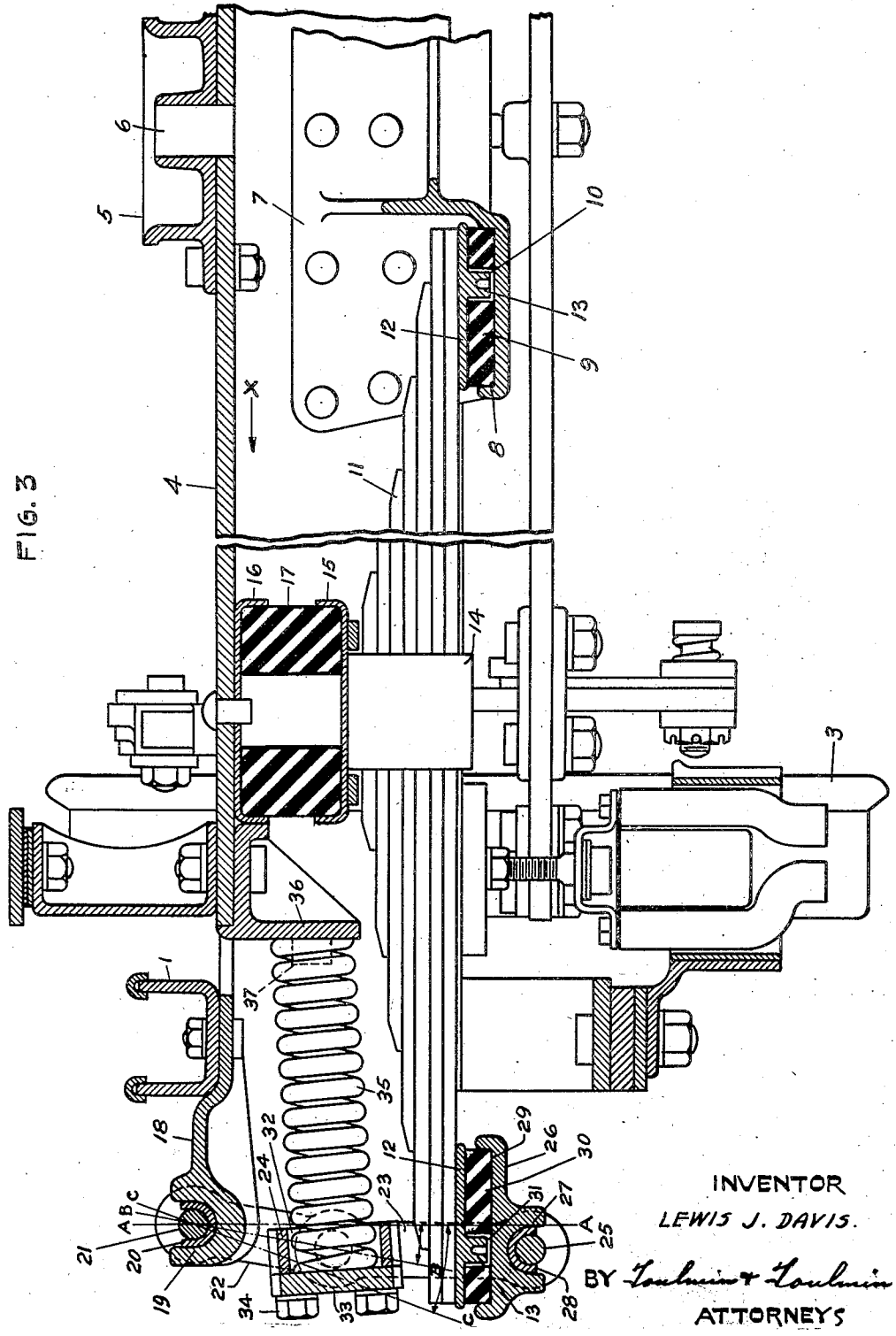
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SWINGING LINK ARRANGEMENT FOR RAILWAY TRUCKS

Filed March 16, 1931 3 Sheets-Sheet 3

FIG. 3



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Patented Nov. 8, 1932 1,886,533

UNITED STATES PATENT OFFICE

LEWIS J. DAVIS, OF CINCINNATI, OHIO, ASSIGNOR TO THE CINCINNATI CAR CORPORATION, OF CINCINNATI, OHIO, A CORPORATION OF OHIO

SWINGING LINK ARRANGEMENT FOR RAILWAY TRUCKS

Application filed March 16, 1931. Serial No. 522,945.

This invention relates to improvements in swinging link arrangements for railway trucks, and has for its object to provide means to dampen and lessen the side movement of car bodies while running.

It is also an object of this invention to provide means for cushioning the up and down movement of the body on the supporting trucks or running gear.

It is also an object of this invention to provide means for supporting a car body on the trucks so that side movement is counteracted by the downward movement of the weight of the body.

It is especially the object of this invention to provide means whereby the lateral and vertical movements of the car body are lessened and controlled one by the other.

These and other advantages will appear from the following description taken in connection with the drawings, in which there is shown a preferred embodiment of this invention.

Referring to the drawings:

Figure 1 is a top plan view of one end of a car truck.

Figure 2 is a side elevation of a truck with a part thereof broken away.

Figure 3 is a section on the line 3—3 of Figure 2.

Figure 4 is a side elevation of a link structure for supporting one end of a spring attached to the bolster.

Figure 5 is a top plan view of the link structure shown in Figure 4, together with coil springs associated therewith.

In Figure 1 there is shown one side of a car truck, the frame of which is indicated by the numeral 1. This frame is supported by an axle 2 and wheels 3. There are two axles and four wheels for each frame. The frame and wheel structures are of the conventional form and a detailed description thereof will not be given here.

The bolster 4 extends across the central part of the frame, between the axles 2, and is supported as hereinafter described. In the center of this bolster is provided a seat 5 for supporting one end of the car body, not shown. In the central part of this seat and extending through a boss therein is a hole 6 for receiving a pin for holding the car body on the bolster. Attached to the bolster adjacent the seat 5 is a bracket 7, which provides a seat 8 having a cushion 9 therein. In the central part of this cushion is a hole 10. The seat 8 is of any suitable form and shape and is adapted to hold the cushion 9 against longitudinal movement.

This bracket and the cushion supported thereby are to support one end of a semi-elliptical spring 11 which has on each end a plate 12 suitably attached thereto. On each plate and extending downwardly therefrom is a lug 13 to fit in the hole 10 in the cushion 9, so that when the end of the spring is properly placed upon the pad or cushion the spring cannot move longitudinally with relation to the bolster. Around the central part of the spring is a sleeve 14. This sleeve has suitably attached thereto the lower part 15 of a housing. The upper and cooperating part of this housing is indicated by the numeral 16 and is attached to the bolster a short distance from the end thereof. These two parts constitute a housing for containing a resilient member 17. This resilient member is made of rubber or any suitable material, and supports the end of the bolster on the spring in a resilient manner.

Extending from the frame 1 is a bracket 18, which has in the outer end thereof a curved seat 19. In this curved seat is a curved wearing plate 20, which provides a seat for a bolt 21. On each end of this bolt is a link 22. These two links constitute the upper pair of links for supporting the end of the spring opposite that supported on the bracket 7. The links of the other pair are indicated by the numeral 23. One link of the upper pair of links is on each side of the bracket 18 and swings vertically downwardly therefrom. The lower pair of links is attached to the upper pair of links by means of a trunnion 24, the ends of which pass through holes in the adjacent ends of the two links of the two pairs of links. The lower ends of the lower pair of links have holes therein to receive a bolt 25.

Resting on this bolt 25 between the links

23 is a saddle 26 which has on the lower part thereof a curved seat 27. In this seat 27 is a wearing plate 28, which provides a seat for the immediate support of the bolt 25. By this arrangement the saddle is supported between the lower links and upon the bolt 25. On the side of the saddle opposite the seat 27 is a second seat 29, similar in shape to seat 8. This seat carries a cushion 30, which is similar to the cushion 9 and has a hole 31 therein for receiving the lug 13 on the end of the spring opposite that supported by the bracket 7.

The trunnion between the links has a pair of horizontally arranged holes 32 therein, each to receive one end of a spring. Fitting over the outer ends of these holes and against the trunnion is a cover plate 33, which is held thereto by means of bolts or screws 34. In each of the holes 32 is one end of a spring 35. The other ends of these springs rest against a bracket 36 attached to the end of the bolster 4. This bracket is provided with a pair of studs 37 which project into the ends of the springs to hold the springs in position between the links and the end of the bolster.

It will be noticed from an examination of Figure 3 that the end of the spring adjacent the bracket 36 is elevated above the ends of the springs fitting in the trunnion. By this means when a load is applied to the body mounted upon the bolster the bolster tends to lower and thereby compress the spring 35 and cause the links to swing outwardly at their points of connection with each other.

If any force should be applied to the side of the body in the direction of the arrow X, the bolster will move toward the left as shown in Figure 3. This left-hand movement of the bolster tends to move the links at their pivot point on the trunnion. This motion causes the links 22 to swing to the left from the line B—B to the line C—C. When the links 22 have the direction C—C the downward pressure on the bolster and the force exerted by the springs 35 are equal to the force in the direction of the arrow X. These forces tend to reduce the lateral movement of the bolster. A downward movement of the bolster and the car body supported thereby tends to compress the springs 35 and move the link structure out and thereby raise the bolster and the body supported thereby. Hence, by the present bolster support means, any downward movement of the bolster is retarded by that very movement.

The present link bolster support means tends to prevent too excessive vertical or lateral movement of the bolster and the body supported thereby. Both the vertical and the lateral movements are dampened and lessened. In Figure 3 the line B—B indicates the normal direction of the links 22. When force is applied in the direction of the arrow X this link is caused to swing so that it will assume the position of the line C—C. When the links 22 are in the direction of the line C—C the weight of the body on the spring tends to straighten these links and bring them back so they are in their normal position, thereby forcing the bolster 4 back to its normal position.

At the time the bolster, as shown in Figure 3, is receiving its lefthand lateral movement the links 22 at the other end of the bolster, not here shown, are caused to swing inwardly and in this position these links will assume a position similar to that shown in line A—A of Figure 3. This line represents the extreme inward movement of the links 22. The line C—C represents the extreme outer movement of the links 22 and the line B—B represents their normal position.

In other words, any force tending to move the body sideways on the truck will also move the pivotal center at the bottom of the link structure a corresponding distance and will move the point of engagement of the coil spring with the bolster in the same manner. Such movements will cause the coil spring to compress and exert pressure on the trunnion supporting the other end of the coil spring at the junction of the two links. This will cause the top link to swing out from the angular position, which is the angle of the top link at rest. When it assumes the new position, the angularity of the forces such as the lateral force on the bolster and the downward force on the bolster, and the force exerted by the coil spring against the lateral force, will equal each other. As a result, the swing of the body is checked and through gravity and the force in the coil spring, the truck bolster and body will swing back to center position.

This swing link arrangement is on both sides of the truck so that a body movement in either sideways direction will be checked. While the vehicle is running, the coil spring on each side of the truck is exerting a certain pressure, tending to steady the body against minor movements. As the links are suspended at an angle in relation to one another, any increased pressure about the pivotal connection of the links to the bolster through the leaf spring, due to vertical car body movement, will tend to straighten this angle and will bring the coil spring into action with a cushioning effect on the vertical movement of the body.

I desire to comprehend within my invention such modifications as may be embraced within my claims and the scope of my invention.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a railway truck, a frame, a bolster, a

swinging support on the frame for each end of the bolster, and means between the end of the bolster and the swinging support to retard the movement of the bolster.

2. In a railway truck, a frame, a bolster, a swinging support on the frame for each end of the bolster, and a spring between the end of the bolster and the swinging support to retard the movement of the bolster.

3. In a railway truck, a frame, a bolster, a supporting member extending from beneath each end of said bolster, link means between each supporting member and the frame, and means connected to each link means and engaging the end of the bolster to retard the movement of the bolster.

4. In a railway truck, a frame, a bolster, a supporting spring extending from each end of the bolster, link means engaging the frame and each spring to support the bolster, and spring means between each link means and the end of the bolster to retard the movement of the bolster.

5. In a railway truck, a frame, a bolster, and means for supporting each end of the bolster on the frame, said means comprising a link structure, a spring for supporting the bolster on the link structure and a spring acting upon the bolster and the link structure to retard the lateral movement of the bolster.

6. In a railway truck, a frame, a bolster, and means for supporting each end of the bolster on the frame, said means comprising a link structure, a spring for supporting the bolster on the link structure and a spring connected at one end to the link structure and engaging the end of the bolster to retard the lateral movement of the bolster.

7. In a railway truck, a frame, a bolster, a leaf spring attached at one end to one end of the bolster, a link supported at one end by the frame, a second link pivoted to the first-named link and supporting the other end of the spring, and a connection between said links and the bolster to retard the lateral movement of the bolster.

8. In a railway truck, a frame, a bolster, a leaf spring attached at one end to one end of the bolster, a pair of links supported at one end by the frame, a second pair of links pivoted to the first-named pair of links and supporting the other end of the spring, and a connection between said links and the bolster to retard the lateral movement of the bolster.

9. In a railway truck, a frame, a bolster, a leaf spring attached at one end to one end of the bolster, a pair of links supported at one end of the frame, a second pair of links pivoted to the first named pair of links and supporting the other end of the spring, and a coil spring between said links and the end of the bolster to retard the lateral movement of the bolster.

10. In a railway truck, a frame, a bolster, a leaf spring attached at one end to one end of the bolster, a pair of links supported at one end by the frame, a second pair of links connected at one end to the other end of the spring, a trunnion member connecting the other ends of both pairs of links, and means between the trunnion member and the bolster to retard the lateral movement of the bolster.

11. In a railway truck, a frame, a bolster, a leaf spring attached at one end to one end of the bolster, a pair of links supported at one end by the frame, a second pair of links connected at one end to the other end of the spring, a trunnion member connecting the other ends of both pairs of links, and spring means between the trunnion member and the bolster to retard the lateral movement of the bolster.

12. In a railway truck, a frame, a bolster, a leaf spring attached at one end to one end of the bolster, a pair of links pivoted at one end to the frame, a second pair of links connected at one end to the other end of the spring, a trunnion member connecting the other ends of both pairs of links, and a coil spring between the trunnion member and the end of the bolster to retard the lateral movement of the bolster.

13. In a railway truck, a frame, a bolster, a leaf spring attached at one end to one end of the bolster, a pair of links, a bolt connecting one end of each link to the frame, a second pair of links, a bolt connecting one end of each of the last-named links to the other end of the spring, a trunnion member connecting the other ends of said links, said trunnion member having a hole therein and a plate thereon to provide a seat, and a coil spring having one end in the seat and the other end against the end of the bolster to retard the lateral movement of the bolster.

14. In a railway truck, a frame having a bracket extending therefrom, a bolster, a leaf spring attached at one end to one end of the bolster, a pair of links, a bolt connecting one end of each link to the bracket, a second pair of links, a bolt connecting one end of each of the last-named links to the other end of the spring, a trunnion member connecting the other ends of said links, said trunnion member having a pair of holes therein and a plate thereon to provide seats, and a pair of coil springs, one end of each spring being in one of said seats and the other end of each spring engaging the bolster to retard the lateral movement of the bolster.

15. In a railway truck, a frame having a bracket extending therefrom, a bolster having a bracket thereon, a semi-elliptical spring supported at one end by said last-named bracket and engaging the bolster adjacent its end, a jointed link supporting the other end of said spring from said first-named bracket, and means between the end of the bolster and said jointed link to retard the lateral movement of the bolster.

16. In a railway truck, a frame having a bracket extending therefrom, a bolster having a bracket thereon, a semi-elliptical spring supported at one end of said last-named bracket and engaging the bolster adjacent its end, a jointed link supporting the other end of said spring from said first-named bracket, and spring means between the end of the bolster and said jointed link to retard the lateral movement of the bolster.

17. In a railway truck, a frame having a bracket extending therefrom, a bolster having a bracket thereon, a semi-elliptical spring supported at one end by said last named bracket and engaging the bolster adjacent its end, a jointed link supporting the other end of said spring from said first-named bracket, and a coil spring between the end of the bolster and said jointed link to retard the lateral movement of the bolster, the end of said coil spring adjacent the bolster being slightly more elevated than the other end.

18. In a railway truck, a frame having a bracket extending therefrom, a bolster having a downwardly extending bracket thereon, a pad in said last-named bracket, a semi-elliptical spring supported at one end on said pad, means between the ends of said spring and the end of the bolster to support the bolster on the spring, a jointed link supporting the other end of the spring on the first-named bracket, and resilient means between the end of the bolster and the jointed link to retard lateral movement of the bolster.

19. In a railway truck, a frame having a bracket extending laterally therefrom, a bolster having a downwardly extending bracket thereon forming a seat, a pad member in said seat, a semi-elliptical spring supported at one end by said pad and supporting the end of the bolster, a pair of link members supported by the first-named bracket, a second pair of link members supporting the other end of said spring, a trunnion member uniting said pairs of links, said trunnion member having seats therein, coil springs having one of their ends in said seats, and means on the end of the bolster to support the other ends of said springs in a position normally above the first-named end to dampen the lateral movement of the bolster.

20. In a railway truck, a frame having a laterally extending bracket thereon, a bolster having a resilient pad member adjacent one end, a bracket on said bolster providing a seat, a pad member in said seat, a spring having one end supported by said second pad member and its middle point engaging said first pad member, a pair of link members supported by said first bracket, a second pair of link members adapted to engage under the spring member to support the other end thereof, a trunnion uniting the ends of said pairs of link members, a pair of seats in said trunnion, coil springs having one of their ends in said seats, and means on the end of the bolster to support the other ends of said springs slightly more elevated than the first ends to dampen the lateral movement of the bolster.

21. In a truck, a bolster carrying a body, a frame, angularly arranged pivoted links pivoted on the frame and to the bolster, a bolster supporting leaf spring between the bolster and the links, and a dampening spring interposed between the bolster and the angularly arranged links, said links being normally arranged at an angle to one another, whereby vertical and lateral movements of the bolster will be restrained and dampened.

22. In combination, side frames, a floating bolster therebetween, angularly disposed links pivoted on one another on either end of said bolster, the upper half of the links being pivoted on the frame, leaf springs beneath the ends of the bolster having their centers and inner ends connected to the bolster and their outer ends mounted on the lower links, coil springs interposed between the ends of the bolster and the connections of said links.

23. In a vehicle truck, a frame, a bolster, slow acting leaf springs supporting said bolster on said frame, and quick acting coil springs arranged between said frame and bolster to dampen vertical and side movements of said bolster.

24. In a vehicle truck, a frame, a bolster, slow acting leaf springs supporting said bolster on said frame, and quick acting coil springs arranged between said frame and bolster to dampen vertical and side movements of said bolster, and leverage means between said bolster and quick acting coil springs on one hand and said frame on the other whereby the action upon the coil springs of the movements of said bolster vertically and laterally will be amplified upon the coil springs.

In testimony whereof, I affix my signature.

LEWIS J. DAVIS.