Jan. 22, 1946. J. A. SHAFER 2,393,426

CAR TRUCK

Filed Nov. 8, 1943 3 Sheets-Sheet 1

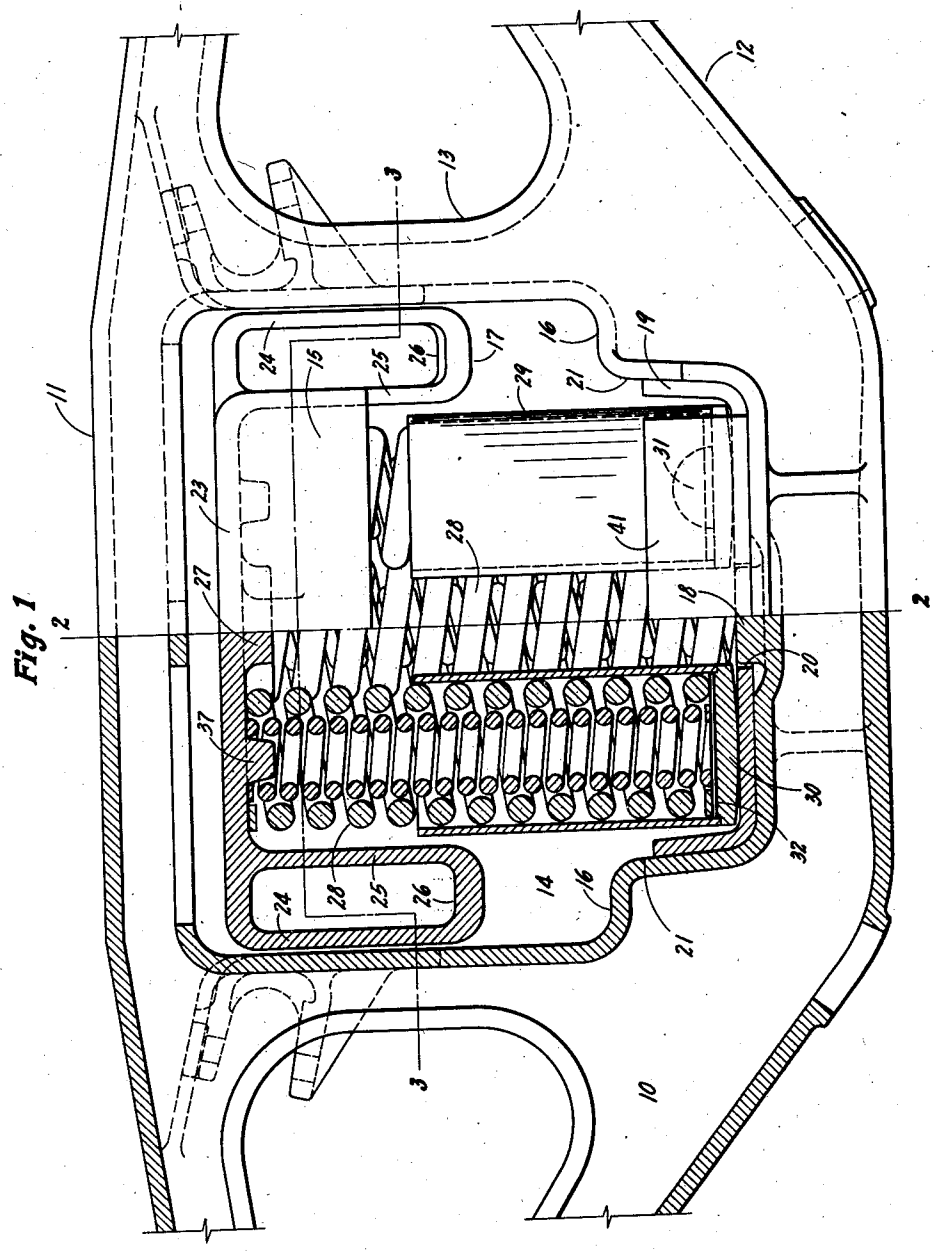


Fig. 1

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Fig. 2

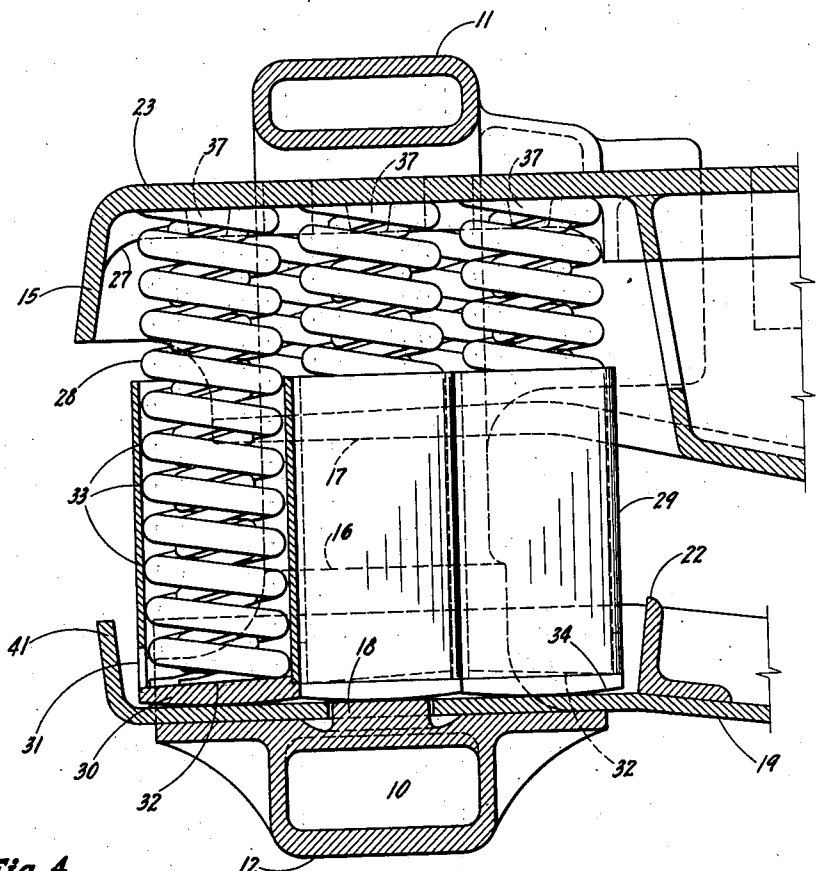
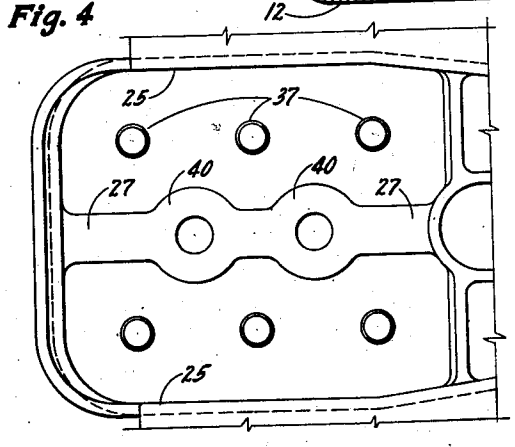


Fig. 4



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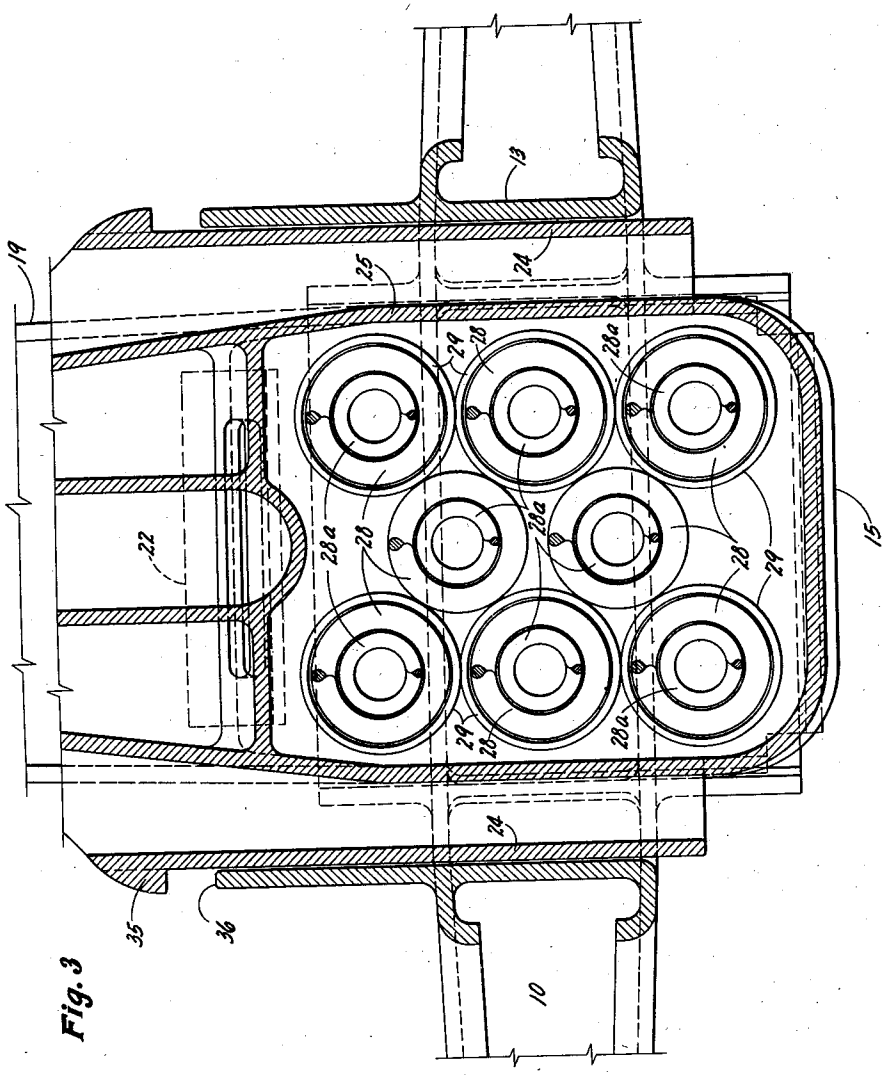


Fig. 3

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Patented Jan. 22, 1946 2,393,426

UNITED STATES PATENT OFFICE

2,393,426

CAR TRUCK

James A. Shafer, East Cleveland, Ohio, assignor to National Malleable and Steel Castings Company, Cleveland, Ohio, a corporation of Ohio

Application November 8, 1943, Serial No. 509,344

9 Claims. (Cl. 105—197)

This invention relates to railway car trucks and more particularly to a high-speed freight car truck in which the wheels and axles can follow the vertical and horizontal irregularities of the track with a minimum of disturbance imparted to the car body.

An object of my invention is to provide a truck with friction means of large bearing area for effectively preventing harmonic vibrations of the bolster supporting springs.

Another object of my invention is to provide extremely long springs which have a large amount of deflection and a slow frequency of oscillation.

A further object of my invention is to provide lateral motion for the truck bolster by utilizing the spring suspension for this purpose.

A further object of my invention is the provision of spring plank means to prevent the horizontal oscillations or see-sawing of the truck side frames at high speed.

A still further object of my invention is the provision of means to permit quick wheel change and to provide oversolid protection for the springs.

A more specific object of my invention is the provision of very long, small diameter, unstable, low frequency springs, inserted in rocker bottom containers, thereby generating friction on the inside of the containers when the springs tend to buckle. This friction effectively dampens the vibration of the springs and the rocker bottom containers provide lateral motion when the trucks are in service.

Other objects and advantages of my invention will become apparent from the following description, taken in conjunction with the drawings, in which:

Figure 1 is a view in elevation and partly in longitudinal section, showing an embodiment of my invention.

Figure 2 is a vertical sectional view taken on line 2—2 of Fig. 1, except through the spring suspension which shows only one of the spring housings in section.

Figure 3 is a horizontal sectional view, taken on line 3—3 of Fig. 1; and

Figure 4 is a plan view of the under side of a portion of the end of the bolster.

Referring to the drawings, there is shown a side frame 10 having compression member 11, tension member 12 and vertical columns 13, 13 connecting said members and forming a bolster receiving opening 14 therebetween. Extending into opening 14 is the end portion 15 of the bolster. Shelves 16 projecting inwardly into the bolster opening from columns 13, contact the bolster at surfaces 17 before the springs are driven solid.

Spring plank 19 extends between the side frames and has end portions that are flared somewhat more than would correspond to the tapered surfaces 21 at the bottom of the columns 13. The weight of the car body and lading forces the spring plank downward into this tapered aperture, thus securing a tight fit between the spring plank and the frame and preventing see-saw of the frames. Dowel 18 on the tension member of the side frame projects upwardly into opening 20 of the spring plank to hold the two side frames of the truck in spaced relation. Angle 22 is secured to spring plank 19 inwardly of each side frame and with flange 41 on the outer end of the spring plank forms an enclosure for the springs and their containers.

End portion 15 of the bolster comprises a top wall 23, side walls 24 and intermediate walls 25. Bottom walls 26 join the lower ends of one of the side and intermediate walls on each side of the bolster forming a pair of spaced box sections with a spring pocket therebetween. A center rib 27 on the under side of the top wall provides additional strength. This center rib 27 is enlarged in two regions to form spring seats 40 for the two center springs that do not have spring containers. The height of seats 40 is substantially the thickness of plugs 30 so that the vertical distance between the spring seats on the side frame and bolster is the same for all the springs. The above arrangement of walls and ribs results in a very strong end construction for the bolster and permits the use of extremely long springs of large deflection which are necessary to secure low frequency and good riding qualities. I also obtain a large spring seating area to accommodate the increased number of springs required due to the low load-compression ratio of the springs used. Dowels 37 on the under side of top wall 23 position the upper ends of the springs.

The spring suspension consists of springs 28 and 28*a*, some of which are inserted in containers or housings 29, said containers having rocker bottom plugs 30 at their bottoms. Hole 31 in container 29 is provided for drainage purposes. The top surface 32 of container plug 30 is tapered, thus providing a seat for the springs that is not level. This tapered surface causes the slender spring to buckle or bend until spring 28 contacts the container in the region 33 and thus develops friction to prevent harmonic oscillation of the springs.

The curved bottom 34 on each container plug 30 permits the springs and containers to rock when an end thrust is applied to the bolster, with increasing resistance to said rocking the further the spring suspension rocks from its normal vertical position. The action is similar to that secured by the use of the well-known swing hanger construction. This lateral movement of the bolster is limited by the usual lugs 35 which are adapted to engage stops 36 on the side frames.

It is well known that coil springs have a point of instability which is a point in their travel at which buckling will occur upon the application of a small lateral pressure. In the present invention the normal load on the car compresses the springs to or beyond the point of instability. The sloping surfaces 32 on plugs 31 produces a lateral component of force on the outer sets of springs, thus urging these springs into engagement with their containers. Inner coils 28a of the springs in containers also buckle and force the outer coils into tighter engagement with containers 29.

Disassembly of the truck for wheel change is readily accomplished as it is only necessary to remove the journal bearings and wedges, tip the brake hangers out of the brake hanger brackets, raise the spring plank until it disengages frame dowel 18 and the frames can be pulled off. The brake rigging or spring suspension is not disturbed.

While I have shown spring containers 29 housing the bottoms of certain of the springs they could just as well be inverted, so as to engage top wall 23 of the bolster, with equally satisfactory results. In this case dowels 37 would be moved from the under side of the bolster to the spring plank. In inverted position, containers 29 would not be so apt to become clogged with snow and dirt.

The terms and expressions which I have employed are used as terms of description and not of limitation, and I have no intention, in the use of such terms and expressions, of excluding any equivalents of the features shown and described or portions thereof, but recognize that various modifications are possible within the scope of the invention claimed.

What I claim is:

1. In a railway car truck, a spring suspension comprising relatively long springs of small diameter adapted to be compressed by the normal load on the car at least to their point of instability, means engaged by one end of said springs for loading said springs eccentrically and causing them to buckle, and means loosely surrounding said springs and in frictional engagement therewith when said springs buckle.

2. A coil spring for use in a railroad truck spring suspension, said spring being of relatively small coil diameter and great length, such that when subjected to its average operating load said spring has a tendency to buckle, and a cylindrical member surrounding said spring loosely when said spring is under no load and acting to limit buckling of said spring when under load and to generate friction with said spring when the length of said loaded spring changes.

3. A railway car truck comprising a side frame and a bolster, a spring suspension for said truck comprising spring means and housings surrounding said spring means, said spring means being adapted to buckle when a normal load is placed thereon, upon the application of a lateral force thereto, and means associated with said housings for causing a lateral force to be exerted on said spring means.

4. A railway car truck comprising a side frame and a bolster, a spring suspension for said truck comprising spring means and housings surrounding said spring means, said spring means being adapted to buckle, when a normal load is placed thereon, upon the application of a lateral force thereto, and a sloping surface on the bottom of each housing for causing a lateral force to be exerted on said spring means.

5. A railway car truck comprising a side frame and a bolster having spring seats thereon, a spring suspension for said truck comprising a plurality of cylindrical members each having one end thereof in engagement with one of said seats, spring means in said members having an end thereof engaging the other of said seats, and means associated with said members adapted to buckle said spring means and force portions thereof into engagement with said members to develop friction to snub oscillations of said spring means.

6. A railway car truck comprising a side frame and a bolster having spring seats thereon, a spring suspension for said truck comprising a plurality of cylindrical members each having one end thereof in engagement with one of said seats, spring means in said members having an end thereof engaging the other of said seats, and an inclined surface at one end of said members in engagement with said spring means adapted to cause the latter to buckle upon the application of a load on said truck to force portions of said spring means into engagement with said means to develop friction to snub oscillations of said spring means.

7. A railway car truck comprising a side frame and a bolster, said bolster being adapted to move laterally of said side frame, spring means for supporting said bolster, cylindrical members surrounding said spring means, each of said members having a curved bottom portion supported by said side frame adapted to permit rocking of said members during lateral movement of said bolster, said bottom portion having an inclined surface engaging said spring means adapted to cause buckling thereof and force portions of said spring means into engagement with said members to snub oscillations of said spring means.

8. A railway car truck comprising a side frame and a laterally movable bolster, spring means supporting said bolster, housing means surrounding said spring means, rocker means on said housing means adapted to permit rocking thereof during lateral movement of said bolster, and means in said housing means adapted to load said spring means eccentrically to force portions thereof into engagement with said housing means to snub oscillations of said spring means.

9. A railroad car truck comprising a side frame and a bolster, a spring suspension for supporting said bolster upon said side frame comprising coil springs, housings loosely surrounding said springs, and means for loading said springs eccentrically to cause them to deflect laterally into frictional contact with said housings.

JAMES A. SHAFER.