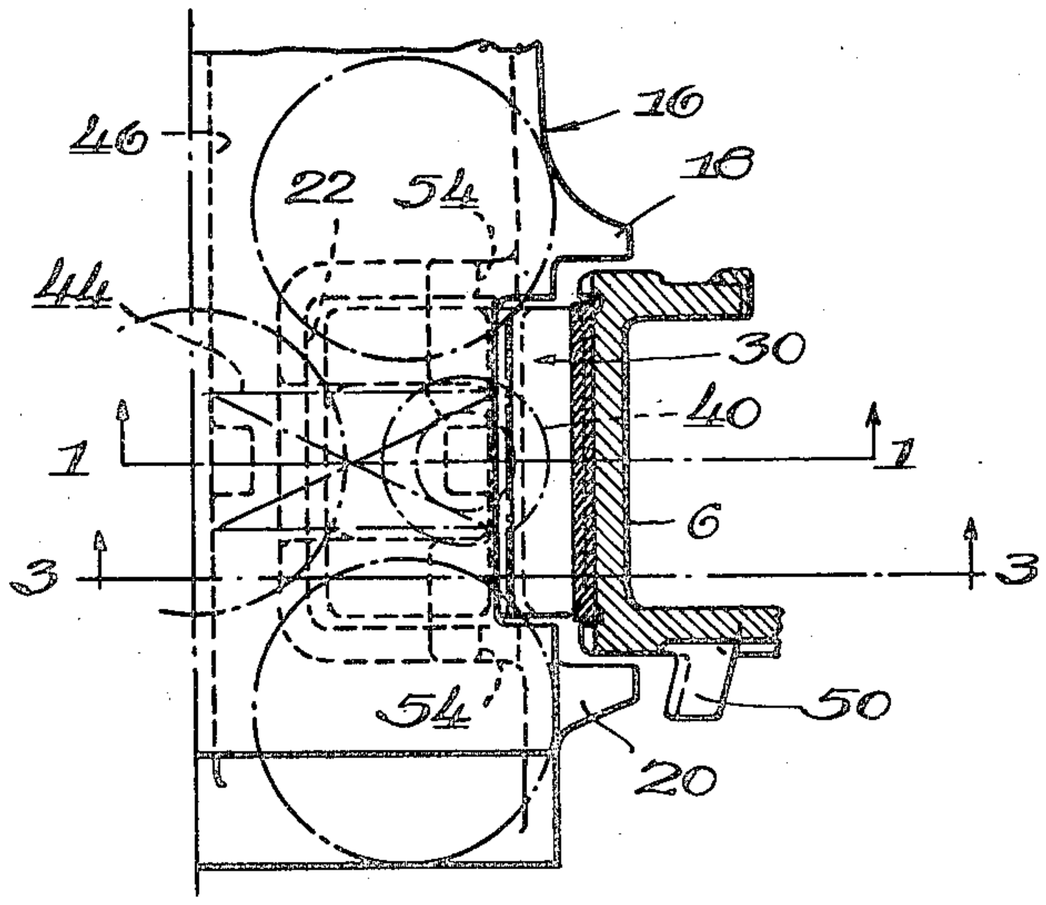
Oct. 25, 1949. L. A. LEHRMAN 2,485,973

SNUBBED BOLSTER TRUCK

Filed July 30, 1945 3 Sheets-Sheet 1

Fig. 2



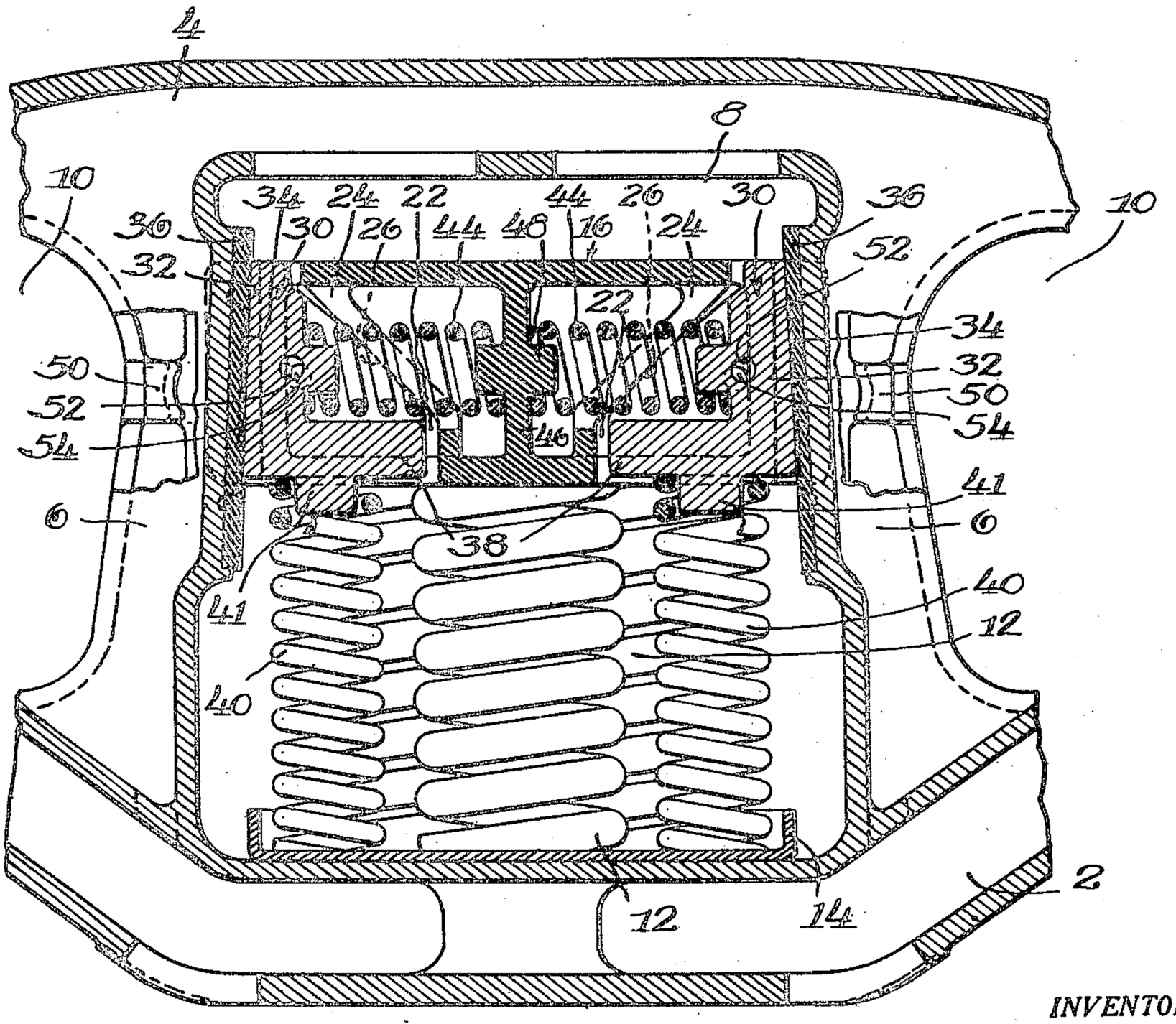


Fig. 1

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SNUBBED BOLSTER TRUCK

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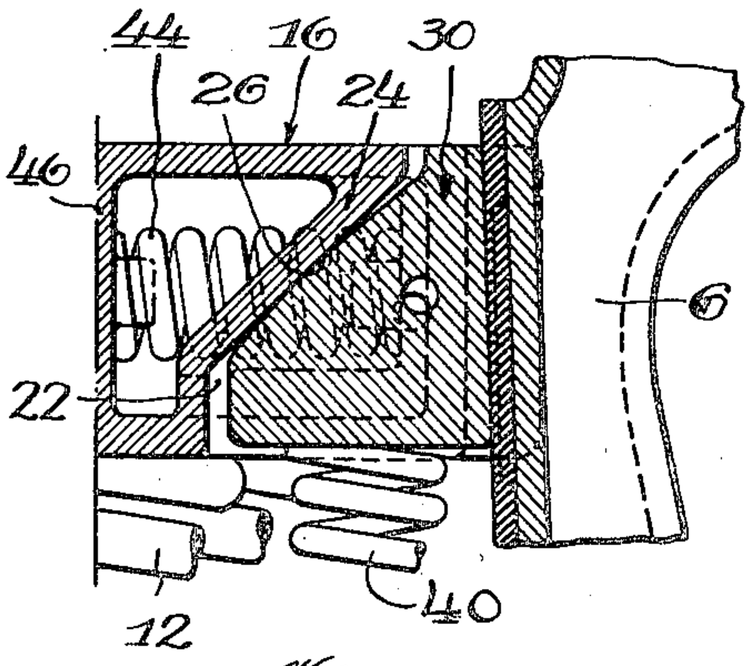

Fig. 3

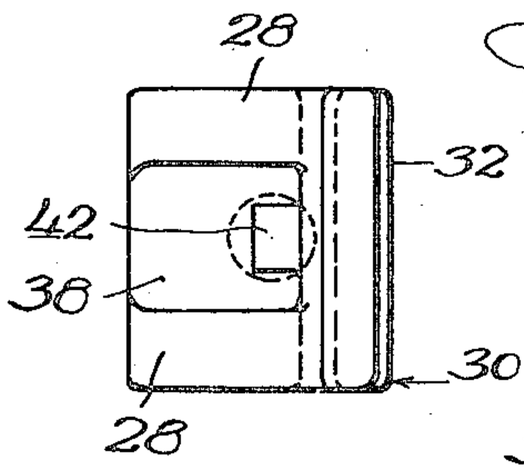

Fig. 5

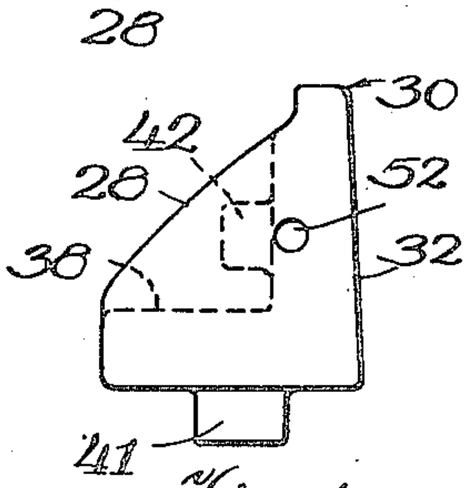

Fig. 6

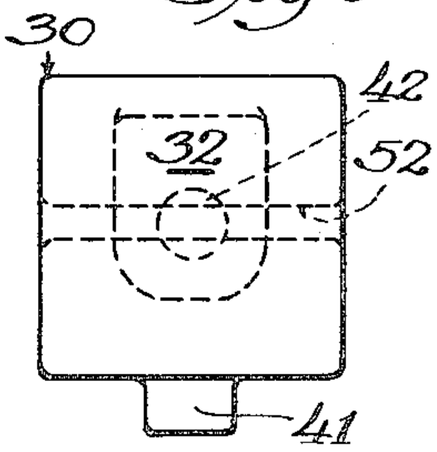

Fig. 4

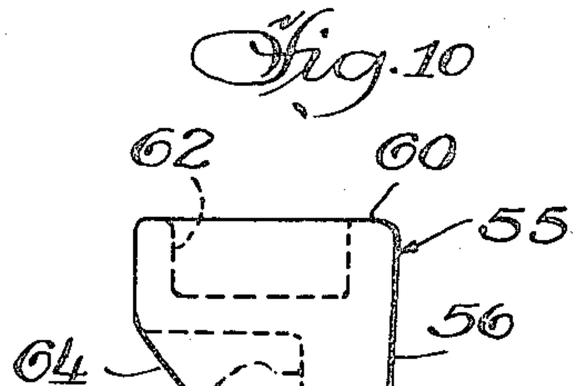

Fig. 10

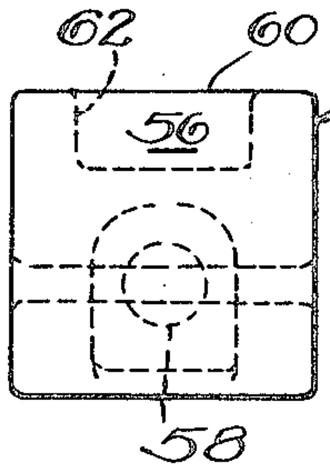

Fig. 12

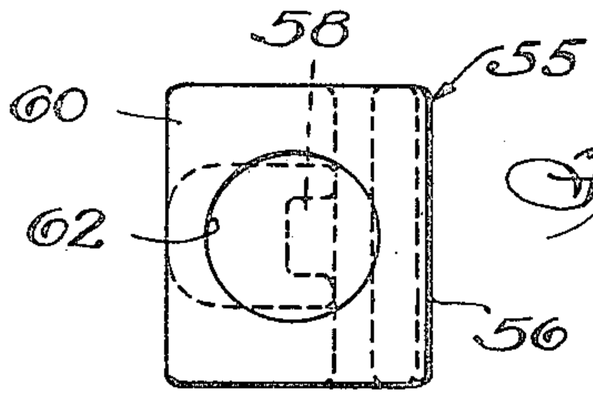

Fig. 11

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SNUBBED BOLSTER TRUCK

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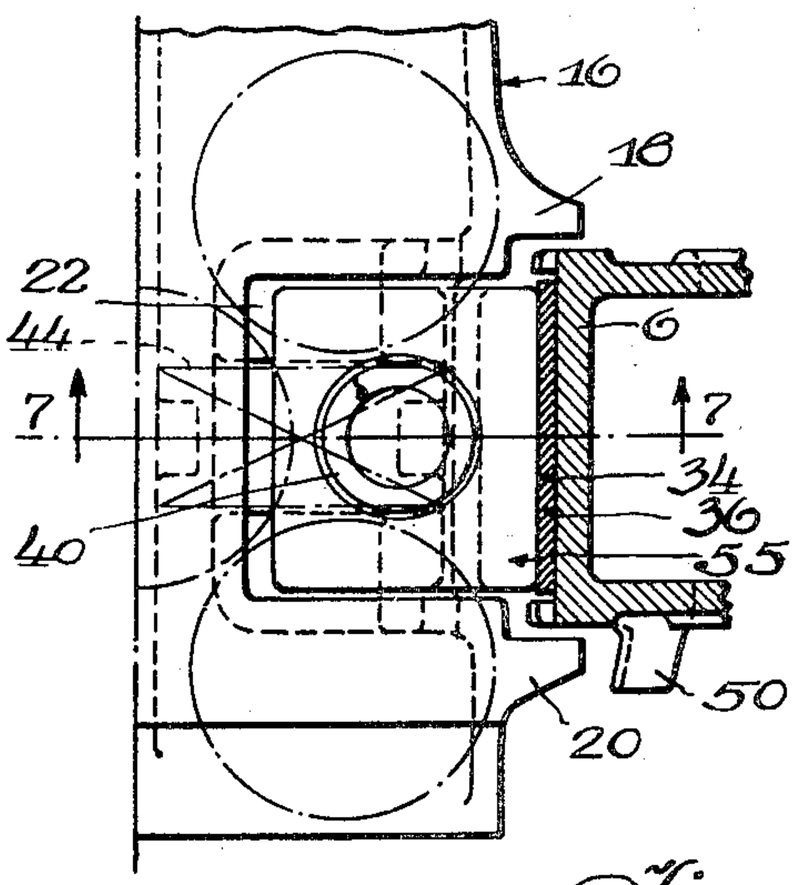


Fig. 8

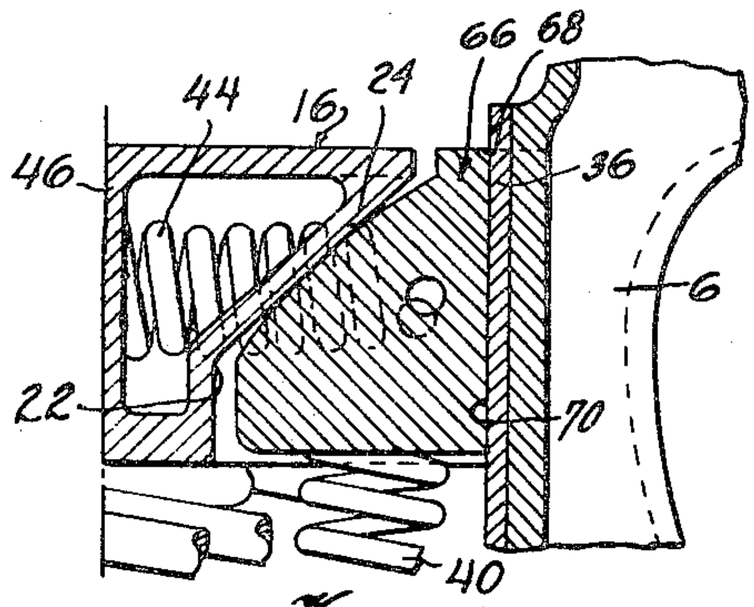
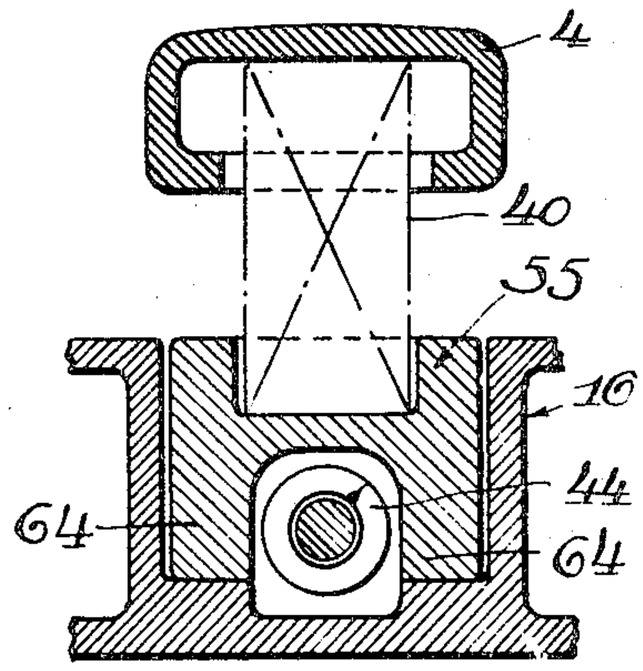


Fig. 13.

Fig. 9



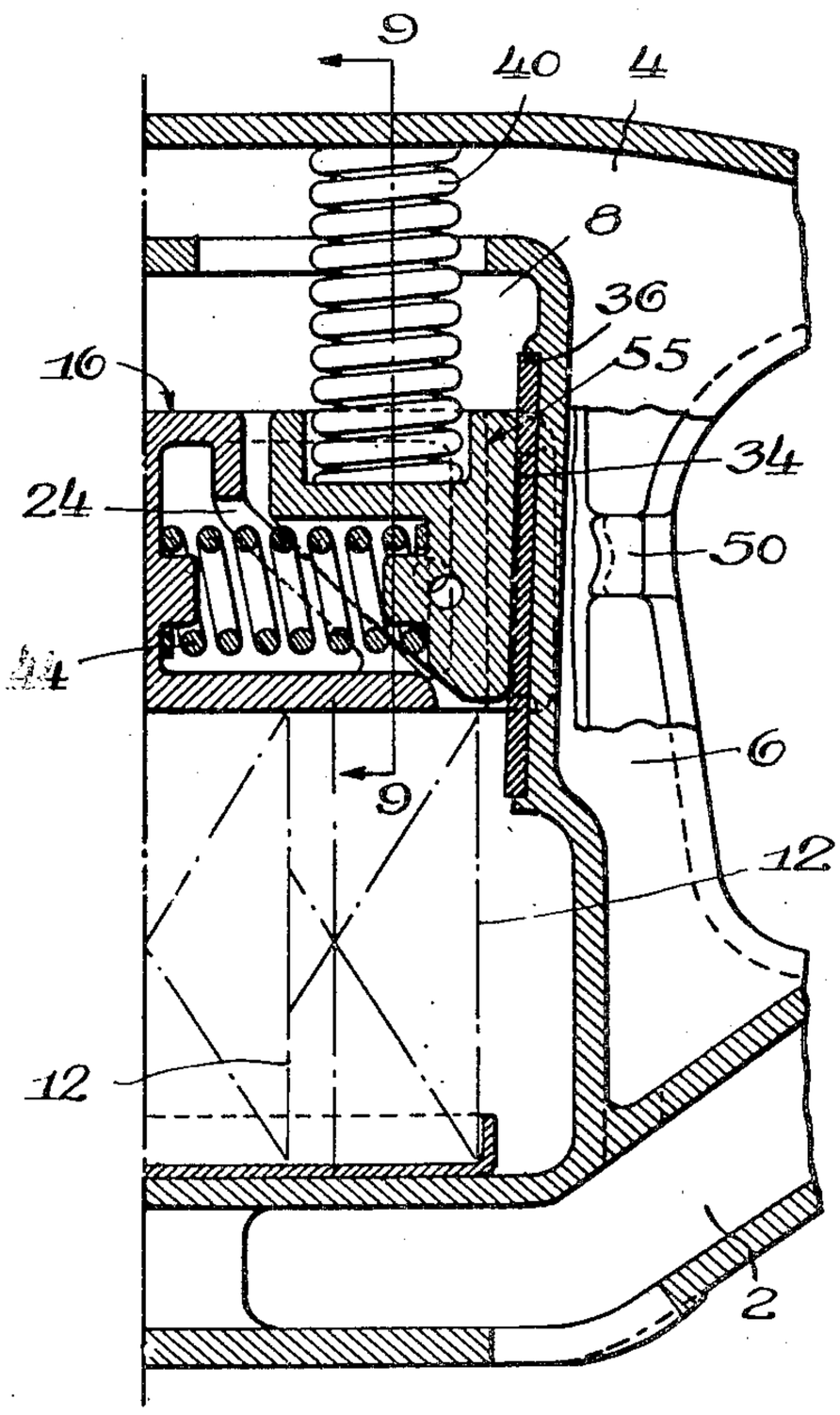


Fig. 7

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2,485,973

UNITED STATES PATENT OFFICE

2,485,973

SNUBBED BOLSTER TRUCK

Leo A. Lehrman, Chicago, Ill., assignor to American Steel Foundries, Chicago, Ill., a corporation of New Jersey

Application July 30, 1945, Serial No. 607,766

19 Claims. (Cl. 105—197)

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This invention relates to railway car trucks and more particularly to a novel truck comprising means for dampening oscillations of the truck bolster on its supporting springs.

A general object of the invention is to design a truck of the above described type incorporating means for effectively dampening bolster oscillations by developing relatively great frictional resistance thereto.

Another object of the invention is to provide the bolster with a friction shoe at each side thereof and to provide actuating means for said shoe characterized by a plurality of angularly related springs for urging the shoe into frictional engagement with a complementary surface of the truck side frame from which the bolster is spring-supported.

Still another object of the invention is to design an arrangement such as above described wherein each shoe is resiliently wedged between the bolster and the side frame friction surface by a spring bearing against the side frame, said shoe being directly urged against the side frame friction surface by another spring compressed between the shoe and the bolster.

The invention comprehends a friction shoe of novel form comprising a main friction wall having a friction face on one side thereof and a spring seat on the opposite side thereof, said shoe comprising another spring seat angularly related to the first-mentioned seat.

The foregoing and other objects and advantages of the invention will become apparent from the following specification and the accompanying drawings wherein:

Figure 1 is a fragmentary sectional view of a railway car truck embodying the invention, said view being taken in a longitudinal vertical plane approximately bisecting the side frame, as indicated by the line 1—1 of Figure 2, portions of the structure being shown in elevation;

Figure 2 is a fragmentary top plan view of the structure shown in Figure 1 with the side frame shown in section through one of the columns thereof;

Figure 3 is a fragmentary sectional view taken in the longitudinal vertical plane indicated by the line 3—3 of Figure 2;

Figures 4–6 inclusive illustrate in detail the friction shoe utilized in the arrangement of Figures 1–3, Figure 4 being a side elevation of the shoe, Figure 5 being a top plan view thereof, and Figure 6 being a front elevation thereof;

Figure 7 is a fragmentary sectional view partly in elevation of a railway car truck embodying

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a modification of the invention, the section being taken in the longitudinal vertical plane approximately bisecting the truck side frame, as indicated by the line 7—7 of Figure 8;

Figure 8 is a fragmentary top plan view of the structure shown in Figure 7 with the side frame shown in section through one of the columns thereof;

Figure 9 is a sectional view taken in the transverse vertical plane indicated by the line 9—9 of Figure 7;

Figures 10–12 inclusive illustrate in detail the friction shoe utilized in the embodiment of Figures 7–9, Figure 10 being a side elevation of the shoe, Figure 11 being a top plan view thereof, and Figure 12 being a front elevation thereof; and

Figure 13 is a view comparable to Figure 3, illustrating a further modification of the invention.

Describing the invention in detail and referring first to the embodiment thereof illustrated in Figures 1–6 inclusive, the truck side frame comprises tension and compression members 2 and 4 connected adjacent each end of the frame by a column 6 defining a bolster opening 8 and an adjacent window opening 10.

The tension member 2 affords a support for a spring group comprising a plurality of bolster-supporting springs 12 which, in the illustrated embodiment, are seated on the conventional spring plate 14. It will be understood that if desired the plate 14 may be eliminated and the springs 12 may bear directly against the tension member 2 which may be provided with conventional positioning means (not shown) for said springs.

A bolster generally designated 16 is supported by the springs 12 and in turn affords support for the body bolster of an associated car body (not shown). The bolster 16 is provided at each side thereof with inboard and outboard guide lugs 18 and 20 affording an interlock with the adjacent side frame column 6 to maintain the side frame and bolster in assembled relationship. The bolster is provided with a pocket 22 in each side thereof and is formed with spaced diagonal walls or ledges 24 within said pocket in complementary wedge engagement as at 26 (Figures 1 and 3) with spaced ledges 28 of a friction shoe generally designated 30.

The friction shoe 30 is shown in detail in Figures 4–6 inclusive and comprises a front wall 32 in frictional engagement as at 34 (Figure 1) with a liner 36 mounted on the adjacent column 6. The shoe also comprises a bottom wall 38

affording a seat for a supporting spring 40 mounted on the spring plate 14, and said wall 38 comprises positioning means for the upper end of spring 40 in the form of a boss 41 received therein. On the rear surface of the wall 32, the shoe is formed with a spring seat and a spring positioning boss 42 for a horizontal spring 44 compressed between the shoe and the longitudinal vertical center rib 46 of the bolster 16, said rib being provided with a positioning boss 48 for the spring 44. It may be noted that the spring 44 extends between the associated walls or ledges 24 of the bolster and between the complementary ledges 28 of the friction shoe into a cavity therein defined by the ledges 28, thereby affording a compact structure.

It will be understood that the spring 44 is operable to urge the shoe 30 directly against the column liner 36 and the spring 40 is operable to urge the shoe against the walls 24, whereby a wedging action is developed to increase the pressure of the shoe 30 against the column, thereby increasing the amount of friction developed during oscillation of the bolster. This wedging action causes increased frictional resistance to movement of the bolster downwardly and for this reason, the shoe engaging surfaces of the liner 36 are constructed so as to diverge downwardly, thus tending to lessen the frictional resistance developed; however, it will be understood that if desired the shoe engaging surfaces of the liner 36 may be vertical as shown in Figure 13 or may even converge downwardly as in Figure 7.

Each column 6 is provided on its outboard face with a fulcrum lug 50 whereby a tool, such as a crowbar, may be inserted between said lug 50 and the adjacent bolster gib 20 to thrust the bolster against the opposite column, whereupon a key may be inserted through the transverse opening 52 through the shoe and into aligned openings 54, 54 through the inboard and outboard bolster walls defining the inboard and outboard margins of the pocket 22. In this manner the shoes 30, 30 may be keyed to the bolster to render the friction devices inoperative, thus facilitating assembly and disassembly of the side frame and bolster.

Figures 7–12 illustrate a modification of the invention which is substantially the same as that shown in Figures 1–3 except that the vertical shoe actuating spring 40 is compressed between the top web of the compression member 4 and the friction shoe 55, the bolster structure being inverted to accommodate this arrangement. This arrangement causes increasing frictional resistance to the upstroke of the bolster and for this reason, the shoe engaging surfaces of the column liner 36 preferably diverge upwardly to eliminate any possibility of the bolster becoming jammed due to the great frictional resistance developed on the upstroke. The structure shown in Figures 7–9 is similar to that shown in Figures 1–3 and for this reason corresponding parts are identified by the numerals utilized in the description of Figures 1–3.

The friction shoe 55 in the arrangement of Figures 7–9 comprises a front wall 56 with a front friction surface adapted for frictional engagement as at 34 with the associated column liner 36, and the rear surface of the wall 56 is provided with a spring seat and a spring positioning boss 58 for the horizontal actuating spring 44. The top wall 60 of the shoe is provided with a recess 62 adapted to position the

vertical shoe actuating spring 40, and at each side thereof the friction shoe is provided with a diagonal ledge 64 adapted for wedge engagement with the associated ledge or wall 24 of the bolster.

Figure 13 illustrates a further modification of the invention which is substantially the same as that shown in Figures 1–3, and the parts corresponding to those in Figures 1–3 are identified by corresponding reference numerals. The present embodiment differs from those previously described in that the shoe 66 is provided with a vertical friction face 68 engaging a vertical face 70 of the liner 36 on the column 6.

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. In a railway car truck, a side frame comprising top and bottom members and spaced columns defining therewith a bolster opening, a bolster resiliently supported from said bottom member in said opening, said bolster comprising a vertical rib, and friction means comprising a pocket in each side of said bolster, a friction shoe in said pocket comprising spaced wedge surfaces in wedge engagement with spaced complementary wedge faces of said bolster, said shoe being in frictional engagement with friction means on the adjacent column, and actuating means for said shoe comprising spring means compressed between said rib and said shoe and extending between said faces and between said surfaces, and spring means compressed between one of said members and said shoe for urging the surfaces thereon into engagement with said faces.

2. In a railway car truck, a side frame comprising spaced columns and an intervening bolster opening, a bolster resiliently supported from said frame in said opening, and friction means comprising a pocket in each side of said bolster, spaced diagonal walls formed on said bolster within said pocket, a friction shoe comprising spaced ledges in wedge engagement with respective walls, said shoe being in frictional engagement with a surface of said column, a horizontal actuating spring extending between said spaced walls and between said spaced ledges and compressed between said shoe and said bolster, and a vertical actuating spring seated on said frame and bearing at its upper end against said shoe, the shoe engaging surfaces of respective columns being downwardly divergent.

3. In a railway car truck, a side frame comprising spaced columns and an intervening bolster opening, a bolster resiliently supported from said frame in said opening, and friction means comprising a pocket in each side of said bolster, spaced diagonal walls formed on said bolster within said pocket, a friction shoe comprising spaced ledges in wedge engagement with repective walls, said shoe being in frictional engagement with a surface of said column, a horizontal actuating spring extending between said spaced walls and between said spaced ledges and compressed between said shoe and bolster, and a vertical actuating spring bearing at its upper and lower extremities against said frame and said shoe respectively, the shoe engaging sur-

faces of respective columns being downwardly convergent.

4. In a railway car truck, a side frame comprising tension and compression members and a column therebetween, a bolster resiliently supported from said frame, said bolster comprising spaced diagonal walls sloping toward said column, and friction means comprising a shoe in wedge engagement with said walls and in frictional engagement with said column, a vertical spring bearing against said frame and said shoe for urging the latter into engagement with said walls and said column, and a horizontal spring extending between said walls and compressed between said bolster and said shoe.

5. In a railway car truck, a side frame comprising spaced columns and an intervening bolster opening, a bolster resiliently supported from said frame in said opening, and friction means comprising a pocket in each side of said bolster, spaced diagonal walls in said pocket, a friction shoe in complementary wedge engagement with said walls and in frictional engagement with the adjacent column, a horizontal spring extending between said walls and compressed between said shoe and bolster, and a vertical spring bearing against said shoe and a portion of said frame.

6. In a railway car truck, a side frame, a bolster spring-supported therefrom, and friction means for dampening oscillations of said bolster comprising a pair of wedge surfaces therewithin, a shoe engaging said surfaces and frictionally engaging said frame, spring means compressed between said frame and said shoe for urging the latter against said surfaces, and spring means extending between said surfaces and compressed between said bolster and said shoe for urging the latter against said frame independently of said surfaces.

7. In a railway car truck, a side frame, a bolster spring-supported therefrom, friction means comprising a shoe in wedge engagement with the bolster and in fractional engagement with the frame, spring means reacting between said frame and shoe, and other spring means reacting between said bolster and said shoe, one of said spring means being oriented to urge the shoe into said wedge engagement with the bolster and into frictional engagement with said frame, and the other of said spring means being oriented to urge said shoe in a direction away from its engagement with the bolster and into engagement with said frame.

8. In a railway car truck, a side frame comprising spaced columns, a bolster movably supported therebetween, and friction means comprising friction elements engaging friction surfaces on the respective columns and in wedge engagement with said bolster, said friction surfaces on said columns sloping from the vertical and lying in converging planes, and actuating means for each element comprising a vertical spring compressed between said element and a portion of said frame toward which said column friction surfaces diverge, and a horizontal spring housed within the bolster and compressed against said element.

9. In a friction shoe for a railway car truck, a hollow member with angularly related external surfaces, spring-positioning means on one of said surfaces, an internal spring seat surface on said member opposite the other external surface thereof, spring-positioning means on said internal surface, spaced rigid portions at the lateral edges of said internal surface, said rigid portions

presenting spaced coplanar external wedge faces angularly related to said external surfaces.

10. In a railway car truck, a side frame, a bolster spring-supported therefrom, an inclined friction surface on said frame, and friction means comprising a shoe in wedge engagement with the bolster and having a diagonally arranged friction face in complementary frictional engagement with said friction surface on the frame, spring means engaged with said frame and said shoe for urging said shoe into said wedge engagement, and spring means carried by the bolster and in cooperation with said first-mentioned spring means for urging said shoe against said friction surface.

11. In a vehicle, a support member, a member spring-supported therefrom, a friction element in wedge engagement with one member and in frictional engagement with a surface on the other member, and angularly related spring means, one of said spring means reacting against one of said members and said element, the other of said spring means reacting against the other of said members and said element, said spring means cooperatively urging said element into said frictional engagement, and additionally one of said spring means urging said element into said wedge engagement, and the other of said spring means urging said element in a direction away from said wedge engagement and into said frictional engagement with said surface.

12. In a friction shoe for a railway car truck, a member with spaced coplanar wedge surfaces and a cavity therebetween, a spring seat in said cavity, and an external spring seat on said member angularly related to the first-mentioned spring seat.

13. In a railway car truck, a side frame member, a bolster member movably supported therefrom, a friction shoe in wedge engagement with one member and in frictional engagement with the other member, and spring means reacting against different members and each reacting against said shoe, the spring means reacting against the frame member urging the shoe into said wedge engagement and the spring means reacting against the bolster member urging the shoe in a direction away from said wedge engagement and into said frictional engagement.

14. A friction shoe comprising a friction wall having a friction face on one side thereof and a spring seat on the opposite side thereof, another wall joining the first-mentioned wall and comprising a spring seat on a side thereof remote from said first-mentioned spring seat and disposed approximately perpendicular thereto, and spring-positioning means on each of said seats.

15. In a railway car truck, a side frame having a sloping friction surface, a bolster resiliently supported from the frame, a friction shoe wedged between the bolster and said surface, spring means reacting between the frame and said shoe urging the latter into the wedged position thereof, another spring means reacting between the bolster and said shoe urging the latter against said surface, vertical movement of said bolster being operative to vary the load on one of said spring means, and with said movement of said bolster said shoe sliding along said surface and moving laterally of the bolster, thus changing the load on the other of the spring means.

16. In a railway car truck, a side frame, a vertically movable bolster resiliently supported from said frame, a friction surface on said frame sloping vertically away from the bolster, snubbing

means between said bolster and surface including a friction shoe in complementary frictional engagement with said surface and in wedge engagement with said bolster, spring means extending transversely of the bolster and compressed between the same and said shoe for urging said shoe against said surface, and other vertically arranged spring means compressed between the shoe and said frame for urging the shoe into said wedge engagement with the bolster and into frictional engagement with said surface, the slope of said surface determining the movement of said shoe toward or away from said bolster upon vertical movement of said bolster thereby changing the compression of said first-mentioned spring means, and said movement of said bolster varying the compression of said vertically arranged spring means.

17. A friction shoe for a railway car truck comprising a member of generally triangular form in side elevation and including a front wall presenting a sloping friction surface on one side and a substantially vertical spring seat on its opposite side, a substantially horizontal wall merging with said front wall at one end thereof and presenting an external spring seat, and spaced webs at the juncture of said walls presenting coplanar external diagonal wedge faces extending between said walls.

18. In a car truck, a side frame, a bolster resiliently supported on said side frame, a shoe carried in the bolster and fractionally engaging a surface of the side frame, spring means urging said friction shoe against said surface comprising a spring maintaining a constant force on the friction shoe regardless of the weight on the bolster, and a spring maintaining a variable force on the friction shoe increasing directly with the load on the bolster, the total force between the friction shoe and said surface of the side frame being at all times the sum of the independent forces exerted separately by the constant force spring and the variable force spring.

19. In a car truck, a side frame, a bolster resiliently supported in said side frame, a shoe carried on the bolster and having capacity for lateral movement with respect to it and adapted to frictionally engage a surface on a column of the side frame, and spring means urging said friction shoe outwardly against said surface comprising a spring within the bolster maintaning a constant force on the friction shoe regardless of the weight on the bolster, and a spring beneath the bolster, acting through an element within the bolster for maintaining a variable force on the friction shoe increasing directly with the load on the bolster, said latter spring acting in parallel with the first-mentioned spring, the total force between the friction shoe and said surface of the side frame being at all times the sum of the independent forces exerted separately by the constant force spring and the variable force spring.

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Certificate of Correction

Patent No. 2,485,973 **October 25, 1949**

LEO A. LEHRMAN

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows:

Column 5, line 43, for the word "fractional" read *frictional*; column 7, line 32, for "fractionally" read *frictionally*; column 8, line 13, for "maintaning" read *maintaining*; and that the said letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 21st day of March, A. D. 1950.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.