Aug. 29, 1939. R. C. HOBSON 2,170,862

CAR TRUCK

Original Filed April 2, 1935 2 Sheets-Sheet 1

Fig. 1.

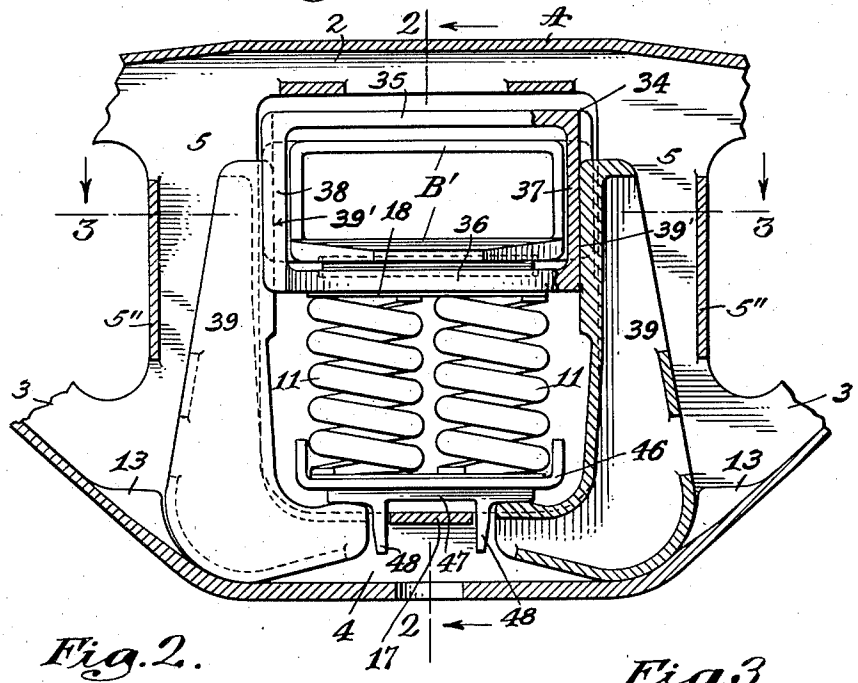


Fig. 2.

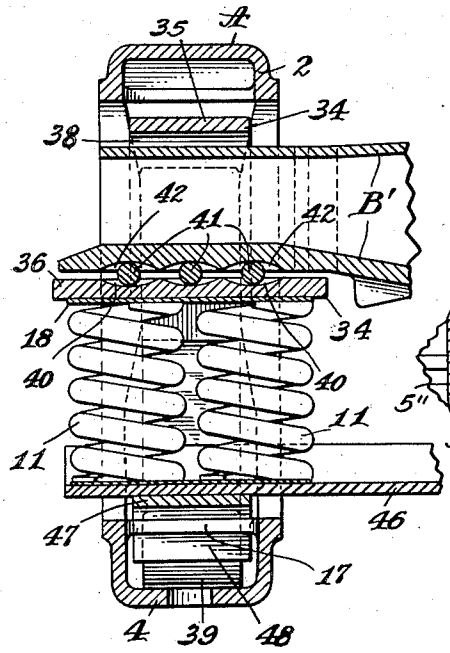
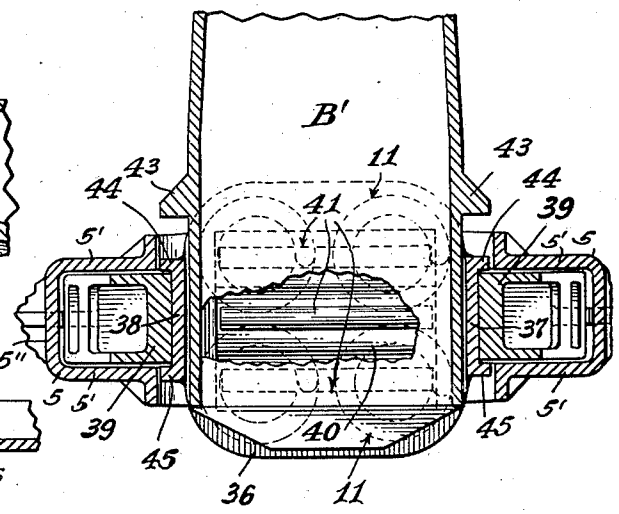


Fig. 3.



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Fig. 4.

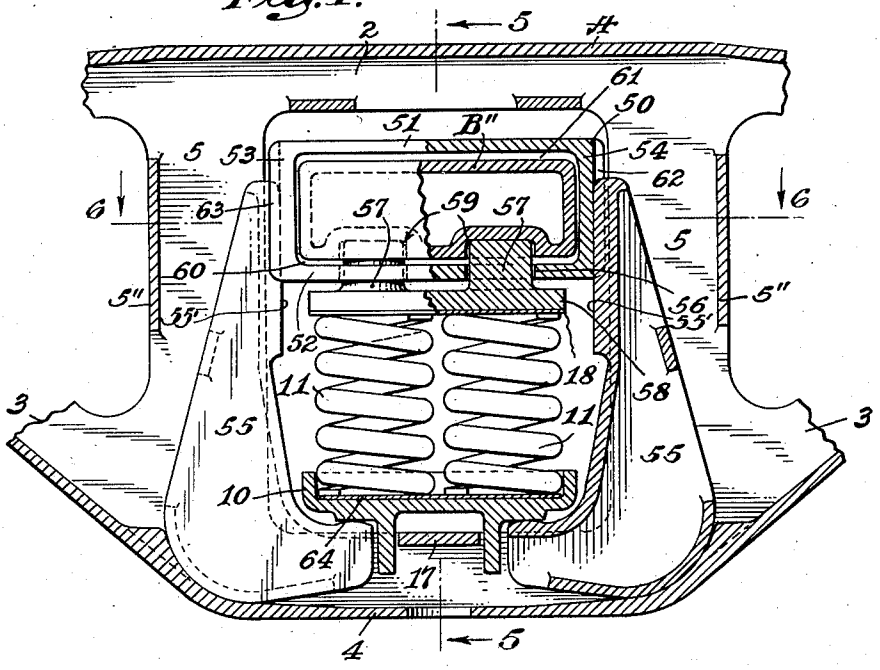


Fig. 5.

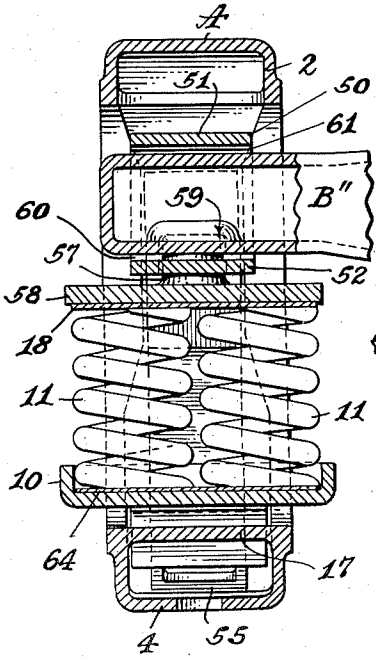
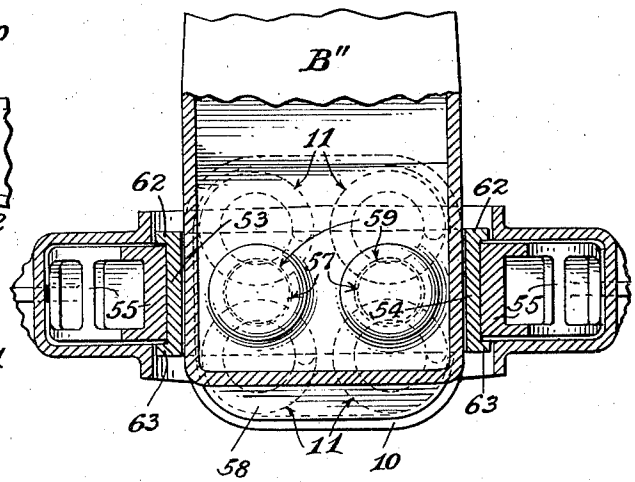


Fig. 6.



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UNITED STATES PATENT OFFICE

2,170,862

CAR TRUCK

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Original application April 2, 1935, Serial No. 14,213, now Patent No. 2,091,854, dated August 31, 1937. Divided and this application May 12, 1937, Serial No. 142,303

15 Claims. (Cl. 105—193)

This application is a division of my co-pending application Serial No. 14,213, filed April 2, 1935, now Patent No. 2,091,854, granted August 31, 1937.

This invention relates to railway car trucks. One of its objects resides in the provision of a novel car truck wherein loads or forces from the bolster are transmitted to the side frames at points directly below the side frame columns, with marked reduction in bending moments and secondary bending stresses in the tension and compression members and the side frame columns. The invention further comprises new and improved means for frictionally supplementing the resistance offered by the bolster supporting springs to downward movement of the bolster and for damping oscillations of said springs. The invention also provides improved features in conjunction with the type of car truck illustrated in my pending application Serial No. 716,948, filed March 23, 1934, now Patent No. 2,091,853, granted August 31, 1937, wherein there is disclosed a spring snubbing arrangement comprising rocker elements having horizontal arms underlying the bolster supporting springs and vertical arms extending along opposite sides of the bolster and adapted under the pressure of said springs to generate friction at the sides of the bolster for assisting the springs in resisting downward travel of the bolster and damping oscillations of said springs.

The invention also comprises a novel side frame, especially adapted for use with the rocker elements of the type shown in my application Serial No. 716,948 above referred to, and which not only may be cast or molded with particular facility, but also provide ready access to the rockers from outside the frame by way of openings at the outer sides of the side frame columns. This side frame at the same time may, when desired, be employed without rocker elements for supporting the bolster.

In addition, the invention provides means for enabling the bolster to move freely laterally with respect to the side frame, in combination with rocker means for frictionally resisting vertical movements of the bolster.

Still another feature comprises provision for vertical movement of the bolster through predetermined extents, unopposed by the rocker dampening mechanism, and for bringing the latter into action when said vertical movement exceeds a given amount; whereby the bolster may ride freely on the springs until a predetermined amplitude of vibration is exceeded, at which time the rocker means comes into action for preventing excessive vibrations of the springs.

Other features and advantages of the invention will be hereinafter described and claimed.

In the accompanying drawings:

Figure 1 is a fragmentary view in vertical section showing an embodiment of the invention wherein provision is made for free lateral movement of the bolster with respect to the side frame.

Figure 2 is a transverse vertical sectional view on line 2—2 of Fig. 1.

Figure 3 is a horizontal sectional view on line 3—3 of Fig. 1.

Figure 4 is a fragmentary vertical sectional view illustrating another embodiment of the invention wherein means is provided for enabling the bolster to move vertically within given limits without encountering opposition by the friction damping means, vertical movement of the bolster beyond said limits being opposed by said friction damping means.

Figure 5 is a transverse vertical sectional view on line 5—5 of Fig. 4; and

Figure 6 is a horizontal sectional view on line 6—6 of Fig. 4.

Referring to the drawings, there is shown in Fig. 1 a car truck side frame A comprising a compression member 2, inclined tension members 3, 3, a lower horizontal tension member 4, and columns 5, 5, joining the compression member 2 and tension member 4 and providing a bolster-receiving opening or window therebetween. The bolster B' extends at one end into said opening. It will be understood that the car truck also includes a similar side frame into which the opposite end of the bolster projects, but a description of one side frame and its cooperation with the bolster is sufficient for an understanding of my invention. At its opposite ends the side frame A is provided with integral journal boxes for the truck wheel axles in the well known manner.

In Figs. 1–3 I have shown an embodiment of my invention wherein means are provided for enabling the bolster to move freely laterally with respect to the side frame. In carrying out this form of the invention, I place around the bolster B' a band 34 comprising top and bottom members 35, 36 and side members 37, 38. The sides of the band are engaged by the rockers 39, 39, which may have flat engaging surfaces 39', 39' similar to those of the rockers shown in my aforesaid prior application. The upper ends of the bolster supporting springs bear against the

bottom member 36 of the band 34, through the spring plate 18, said bottom member being of extended area as shown, to accommodate said springs. The upper surface of said bottom member of the band is provided with pockets or depressions 40 to receive rollers 41, and the bottom of the bolster has similar pockets 42 for accommodating said rollers. It will be seen that with this construction the vertical movements of the bolster are resisted, and undue oscillations of the springs 11 snubbed, by the friction between the rockers 39, 39 and the side walls 37, 38 of the band 34; the bolster at the same time being free to move laterally of the side frame up to the point where its stop lugs 43, 43 engage the ends of said side walls. As shown, each of said side walls is provided with flanges 44, 45 at each end, between which flanges the associated rocker 39 is received; the flanges 44 of the respective side walls aforesaid further providing extended bearing area for engagement by said bolster lugs.

The springs 11 in Figs. 1, 2, and 3 are preferably mounted on a spring plank 46, which may be suitably secured to or formed integral with a plate 47 having extensions 48, 48 depending therefrom into the space between the side walls of the tension member 4, and on opposite sides of the transverse web 17 connecting said side walls. The bottom of said plate 47 is engaged by the horizontal arms of the rockers 39, 39.

In the form of my invention shown in Figs. 4–6, I have provided for a preliminary vertical movement of the bolster, resisted only by the springs, before the rockers commence their snubbing action. For this purpose there is placed around the bolster a band 50, comprising top and bottom walls 51, 52, and side walls 53, 54. The rockers 55, 55 have flat surfaces 55', 55' at their upper ends for engaging said side walls 53, 54. The bottom wall 52 of the band 50 has openings 56 through which extend the projections 57 of a spring cap 58 resting upon the springs 11. Recesses 59 are provided in the under side of the bolster B'' for receiving said spring cap projections 57. The vertical extent of said projections is such that in the normal position of the parts clearance between the under side of the bolster and the top of the bottom wall 52 is provided as indicated at 60; while clearance also exists at the same time between the top of the bolster and the under side of the top wall 51, as shown at 61. It will thus be seen that the bolster may oscillate freely within the range of the clearances 60, 61, without bringing the friction system into action. When, however, either of these clearances is taken up, the band 50 is moved with consequent generation of friction between the side walls of said band and the rockers 55. With this construction the friction system is out of action and the bolster subjected simply to the free action of the springs under ordinary operating conditions, but upon a predetermined extent of vertical movement of the bolster the friction system comes into action, preventing undesirable harmonic vibrations of the springs, and also supplementing the action of the latter for cushioning severe shocks.

To change wheels in the embodiment of Figs. 4–6, the bolster is first jacked up a sufficient amount to bring its recesses 59 clear of the projections 57, after which the side frame can be readily removed. In this form of the invention it is unnecessary to draw the rockers back into the side frame columns as a preliminary to wheel change.

The side walls 53, 54 are shown each provided with end flanges 62, 63 between which the upper end of the cooperating rocker is received. The springs 11 may bear upon the cap 58 through spring plate 18 and at their lower ends may rest on a plate 64 in the spring seat 10.

It will be observed that in the foregoing embodiments of my invention the bolster loads are applied to the side frame at points beneath the side frame columns. Specifically, as pointed out in my prior application aforesaid, the resultant of the forces applied by the bolster to each rocker passes through the region adjacent a point at the intersection of the gravity axis of the corresponding column with the gravity axes of the associated inclined and horizontal tension members. The load transmission provided by my invention is thus in distinct contrast to the load transmission provided in conventional side frames wherein the resultant of the bolster weight passes through the central region of the horizontal tension portion of the side frame with consequent production of a decided beam action involving powerful secondary bending stresses, tending to distort said horizontal tension portion together with the compression member, the inclined tension members, and the side frame columns. This undesirable action is avoided by the application of bolster forces provided by my invention, wherein practically no bending moment is applied by the bolster to any of the members 3, 4, and 5, or to the compression member 2. The reduction in bending stresses in the side frame members resulting from such application of the load enables the cross-sectional area of the tension and compression members, and the side frame columns, to be reduced with consequent saving in weight of the side frame.

It will be apparent that, if desired, a spring plank, such, for example, as that shown in Figs. 1–3, may be employed in the form of my invention shown in Figs. 4–6 of the present application. It will be noted that in Figs. 4–6 the bolster ties the side frames together by the engagement of the spring cap projections 57 in the recesses 59 in the bolster, said projections also passing through the bottom member of the band 50, the sides of which receive the rockers 55.

Matter shown and described but not claimed herein is claimed in my prior Patents Nos. 2,091,954 and 2,091,953, hereinbefore referred to.

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 car truck, a side frame, a bolster, spring means beneath said bolster for supporting the same, a unitary band surrounding said bolster and adapted at times to move therewith, said band having portions spaced from said bolster to permit a limited amount of relative movement therebetween including side portions adjacent the sides of the bolster, and a bottom portion joining said side portions interposed between said bolster and spring means, and means on said side frame for supporting said spring means and exerting pressure against said side portions under the influence of said spring means.

2. In a car truck, a side frame, a bolster, spring

means beneath said bolster for supporting the same, a unitary band surrounding said bolster and adapted at times to move therewith, said band having portions spaced from said bolster to permit a limited amount of relative movement therebetween including side portions adjacent the sides of the bolster, and a bottom portion joining said side portions interposed between said bolster and spring means, and rocker members on said side frame each having a horizontal arm extending beneath said spring means for supporting the same and vertical arms exerting pressure against said side portions under the influence of said spring means.

3. In a car truck, a side frame, a bolster, spring means beneath said bolster for supporting the same, a unitary band surrounding said bolster and adapted at times to move therewith, said band having portions spaced from said bolster to permit a limited amount of relative movement therebetween including side portions adjacent the sides of the bolster, and a bottom portion joining said side portions interposed between said bolster and spring means, means on said side frame for supporting said spring means and exerting pressure against said side portions under the influence of said spring means, and means comprising portions of said band for limiting relative movement between said bolster and band.

4. In a car truck, a side frame, a bolster, springs beneath said bolster for supporting the same, means interposed between said bolster and said springs for enabling the bolster to move laterally with respect to the side frame, elements at the sides of the bolster, and means on said side frame for supporting said springs and exerting pressure against said elements under the influence of said springs.

5. In a car truck, a side frame, a bolster, springs beneath said bolster for supporting the same, means interposed between said bolster and said springs for enabling the bolster to move laterally with respect to the side frame, elements at the sides of said bolster and movable vertically therewith, and means on said side frame for supporting said springs and exerting pressure against said elements under the influence of said springs.

6. In a car truck, a side frame, a bolster, springs beneath said bolster, a band surrounding said bolster and supported by said springs, means including said band supporting said bolster on said springs for lateral movement with respect to the side frame, and rocker means on said side frame for supporting said springs and exerting pressure against the sides of said band under the influence of said springs.

7. In a car truck, a side frame, a bolster, springs beneath said bolster, a band surrounding said bolster, and including a lower wall supported on said springs, anti-friction means interposed between said band and the bottom of said bolster, and rocker means on said side frame for supporting said springs and exerting pressure against the sides of said band under the influence of said springs.

8. In a car truck, a side frame, a bolster, springs beneath said bolster, a member comprising top, bottom, and side walls surrounding said bolster, said bottom wall being mounted on said springs and means including said bottom wall supporting the bolster for lateral movement with respect to the side frame, flanges projecting from opposite ends of each side wall of said member, a pair of rocker members mounted on the side frame, each of said rocker members having a horizontal arm extending under said springs and a vertical arm engaging a respective one of said side walls between the flanges thereof.

9. In a car truck, a side frame, a bolster, springs beneath said bolster, a member having top, bottom, and side walls and surrounding said bolster, said bottom wall being mounted on said springs, anti-friction means interposed between said bottom wall and the bottom of the bolster for providing for lateral movement of the bolster with respect to the side frame, rocker elements on said side frame, said rocker elements having horizontal arms underlying said springs and vertical arms engaging opposite side walls of said member, each of said side walls having flanges extending on opposite sides of the vertical arm of the associated rocker element.

10. In a car truck, a side frame, a bolster, friction means in horizontal overlapping relation with the sides of said bolster adapted to be moved thereby after predetermined vertical movement thereof spring means beneath said bolster for supporting the same, and rocker means supporting said spring means and engaging said friction means and brought into action after said predetermined vertical movement of said bolster for frictionally opposing further vertical movement thereof.

11. In a car truck, a side frame, a bolster, spring means beneath said bolster for supporting the same, a pair of rocker elements supported by said side frame each having a horizontal arm underlying said spring means and a vertical arm extending adjacent a side of the bolster, and means engaged by said vertical arms and movable with respect thereto upon a predetermined vertical movement of the bolster for generating friction in opposition to further vertical movement of said bolster.

12. In a car truck, a side frame, a bolster, friction means in horizontal overlapping relation with the sides of said bolster adapted for a limited amount of vertical movement relative thereto, spring means beneath said bolster for supporting the same, and rocker means supporting said spring means and brought into action after said limited vertical movement of the bolster for generating friction with said friction means under the pressure of said spring means.

13. In a car truck, a side frame, a bolster, spring means beneath said bolster for supporting the same, a member surrounding the bolster and including top, bottom, and side walls, means on said springs normally supporting said bolster in spaced relation to said top and bottom walls, means engaging the side walls of said member for generating friction therewith under the pressure of said springs during movement of said member, said bolster being adapted upon a predetermined downward movement thereof to engage said bottom wall of said member with consequent movement thereof and generation of friction opposing further downward movement of said bolster.

14. In a car truck, a side frame, a bolster, spring means beneath said bolster, a member surrounding said bolster and having top, bottom, and side walls, a spring cap on said spring means and having projections extending through openings in the bottom wall of said member into engagement with the bolster for normally supporting the bolster in spaced relation to the top and bottom walls of said member, said bolster

being adapted upon predetermined downward movement to engage said bottom wall and draw said member downwardly, and means engaging opposite side walls of said member and exerting pressure thereagainst under the influence of said spring means for frictionally opposing vertical movement of said member.

15. In a car truck, a side frame, a bolster, spring means beneath said bolster, a member surrounding said bolster and having top, bottom, and side walls, a spring cap on said spring means and having projections extending through openings in the bottom wall of said member into engagement with the bolster for normally supporting the bolster in spaced relation to the top and bottom walls of said member, said bolster being adapted upon predetermined downward movement to engage said bottom wall and draw said member downwardly, and means engaging opposite side walls of said member and exerting pressure thereagainst under the influence of said spring means for frictionally opposing vertical movement of said member, said means engaging opposite side walls of said member comprising rocker elements having horizontal arms underlying said spring means and vertical arms extending into engagement with said side walls, each side wall having flanges extending from opposite ends thereof and overlapping opposite sides of the associated vertical rocker arm.

ROY C. HOBSON.