May 31, 1927. B. W. KADEL ET AL 1,630,574

CAR TRUCK

Filed June 9, 1926 3 Sheets-Sheet 1

Fig. 1

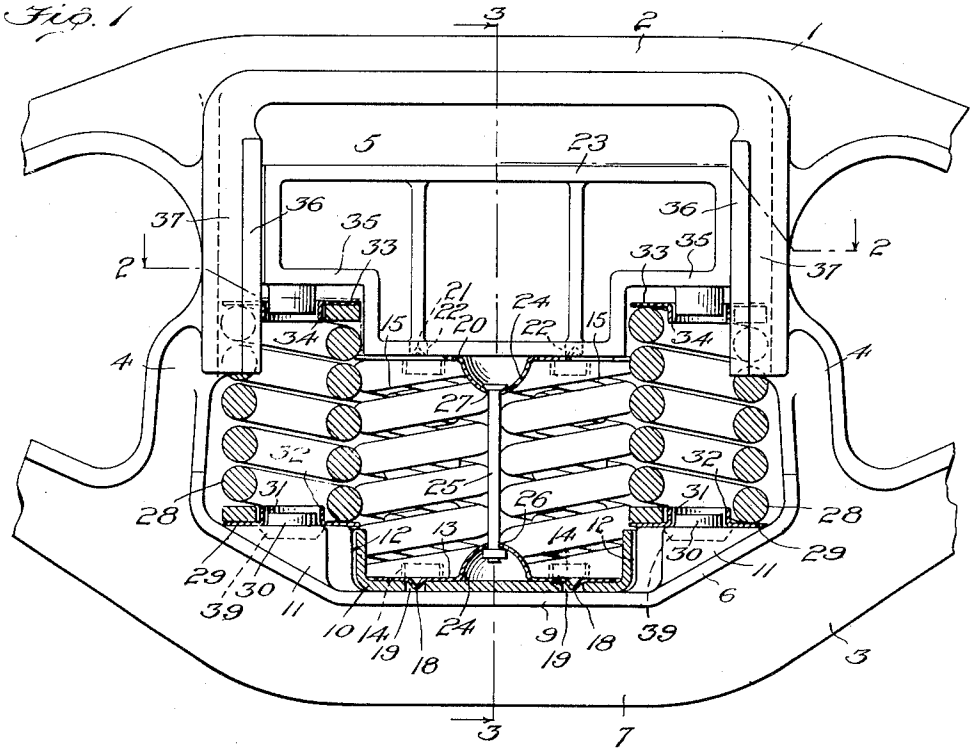
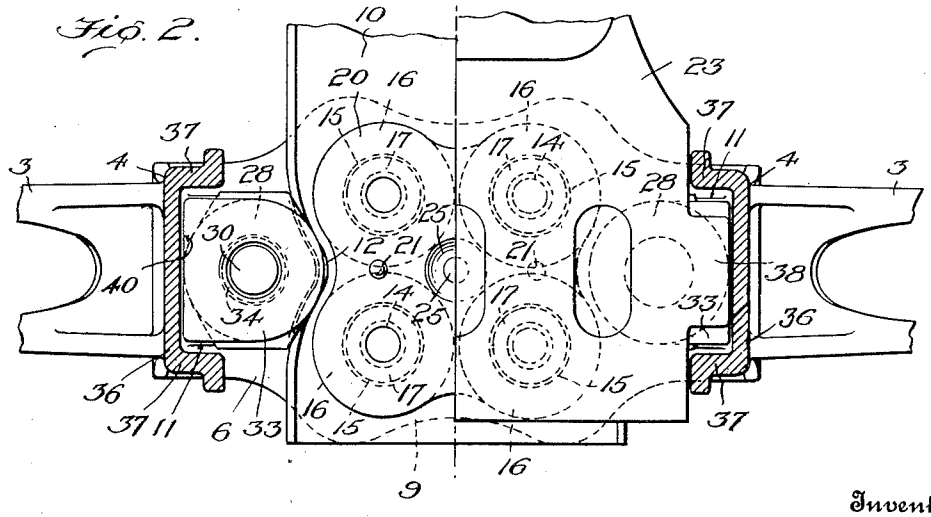


Fig. 2.



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Fig. 3

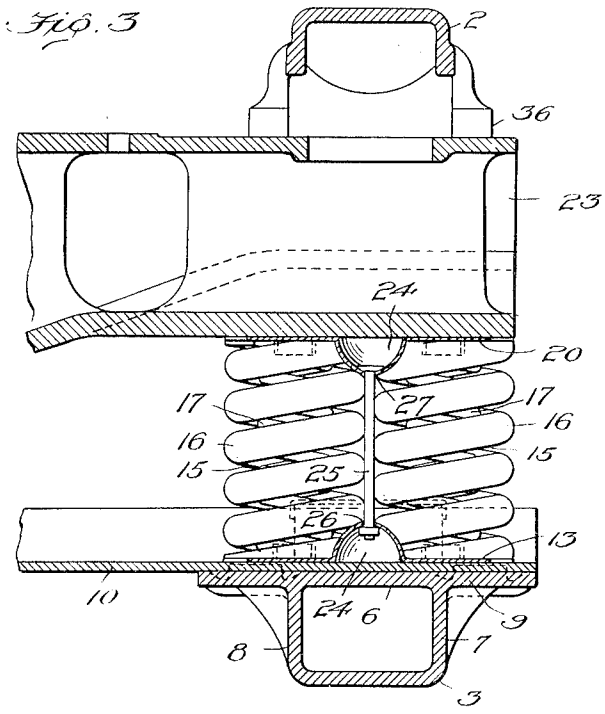
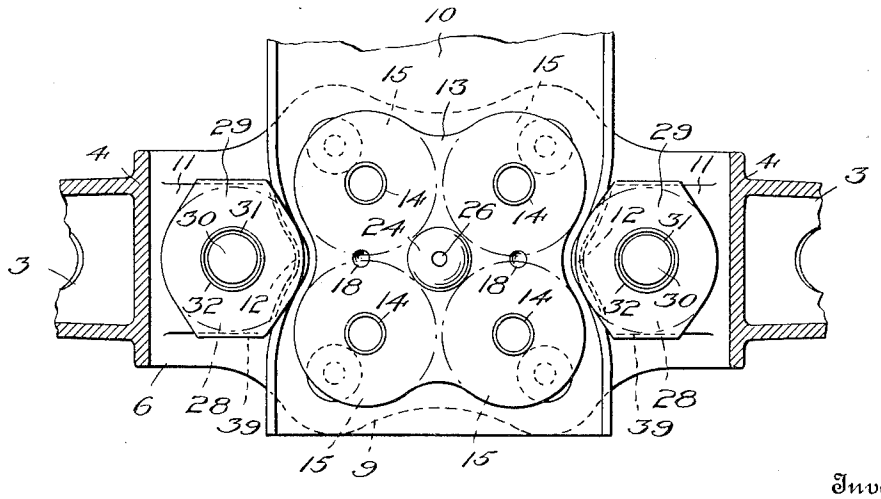


Fig. 4



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Fig. 5

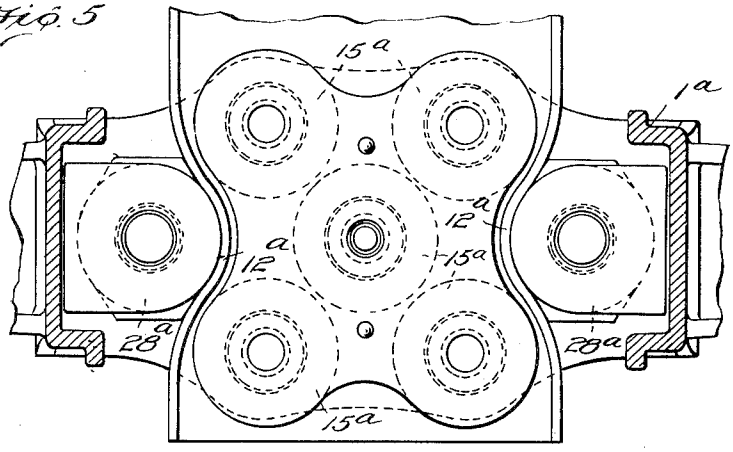


Fig. 6

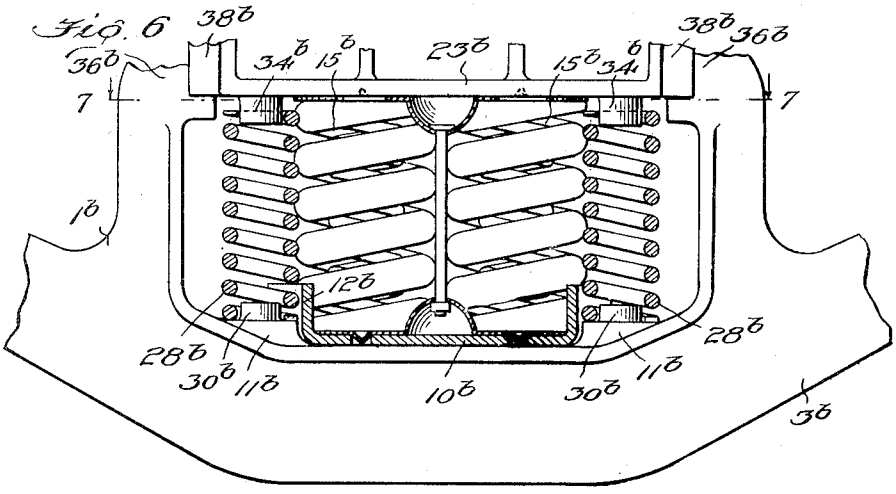
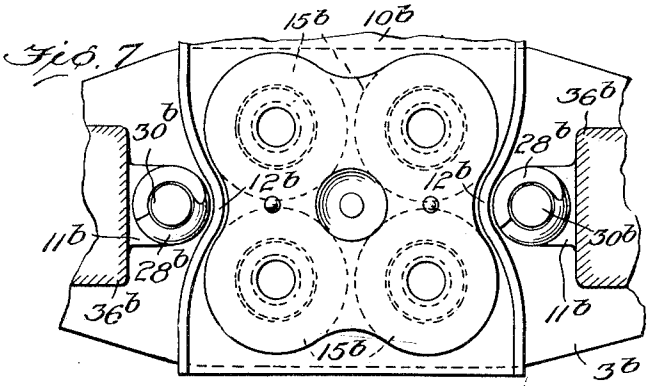


Fig. 7



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UNITED STATES PATENT OFFICE.

BYERS W. KADEL, OF BALTIMORE, MARYLAND, AND DONALD S. BARROWS, OF ROCHESTER, NEW YORK.

CAR TRUCK.

Application filed June 9, 1926. Serial No. 114,740.

This invention relates to trucks and, more particularly, to railway car trucks in which the capacity of the bolster springs is reinforced by auxiliary springs positioned at higher elevations along the longitudinal center line of the corresponding side frame.

The principal object of our invention, generally considered, is the provision of additional springs for augmenting the capacity of the nest of springs supporting the truck bolster, said auxiliary springs, however, being positioned at higher elevations and alternatively engaging upwardly offset portions of the bolster whereby they are not brought into play until after a predetermined compression of said nest of springs.

An object of our invention is the provision of a nest of springs for supporting each end of the truck bolster, said springs being reinforced by a pair of springs positioned one on either side of the nest of springs along the longitudinal center line of the side frame, said additional springs being disposed at a higher elevation than the nest of springs for allowing the tension member of the side frame to slope upwardly thereunder, the bolster supported by said nest of springs being formed with auxiliary spring engaging portions positioned at such a height with respect to the auxiliary springs that said auxiliary springs do not come into play until after a predetermined compression of the nest of springs.

A further object of our invention is the provision of auxiliary springs for supplementing the action of the nest of springs supporting the truck bolster of railway car trucks, said additional springs being disposed at higher elevations than the original springs whereby the tension members of the side frames can slope upwardly thereunder and preferably of such a height that they are not brought into play until the original springs are normally loaded.

A still further object of our invention is the supporting of the bolster of a railway car truck by means of nests of springs supplemented by a spring positioned on each side of said nests along the longitudinal center lines of the side frames, said auxiliary springs being disposed on spring supporting portions of the frame at higher elevations than the other springs and preferably formed stiffer than said other springs and of such length that they are adapted to go solid simultaneously with said other springs, the bolster being so constructed that it does not engage the auxiliary springs until after a predetermined compression of the other springs and preferably at the time said other springs are normally loaded.

Other objects and advantages of the invention relating to the particular arrangement and combination of the various parts will become apparent as the description proceeds.

Referring to the drawings illustrating our invention, the scope whereof is defined by the appended claims:

Figure 1 is a fragmentary side elevation of a railway car truck particularly showing the bolster springs and the adjacent portions of the side frame, bolster and spring plank.

Figure 2 is a horizontal sectional view on the line 2—2 of Figure 1 looking in the direction of the arrows.

Figure 3 is a vertical sectional view on the line 3—3 of Figure 1 looking in the direction of the arrows.

Figure 4 is a plan of the spring plank and spring supporting portion of the side frame, certain portions of the frame being shown in section and the position of the bolster springs being indicated diagrammatically by dot and dash lines.

Figure 5 is a plan view corresponding to the left-hand side of Figure 2 but showing a modification.

Figure 6 is a fragmentary side elevation corresponding to Figure 1 but showing a further modification.

Figure 7 is a horizontal sectional view on the line 7—7 of Figure 6 looking in the direction of the arrows.

Referring now to the drawings in detail, like parts being designated by like reference characters and first, considering the embodiment or modification illustrated in Figures 1 to 4, inclusive, a side frame 1, which may correspond to frames generally employed with fifty ton trucks, is formed with a compression member 2, a tension member 3 and bolster guide columns or struts 4 spacing intermediate portions of said compression and tension members and leaving a window or bolster opening 5 therebetween. The compression member 2 may be generally U shape in cross section and the strut portions 4, particularly at the bolster guiding portions thereof, may be of similar construc-

tion. The tension member 3, particularly between the strut portions 4 beneath the window opening 5, is formed generally box shape in cross section as shown most clearly in Figure 3, the upper web 6 of said box section being extended beyond the side webs 7 and 8 thereof to form a spring plank seat portion 9 of ample width.

Preferably supported directly on the spring plank seat portion 9 of the tension member 3 is a spring plank 10 which may be channel shape in cross section, as indicated. Positioned on opposite sides of the spring plank seat portion 9 of the tension member 3 along the longitudinal center line of the side frame are auxiliary spring supporting embossments or stools 11, the upper surfaces of said embossments being disposed at a higher elevation than the surface of the spring plank seat portion 9 whereby the tension member 3 may be sloped upwardly and outwardly therebeneath without decreasing the same in depth. In order to economize space between the strut portions 4, the auxiliary spring supporting embossments 11 encroach on the normal lines of the spring plank 10 so that said spring plank is inset at 12 around the engaging portions of said auxiliary spring seats, as indicated most clearly in Figure 2, said engagement also serving to lock the spring plank in the desired assembled relation with respect to the side frame.

Positioned on the spring plank 10 is a spring plate 13 preferably provided, in the present embodiment, with four spring locating collars 14, said collars being normally positioned with respect to each other for receiving a standard four unit nest of springs, each unit 15 preferably comprising an outer coil 16 and an inner coil 17, the inner coil 17 preferably snugly fitting around its corresponding collar 14 and the outer coil 16 preferably wound in the opposite manner and properly positioned by the inner coil 17, a normal amount of clearance being provided therebetween. For properly positioning the spring plate 13 with respect to the spring plank 10, said plate may be provided with locating bosses 18 adapted for engagement in normally positioned apertures 19 in the spring plank 10. The upper spring plate 20 may be likewise formed with positioning bosses 21 adapted for engagement in normally positioned apertures in the bolster 23. The spring plates 13 and 20 may be inwardly embossed toward each other as indicated at 24 and receiving a retaining bolt 25 extending through perforations 26 and 27, respectively, of the upper and lower spring plates.

For increasing the spring capacity of the nest of springs, in the present embodiment, we provide additional springs 28 positioned on either side of the nest of springs 15 and preferably disposed with respect to said nest of springs on the longitudinal center line of the side frame 1. The springs 28 are preferably provided with lower spring plates 29 properly positioned with respect to the auxiliary spring supports 11 in any desired manner as by means of upstanding bosses 30 extending into perforations 31 therethrough. The spring plates 29 are preferably formed with spring positioning collars 32 around which the springs 28 engage. Upper spring plates 33 may be provided of a construction corresponding with the lower spring plates 29 and engaging downwardly extending bosses 34 on the upwardly offset portions 35 of the bolster 23 for properly locating said spring plates with respect thereto.

The distance between the offset portions 35 of the bolster and the auxiliary spring supporting portions 11 of the frame may correspond with the distance between the spring plank portion of the frame and the main spring supporting portion of the bolster but, in the present instance, it is slightly greater so that the free heights of the auxiliary springs may correspond substantially with the free heights of the spring units of the nest of springs so that, when said nest of springs is initially engaged by the bolster, a space is provided between the tops of the auxiliary springs or the top spring plates thereof and the corresponding portions of the bolster whereby it is necessary to compress the main nest of springs a predetermined amount before the auxiliary springs come into action. The auxiliary spring locating bosses 34 are on this account sufficiently long to prevent displacement of the auxiliary springs even when there is a space, as shown in Figure 1, between the upper spring plates therefor and the upwardly offset portions 35 of the bolster as occurs when said bolster is just engaging the main nest of springs 15. In this way, it will be apparent that the capacity of said auxiliary springs is reserved until after a predetermined compression of the main nest of springs which compression may and preferably does correspond with the normal loading of the main nest of springs. Inasmuch as the total compressive movement with respect to the auxiliary springs is less than that for the main nest of springs, said auxiliary springs are preferably formed of heavier material so that they develop a corresponding supporting force during a shorter travel or during the travel to compress said springs solid. As, after the engagement of the auxiliary springs, all of the springs are compressed as a unit, it is desirable to so wind said auxiliary springs that they go solid simultaneously with the main springs or nest thereof.

The bolster guiding portions 36 of the side

frame 1 may, in the present instance, be formed with inwardly extending guiding flanges 37 embracing the guiding lugs 38 on the bolster for properly retaining the same in place, it being obvious that said bolster may be inserted in place in the usual manner. Although the auxiliary springs 28 are in the present instance formed of heavier material, are single coils, and are adapted to go solid simultaneously with the main nest of springs, yet it is obvious that we do not wish to be restricted to this showing as said springs may be of any desired capacity and adapted for being brought into play or engaged by the bolster at any desired period in the compression of the main nest of springs.

The lower spring plates 29 are obviously prevented from longitudinal movement by the bosses 30 and may be prevented from turning movement, if such is desired, by depending flange portions 39 extending along the sides of the spring supporting portion 11. A similar comment applies to the upper spring plates 33 except that turning thereof is prevented by the engagement of the squared side 40 with the corresponding surface of the bolster guiding portion 36.

Referring now to the modification of our invention illustrated in Figure 5, a similar arrangement is shown except that the nest of springs 15^a is a five unit rather than a four unit nest of springs arranged in substantially square formation, the dimension thereof, longitudinally of the side frame, being determined by the normal spring plank width and the inset portions 12^a thereof and the dimension thereof transverse with respect to the side frame 1^a is determined by the clearance necessary for the center spring unit. Except that the arrangement here shown is particularly adapted for frames normally employed with seventy ton trucks, although we do not wish to be restricted to such use, the other details of construction may correspond substantially with those of the embodiment of our invention illustrated in Figures 1 to 4, inclusive. It is obvious, however, that the strength of the auxiliary springs 28^a may be correspondingly increased to provide a proportional increase in strength on account of their use.

Referring now to the embodiment of our invention illustrated in Figures 6 and 7, a modification is disclosed which differs from the previous modifications in that the bolster 23^b is of the ordinary type not provided with upwardly offset portions for receiving the auxiliary springs 28^b. Said auxiliary springs are, however, supported on slightly raised auxiliary spring supporting portions 11^b and the tension member 3^b of the side frame 1^b is sloped upwardly and outwardly thereunder in a manner similar to the previous modifications except that it is to a less degree. The arrangement shown in these figures is particularly adapted for a truck of lighter capacity, say in the forty ton class, and the auxiliary springs 28^b being therefore lighter than the springs 28 may be of a smaller diameter so that the bolster opening is less than that shown in the first modification.

As in the first modification, a four unit nest of springs 15^b is shown as the main bolster supporting means and the spring plank 10^b may be constructed of similar configuration and provided with inset portions 12^b cooperating with the auxiliary spring supporting portions 11^b as in the previous modifications. Said spring supporting portions 11^b are preferably provided with upstanding spring locating bosses 30^b and, although no spring plates are shown with said springs, it is obvious that, if desired, such may be used as in the previous embodiments. The bolster, in the present instance, is shown provided with depending spring locating bosses 34^b sufficiently long to engage the auxiliary springs at all times, it being understood that, as in the previous embodiment, said auxiliary springs are of such a length that they are not engaged by the bolster until the main nest of springs 15^b has been stressed a predetermined amount, such amount being preferably that effected by a normal loading thereof Except as specifically described in connection with the present embodiment, the other details thereof may be substantially as disclosed in connection with the previous embodiments except that, as will be obvious, the bolster 23^b is provided with the usual type of outside guiding lugs 38^b between which the bolster guiding portions 36^b extend.

By virtue of the foregoing embodiments of our invention, it will be apparent that we have devised a type of car truck in which the capacity of the springs supporting the bolster is increased, said bolster being alternatively of a type in which the additional springs engage upwardly offset portions thereof and the frame being provided with raised auxiliary spring supporting portions whereby the diagonal end portions of the tension member of the side frame may start to slope upwardly and outwardly beneath said auxiliary springs thereby improving the design of frame and minimizing the general angularity of the end portions of the diagonal tension member. Said auxiliary springs are so constructed that they are not engaged by the bolster for compressing the same until the main or normal nest of springs has been compressed a predetermined amount, preferably an amount corresponding with the normal load thereon. Although the three embodiments illustrated are particularly, respectively, for seventy, fifty and forty ton trucks, yet the principles of the disclo-

sures may be embodied in trucks and elements thereof of any desired capacity or character. The main nests of springs shown are preferably, though not necessarily, those normally used with trucks of the rated capacity, the auxiliary springs used therefor increasing said capacity to the desired amount.

Having now described our invention, we claim:

1. In a truck, in combination, a side frame formed with a bolster opening, a main spring supporting portion underlying said opening, an auxiliary spring supporting portion at a higher elevation adjacent said first mentioned spring supporting portion, a plurality of springs supported by said main spring supporting portion and a bolster supported by said springs, spring means disposed on the auxiliary spring supporting portion of the frame and extending toward said bolster, said spring means being of such a height that it is not stressed until after a predetermined compression of the other springs.

2. In a car truck, in combination, a side frame formed with a bolster opening and a spring supporting portion underlying said opening, said portion being arranged with a main part disposed at relatively low elevation and auxiliary parts disposed at relatively high elevations, a nest of springs supported on said main part and additional springs supported on said auxiliary parts, a bolster supported on said nest of springs and the arrangement being such that the auxiliary springs are not compressed thereby until the main springs have been compressed a predetermined amount.

3. In a car truck, in combination, a side frame formed with a bolster opening and a spring plank seat portion beneath said opening, a nest of springs supported by said spring plank seat portion and a bolster supported by said nest of springs, auxiliary spring seating portions on opposite sides of said spring plank seat portion of the frame and disposed at different elevations with respect thereto, springs positioned on said auxiliary portions and extending toward the bolster and being of such a height that they are not engaged thereby until after a predetermined compression of the other springs.

4. In a car truck, in combination, a side frame formed with a bolster opening and a spring plank seat portion underlying said opening, a nest of springs supported by said spring plank seat portion, and a plurality of extra springs arranged on opposite sides of said nest of springs, said extra springs being of substantially the same height as the other springs but formed for engagement with upwardly offset portions of the bolster whereby they are not compressed until after a predetermined deflection of the main springs.

5. In a car truck, in combination, a side frame formed with a bolster opening and a spring supporting portion underlying said opening, a standard nest of springs supported by said spring supporting portion, a bolster supported by said nest of springs and a pair of auxiliary springs positioned one on either side of the nest of springs and disposed at a higher elevation than said nest of springs, said bolster being formed with upwardly offset portions adapted for engagement with the auxiliary springs after a predetermined compression of the nest of springs.

6. In a car truck, in combination, a side frame formed with a bolster opening and a spring supporting portion beneath said opening, a nest of springs supported by said portion and a bolster supported by said nest of springs, said spring capacity being reinforced by a pair of springs positioned on the longitudinal axis of the side frame, one spring on either side of the nest of springs, said springs being supported on seating portions of the frame at higher elevations than the spring supporting portion thereof, said bolster being formed with inset portions adapted for engagement with said springs subsequent to the bolster engagement with the nest of springs, said auxiliary springs being so wound that they are adapted to go solid simultaneously with the nest of springs.

7. In a car truck, in combination, a side frame comprising a compression member, a tension member and bolster guide columns spacing intermediate portions of said members leaving a window opening therebetween, that portion of the tension member, beneath the window opening, being formed with a spring plank seat portion and auxiliary spring supporting portions, a spring plank supported on said spring plank seat portion, a spring plate supported on said spring plank and formed with means for positioning the same with respect to said spring plank and means for properly locating associated springs with respect thereto, a nest of springs supported on said spring plate and a second spring plate supported on said nest of springs and in turn initially supporting a bolster thereabove, the capacity of said nest of springs being reinforced by additional springs positioned on the auxiliary spring supporting portions of the frame, said additional springs being supported on correspondingly formed spring plates and in turn supporting spring plates thereabove, the corresponding portions of the bolster being upwardly offset for receiving the auxiliary springs and associated upper spring plates and provided with means

for properly locating the same with respect thereto, the free height of said springs being less than the normal free height space provided therefor between said bolster and frame whereby the capacity of said auxiliary springs is reserved until after a predetermined compression of said nest of springs.

8. In a car truck, in combination, a side frame formed with a bolster opening and a spring supporting portion beneath said opening, a nest of springs supported by said spring supporting portion, and a bolster supported by said nest of springs, that portion of the frame on opposite sides of the spring supporting portion thereof being formed with auxiliary spring seating portions at a higher elevation, auxiliary springs positioned on said auxiliary portions, said bolster being provided with portions adapted for engagement with said auxiliary springs approximately just when the nest of springs has been normally loaded.

9. In a car truck, in combination, a side frame formed with a bolster opening and a spring plank seat portion underlying said opening, a nest of springs supported by said spring plank seat portions and a plurality of extra springs arranged on opposite sides of said nest of springs and located at a higher elevation than said nest of springs, said extra springs being of such a length in comparison with the nest of springs and the respective distances between bolster and side frame along the spring axes that they are not brought into play until the nest of springs is normally loaded.

10. In a car truck, in combination, a side frame formed with a bolster opening and a spring seating portion beneath said opening, a plurality of springs supported by said spring seating portion and a bolster supported by said springs, auxiliary spring seating portions on opposite sides of said first mentioned spring seating portion of the frame and disposed at different elevations with respect thereto, springs positioned on said auxiliary spring supporting portions and extending toward the bolster and being of such a height that the capacity thereof is reserved until after a predetermined compression of the other springs, said auxiliary springs, however, being constructed of heavier material whereby a corresponding force is developed therein when compressed to a lesser degree.

11. In a car truck, in combination, a side frame comprising a compression member, a tension member and bolster guide columns spacing intermediate portions of said members leaving a window opening therebetween, that portion of the tension member, beneath the window opening, being formed with a spring plank seat portion and auxiliary spring supporting portions, a spring plank supported on said spring plank seat portion, a spring plate supported on said spring plank and formed with means for positioning the same with respect to said spring plank and means for properly locating associated springs with respect thereto, a nest of springs supported on said spring plate and a second spring plate supported on said nest of springs and in turn initially supporting a bolster thereabove, the capacity of said nest of springs being reinforced by additional springs positioned on the auxiliary spring supporting portions of the frame, the corresponding portions of the bolster being upwardly offset for receiving the auxiliary springs and provided with means for properly locating the same with respect thereto, the free height of said springs being less than the normal free height space provided therefor between said bolster and frame whereby the capacity of said auxiliary springs is reserved until after a predetermined compression of said nest of springs.

12. In a car truck, in combination, a side frame formed with a bolster opening and a spring plank seat portion beneath said opening, a nest of springs supported by said spring plank seat portion and a bolster supported by said nest of springs, an auxiliary spring seating portion adjacent said spring plank seat portion of the frame and disposed at a different elevation with respect thereto, resilient means positioned on said auxiliary portion and extending toward the bolster and being of such a height that it is not engaged thereby until after a predetermined compression of the other springs.

13. In a car truck, in combination, a side frame formed with a bolster opening and a spring supporting portion beneath said opening, a nest of springs supported by said spring supporting portion, and a bolster supported by said nest of springs, that portion of the frame adjacent the spring supporting portion thereof being formed with an auxiliary spring seating portion at a different elevation, auxiliary resilient means positioned on said auxiliary portion, said bolster being provided with a portion adapted for engagement with said auxiliary means approximately just when the nest of springs has been normally loaded.

In testimony whereof we affix our signatures.

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DONALD S. BARROWS.