Nov. 19, 1940. R. B. COTTRELL 2,222,478

CAR TRUCK

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Fig. 1

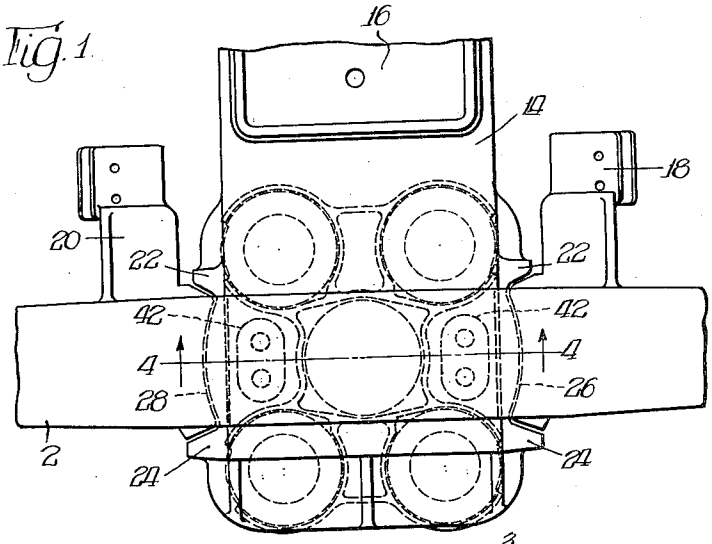
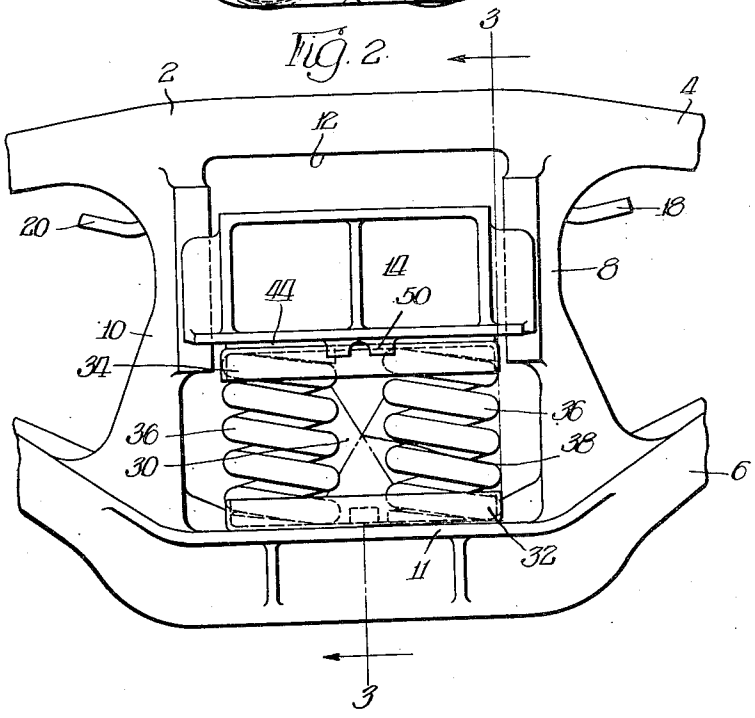


Fig. 2



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CAR TRUCK

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Fig. 3.

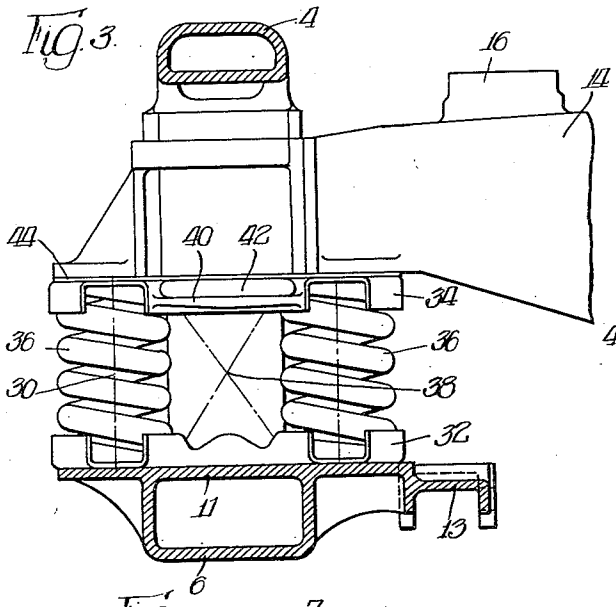


Fig. 4

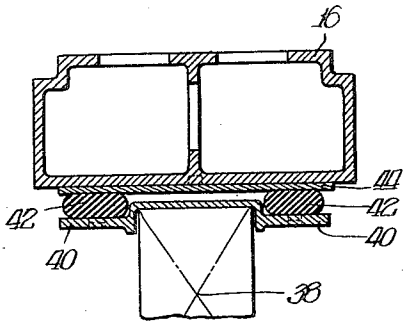


Fig. 5

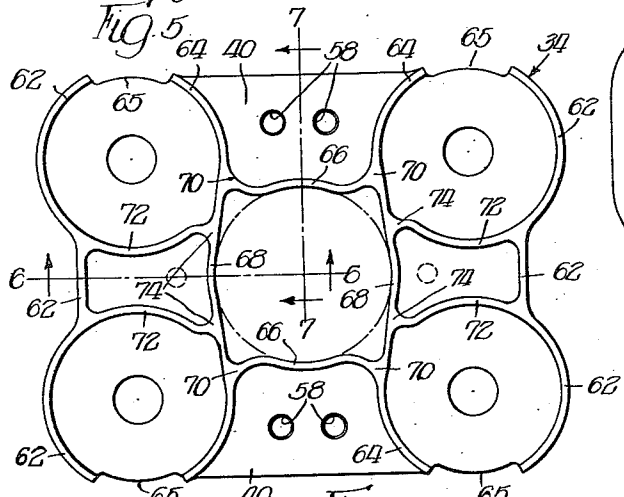


Fig. 6

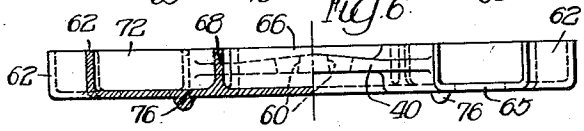


Fig. 7

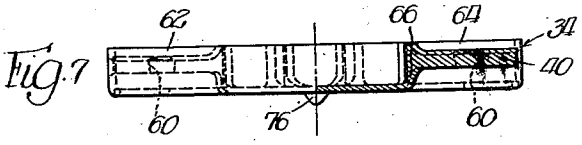


Fig. 8

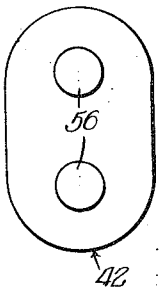


Fig. 9

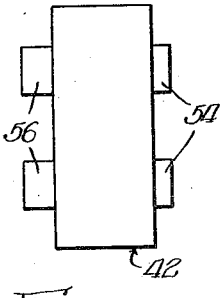
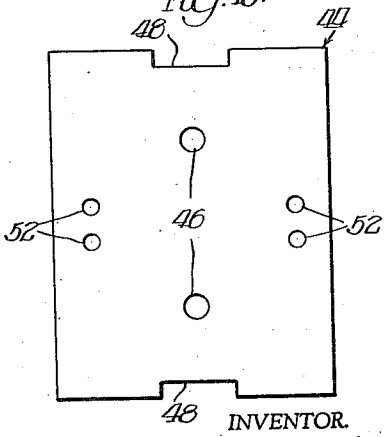


Fig. 10



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CAR TRUCK

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Fig. 11.

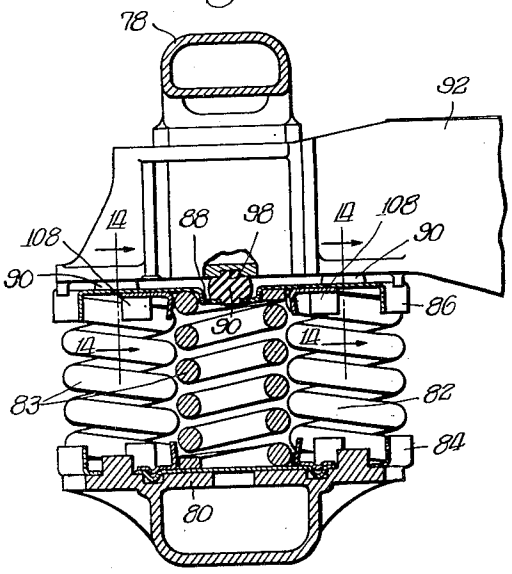


Fig. 12.

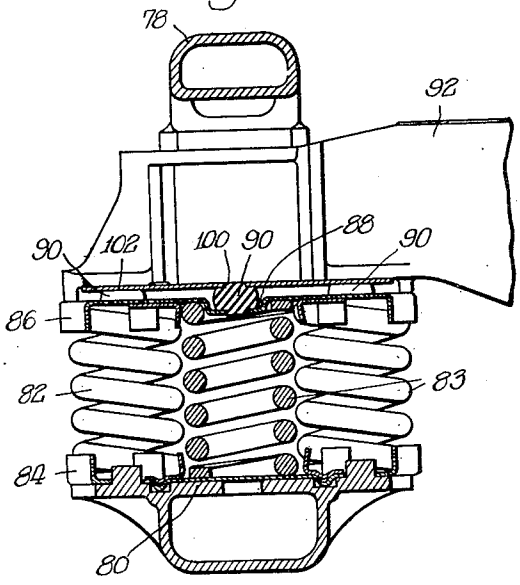


Fig. 13.

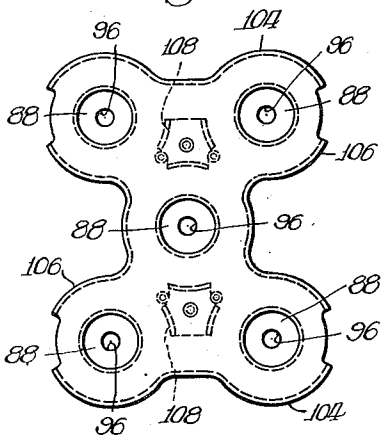


Fig. 14.

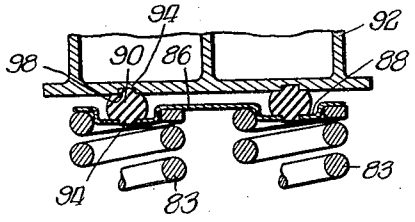
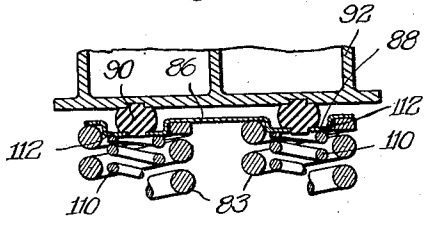


Fig. 15.



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Patented Nov. 19, 1940 2,222,478

UNITED STATES PATENT OFFICE

2,222,478

CAR TRUCK

Robert B. Cottrell, Chicago, Ill., assignor to American Steel Foundries, Chicago, Ill., a corporation of New Jersey

Application January 6, 1939, Serial No. 249,556

11 Claims. (Cl. 105—197)

My invention relates to trucks for railway freight cars and more particularly spring plankless trucks designed for high speed service.

Because of the increasingly high speeds to which railway freight equipment has been subjected in recent years, considerable development has been necessary in order to accommodate the truck structures to the additional requirements resulting from said high speeds as well as increased loads. One of the necessary results has been the development of frictional absorbing means in combination with the simple springs formerly used, the purpose being to prevent the synchronized bouncing which otherwise frequently occurred. When such friction absorbing devices are used in combination with other easy operating springs such as steel coil springs, a relative sluggishness is imparted to the spring group as a whole. This result is very desirable when the car is carrying such a load as to result nevertheless in a certain amount of spring deflection and relatively easy riding. On the other hand, when such cars are empty, the friction absorbing spring group is likely to be so stiff as to offer substantially no resilience, the effect on the car body being substantially the same as if no springs were used. This unfortunate result is particularly true where light weight car bodies are used as is now more frequently the case.

I have devised a simple and effective means of overcoming this difficulty by arranging in combination with such a relatively stiff spring group a complementary resilient means. This complementary resilient means is designed to afford a relatively soft ride when the car is empty.

My novel arrangement is particularly suitable for coal cars or other cars which normally operate under just two loading conditions, namely, full load or empty. It will readily be understood that the spring requirements of the full load are radically different from the spring requirements when the car is empty if satisfactory riding is to be afforded under both conditions.

To those skilled in the art it will readily be apparent that the accomplishment of this result is highly to be desired and yet at the same time presents difficulties which appear almost insuperable because of the lack of space for the auxiliary relatively soft resilient means.

In my novel arrangement I have overcome the above-mentioned difficulties by the very simple device which has proved unusually effective under service conditions.

An embodiment of my novel arrangement is shown in the accompanying drawings wherein

Figure 1 is a fragmentary top plan view of the railway truck structure embodying my invention;

Figure 2 is a fragmentary side elevation of the truck structure shown in Figure 1;

Figure 3 is a transverse sectional view of the truck structure shown in Figures 1 and 2, the section being taken substantially as indicated by the line 3—3 of Figure 2;

Figure 4 is another sectional view in a longitudinal vertical plane and substantially as indicated by the line 4—4 of Figure 1;

Figure 5 is a bottom plan view of my novel form of top spring plate;

Figure 6 is a side elevation thereof, half in section, the section being taken in the vertical plane substantially as indicated by the line 6—6 of Figure 5;

Figure 7 is an end elevation half in section, the section being taken substantially as indicated by the line 7—7 of Figure 5;

Figure 8 is a top plan view of the rubber spring used in my novel spring grouping, and Figure 9 is a side elevation thereof;

Figure 10 is a top plan view of the shimming member associated with my novel truck arrangement.

Figure 11 is a transverse sectional view through a modified form of my novel truck arrangement, the view corresponding in general to that shown in Figure 3 of the previous modification with the section being taken substantially in the vertical plane bisecting the truck transversely and with the bolster being shown in elevation.

Figure 12 is a view corresponding in general to that shown in Figure 11 except for the application of shim means.

Figure 13 is a top plan view of the top spring plate used in the modification shown in Figures 11 and 12.

Figure 14 is a fragmentary section taken through the bolster and spring group, the section being taken in either of the planes indicated by the line 14—14 of Figure 11.

Figure 15 is a view corresponding in general to that shown in Figure 14 except that the spring group comprises inner springs.

Describing my novel truck arrangement in greater detail, the side frame 2 is of well known form having the compression member 4 and the tension member 6 with the integrally formed spaced columns 8 and 10 forming therebetween the window opening 12 within which may be received the end of the bolster 14. Between the columns 8 and 10 the tension member 6 is widened to form the spring seat portion indicated at

11 in the usual manner, and from the inner edge of said spring seat portion may be supported the integral bracket 13 upon which may be mounted a brake beam balancing means as desired. The bolster 14 has the usual side bearing 16 inboard of the side frame. The side frame has the integrally formed brake hanger brackets 18 and 20 on opposite sides of said bolster and the bolster end is retained in position within the window 12 by the inner guide lugs 22, 22, and the outer guide lugs 24, 24 having engagement with the associated flaring surfaces on the columns 8 and 10. The engagement between the sides of the bolster and said columns is a well known type of generally cylindrical form as indicated at 26 and 28 and the over-all width of said bolster end is such as to be receivable within the relatively wide portion at the bottom of the window opening 12 after which the bolster may be raised and the spring group 30 positioned thereunder, said spring group thus providing a resilient support for said bolster end.

The novelty of my improved truck arrangement is in the manner in which the bolster end is supported on the spring seat of the side frame and comprises a novel combination of resilient means so constructed and arranged as to provide a relatively smooth ride whether the car is under condition of light load or heavy load. I accomplish this result by the novel arrangement of the spring group or resilient means generally indicated at 30.

The said spring group 30 is comprised of the bottom spring plate 32 and the top spring plate 34 between which may be positioned a plurality of coil springs indicated at 36, 36 of such size as normally to accommodate the load intended to be carried. The spring group may also comprise a snubber or friction absorbing device 38 of any suitable form with a friction absorbing capacity sufficient to prevent synchronous oscillations of the coil springs 36.

The top spring plate 34 is of novel form and is shown in detail in Figures 5, 6 and 7. At its opposite edges are formed the intermediate shelf portions 40, 40, said shelves forming seating means for auxiliary resilient pads 42, 42 as best seen in the fragmentary view of Figure 4. As illustrated, the top member of the spring group is in form of the flat plate member or shim 44, but the said shim may be omitted as desired as its name implies. In other words, the shim may be used when desired for adjusting purposes. As shown, said shim has the relatively large openings 46, 46 formed therein on alignment with the longitudinal center line of the bolster and designed to cooperate with the lugs 76, 76 on the top spring plate, thus forming positioning means. The shim 44 is likewise formed with the slots 48, 48 at the opposite edges thereof, said slots having cooperation with the lugs 50 formed on the end of the bolster (Figure 2) and serving also to interlock said bolster and said shim. The shim 44 also has adjacent each edge a plurality of relatively small openings 52, 52 for the reception of positioning studs 54, 54 formed on the top surface of the resilient pads 42. It will be understood of course that when the adjusting shim 44 is not required, the bolster will seat directly on said resilient pads 42 free of engagement with the top spring plate if the associated car body is carrying no lading. Under load conditions, however, the resilient pads will be compressed so that the bolster will have engagement with the flat top surface of the spring plate.

The general shape of the resilient pads 42 is shown in Figures 8 and 9. The pad comprises an oval-shaped solid body of resilient material, preferably formed of rubber composition, flat on the opposite sides, and on one of said sides are formed the relatively short positioning lugs or studs 54, 54 already described and in alignment therewith on the opposite side of said means are formed the relatively long positioning lugs or studs 56, 56. The studs 56, 56 are designed to cooperate with openings 58, 58 formed on the before-mentioned shelves 40, 40 of the top spring plate. The said openings 58, 58 have a tapered bore as best seen at 60, 60 (Figure 6) with the smaller end of said bore at the top of said shelf portion whereby the lugs 56, 56 may be securely retained in said openings after being forceably inserted therein. By thus securing the resilient means or pads 42 to the shelves 40 of the top spring plate it is possible to replace the shim 44 with a thinner or thicker shim as may be desired.

Referring more particularly to the novel form of spring plate shown in Figures 5, 6 and 7 inclusive, the said plate may be a relatively flat generally rectangular member having about its periphery the flanges 62, 62 and 64, 64, the ends of said flanges defining the unflanged edges of the plate as indicated at 65, 65 adjacent the four corners thereof. The configuration of the edges of said plate and said flanges there-along are designed to accommodate the seating therewithin of the coil springs 36, 36 already described, each of said flanges comprising a plurality of arcuate portions concentric with a plurality of said coils. As is apparent, said top plate when in operative position is flanged down and said flanges are so arranged as to accommodate a spring at each corner of said plate and a spring or friction absorbing device at the center thereof. The center spring or friction absorbing device is retained in position at two opposite sides by the middle portions 66, 66 of the before-mentioned flanges 64, 64 and also at the other two opposite sides as at 68, 68 by arcuate flanges which are extended at their opposite ends to merge as at 70, 70 with the beforementioned flanges 64, 64. Concentric with each of the four corner coil springs are formed the additional arcuate flanges indicated at 72, 72, said portions 72 being substantially continuous with the arcuate end portions of the flanges 62, thus providing about each of said corner coil springs a flange extending around approximately 300° of its circumference. The arcuate flanges 72, 72 merge as at 74, 74 into the flanges 68, 68 already described. The location of the before-mentioned shelves 40, 40 adjacent opposite edges of the spring plate may best been seen from the bottom plan view of Figure 5. It may be noted that the flanges 64 surround three sides of the resilient pads 42, 42 and that the exposed side is opposite the adjacent side frame column so that said resilient pads would be confined on their shelves even if the retaining lugs were destroyed.

The flat unobstructed side of the spring plate is designed to seat against the bolster. The positioning lugs 76, 76 may cooperate with corresponding openings formed on the bottom wall of the bolster and if necessary extend through the beforementioned openings 46, 46 on the shim if used.

It should be noted that the shelves 40 are positioned intermediate the top and bottom edges

of the spring plate, thus affording maximum reinforcement of other portions of the plate. At the same time said shelves are so spaced with reference to the flat side of the plates that seat against the bolster that the resilient pads **42** may be compressed between the bolster and said shelves. I may so construct said pads that they will accommodate a calculated light load for any particular capacity of car without permitting the bolster to seat against the spring plate. I thus provide an arrangement which permits the light load car body to be carried on the resilient pads, a certain amount of resilience also being afforded by some slight compression of the main load carrying springs **36, 36**. I may so arrange the friction absorbing device **38** in each spring group that it will be substantially inoperative until the resilient pads **42, 42** are fully compressed and the bolster is seated flush against the spring plate. Such full compression of said pads **42, 42** will only occur when conditions other than light load prevail or when unusual track irregularities accentuate the loads normally prevailing light load conditions.

The modification shown in Figures 11 to 14 inclusive differs from that previously described in the form of the top spring plate and the manner in which the resilient pads are supported between said spring plate and the overlying bolster. Describing this modification in greater detail, the side frame **78** is substantially identical to that of the previous modification and has the spring seat portion **80** upon which is supported the spring group generally designated **82** comprising as shown a plurality of coil springs **83, 83**, said spring group being confined between the bottom spring plate **84** and the top spring plate **86**. The top spring plate is formed with a plurality of depressions **88, 88** forming seats for the resilient pads **90, 90**, said resilient pads having a capacity sufficient to support the superposed bolster **92** with some clearance from the top spring plate **86** when the supported car body is empty.

Each of the resilient pads **90** is formed with top and bottom positioning lugs **94, 94** designed to cooperate respectively with the openings **96, 96** centrally formed in the depressions **88** of the top spring plate and with the complementary cavities **98, 98** formed on the bottom wall of the bolster or with openings **100, 100** formed in the shim **102** (Figure 12) which may be seated against the bottom wall of the bolster when required with the openings **100, 100** in alignment with the before-mentioned cavities **98, 98**.

The detail form of the top spring plate **86** may readily be understood from a consideration of Figures 11, 13 and 14. It may be noted that most of its area constitutes a generally flat surface forming seating means for the plurality of coil springs comprising the spring group **82**, the said springs being retained in their respective positions in part by the annular flanges **104, 104** at the opposite ends of the plate, each of said flanges serving as positioning means for two of said coils; and also by the lateral flanges **106, 106** at the other opposite edges of said plate, each of said flanges **106** forming positioning means for three of said coils. Spaced lugs **108, 108** are secured adjacent opposite ends of the plate, said lugs having down-turned arcuate flanges forming additional positioning means for said springs. It may be noted, moreover, that the depressions **88, 88** in the spring plate which serve as seats for the resilient pads also form positioning means for the large coil springs **83, 83**. Inner springs **110, 110** (Figure 15) may be used in the spring group as desired, said springs being located concentrically within the larger coils **83, 83** and having their top ends seated as at **112, 112** against the bottom walls of the depressed portions **88, 88**, the opposite faces of which serve as seating means for the resilient means **90, 90**.

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, a side frame having a spring seat, a spring group seated thereon and a bolster positioned on said spring group, said spring group comprising a plurality of coil springs and a top spring plate having down-turned flanges serving as retaining means for said coil springs, and shelf means on opposite sides of said plate in a plane intermediate the top and bottom edges of said flanges, resilient pads of relatively low capacity seated on said shelves and having positioning means in engagement therewith, and shim means interposed between said pads and said bolster and having positioning means in engagement therewith respectively, said resilient pads having a capacity sufficient to support said bolster when the associated car body is free of lading but being compressible to permit said shim to engage said plate when the associated car body carries lading.

2. In a railway car, a side frame having a spring seat, a spring group seated thereon and a bolster supported on said spring group, said spring group comprising a plurality of coils of relatively high capacity and a friction absorbing device, a spring plate superposed over said coil springs and said device and having down-turned flanges serving as positioning means therefor, said plate having a plurality of shelf means on opposite sides thereof positioned in a plane intermediate the top and bottom edges of said flanges, resilient means of relatively low capacity seated on said shelves and serving to space said bolster from said spring plate when the associated car body is free of lading but being adapted to be compressed to permit said bolster to engage said spring plate when said car body carries a load.

3. In a railway truck, a side frame having a spring seat, a spring group seated thereon and comprising a top spring plate having a flat top wall serving as seating means for an associated bolster and down-turned flanges forming positioning means for springs in said spring group, a plurality of shelves formed on said spring plate intermediate the edges of said flanges and merging therewith, and resilient pads seated on said shelves and having positioning means in engagement therewith, said resilient pads having a relatively light capacity sufficient to support said bolster free of engagement with said top wall when the associated car body is free of lading but adapted to be compressed to permit said bolster to engage said plate under conditions of normal load.

4. In a railway car, a side frame having a spring seat, a spring group seated thereon and a load carrying member supported on said spring group, said spring group comprising a spring plate with a flat wall serving as seating means for said group and arcuate flanges forming positioning means for the associated springs, said

arcuate flanges extending entirely along two opposite sides of said plate, and shelf means formed on the other two opposite sides of said plate and merging with said flanges in a plane intermediate the edges thereof, and auxiliary resilient means of relatively low capacity interposed between said shelves and said load carrying member and serving to space said load carrying member from said plate when the associated car body is free of lading.

5. In a railway car, a side frame having a spring seat, a spring group seated thereon, and a bolster seated on said spring group in engagement with said side frame, said spring group comprising a plurality of coils of relatively high capacity, and friction absorbing means associated therewith, a spring plate superposed on said coils and said means, said spring plate comprising shelves intermediate the top and bottom edges thereof and vertically offset with relation to other portions of said spring plate having engagement with said coils, said shelves extending inwardly between certain of said portions, resilient pads positioned on said shelves and underlying said bolster, interengaging positioning means on said pads and said shelves, said pads having a relatively low capacity sufficient to support said bolster free of other parts of said spring group when the associated car body is free of lading.

6. In a railway car, a side frame having a spring seat, a spring group seated thereon, and a bolster supported on said spring group, said spring group comprising a plurality of coil springs of relatively high capacity and a friction absorbing device, a spring plate seated on said device and said coils and having lateral shelves intermediate the top and bottom edges thereof and vertically spaced from the plane of engagement of said coils and said device with said plate and merging with said plate adjacent said device and between certain of said coils, and resilient pads of relatively low capacity seated on said shelves and having positioning means extending into said shelves, other positioning means on the opposite sides of said pads, and shim means seated on said pads and having engagement with said positioning means, and means interlocking said bolster and said shim means.

7. In a railway car, a side frame having top and bottom members and vertical columns defining a bolster opening, a spring seat therebeneath, a spring group positioned thereon between said columns, and a bolster supported on said spring group, said spring group comprising a plurality of coil springs, and a spring plate having a flat wall serving as seating means for said group, arcuate flanges formed on opposite sides of said plate and other arcuate flanges formed intermediate said sides, all of said flanges serving as positioning means for said coils, and shelf means formed at the other opposite sides of said plate and merging with said flanges, each of said shelves being defined on three sides by said flanges and unflanged at an exposed edge, and resilient pads seated on said shelves and confined between certain of said flanges and said columns.

8. In a railway car, a side frame having a spring seat, a spring group seated thereon and a bolster positioned on said spring group, said spring group comprising a plurality of coil springs and a top spring plate having downturned flanges serving as retaining means for said coil springs, and shelf means on opposite sides of said plate in a plane intermediate the top and bottom edges of said flanges, resilient pads of relatively low capacity seated on said shelves and having positioning means in engagement therewith, and shim means interposed between said pads and said bolster and having positioning means in engagement therewith respectively.

9. In a railway car truck, a side frame having top and bottom members and vertical columns defining a bolster opening, a spring seat therebeneath, a spring group thereon, a bolster end supported on said group, said group comprising a top spring plate, a plurality of coil springs of relatively high capacity, friction absorbing means, said top spring plate having a plurality of shelf means forming seats between certain of said springs, resilient pads of relatively low capacity supported on said seats and having positioning means engaged therewith, said spring plate having spring positioning flanges confining said pads on a plurality of sides thereof, and said columns serving to confine said pads on other sides thereof.

10. In a spring group, a spring plate having a flat wall serving as seating means for said group and comprising annular flanges along opposite edges thereof, and annular flanges intermediate said edges serving as positioning means for associated coil springs, and a plurality of shelf means lying in a plane intermediate the top and bottom edges of said flanges and extending inwardly between said last-mentioned flanges and merging therewith to reinforce the structure of said plate, said shelves serving as seating means for auxiliary spring means.

11. In a spring group, a spring plate having a flat wall serving as seating means for said group and comprising annular flanges along opposite edges thereof and annular flanges intermediate said edges serving as positioning means for associated coil springs, a plurality of oppositely disposed shelf means lying in a plane intermediate the top and bottom edges of said flanges and merging therewith to reinforce the structure of said plate, said shelves extending inwardly toward each other between certain of said springs and serving as seating means for auxiliary spring means, and positioning means on said shelf for said auxiliary spring means.

ROBERT B. COTTRELL.