June 3, 1930. C. R. BUSCH 1,761,815

SIDE BEARING FOR RAILWAY CARS

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Fig. 1.

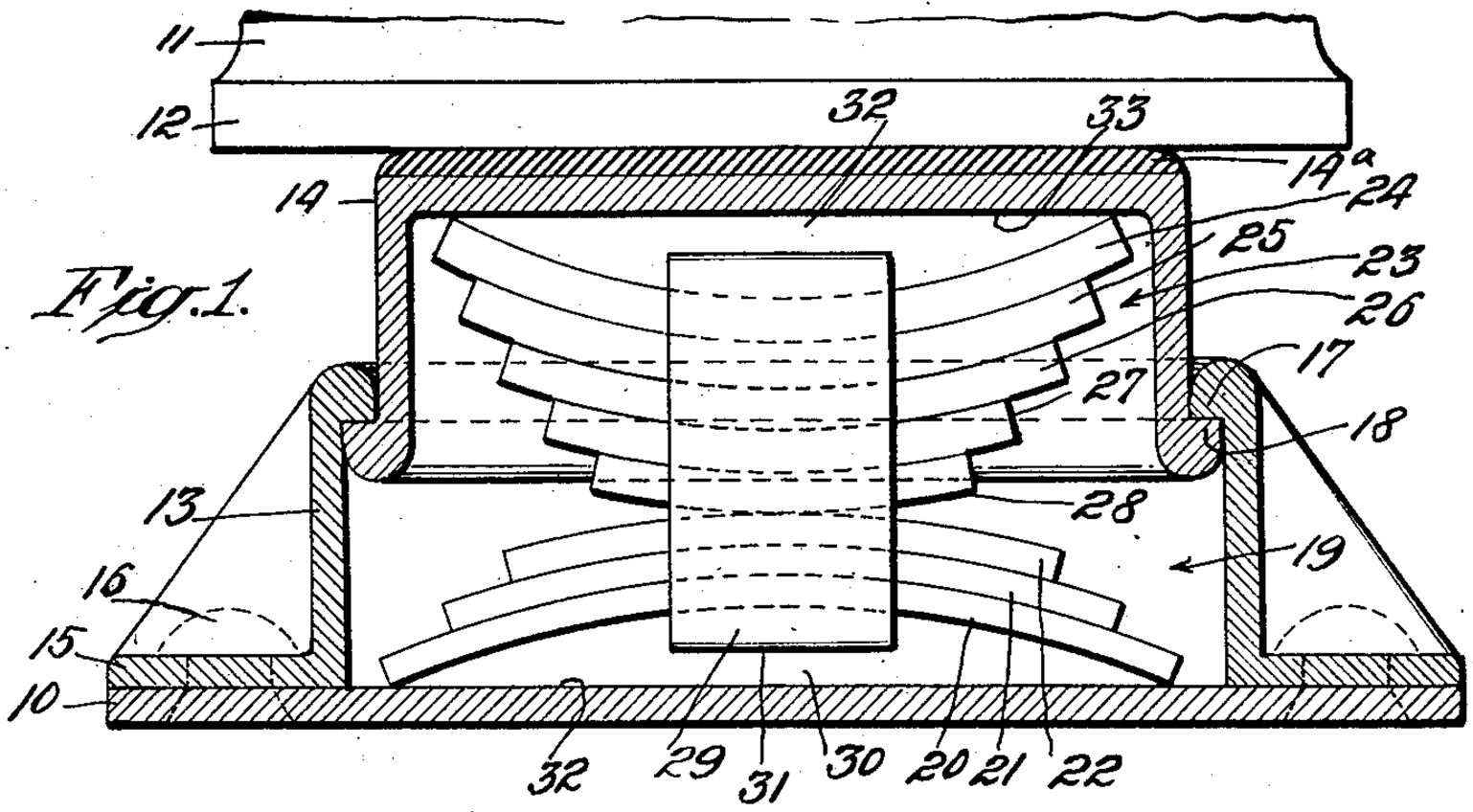


Fig. 2.

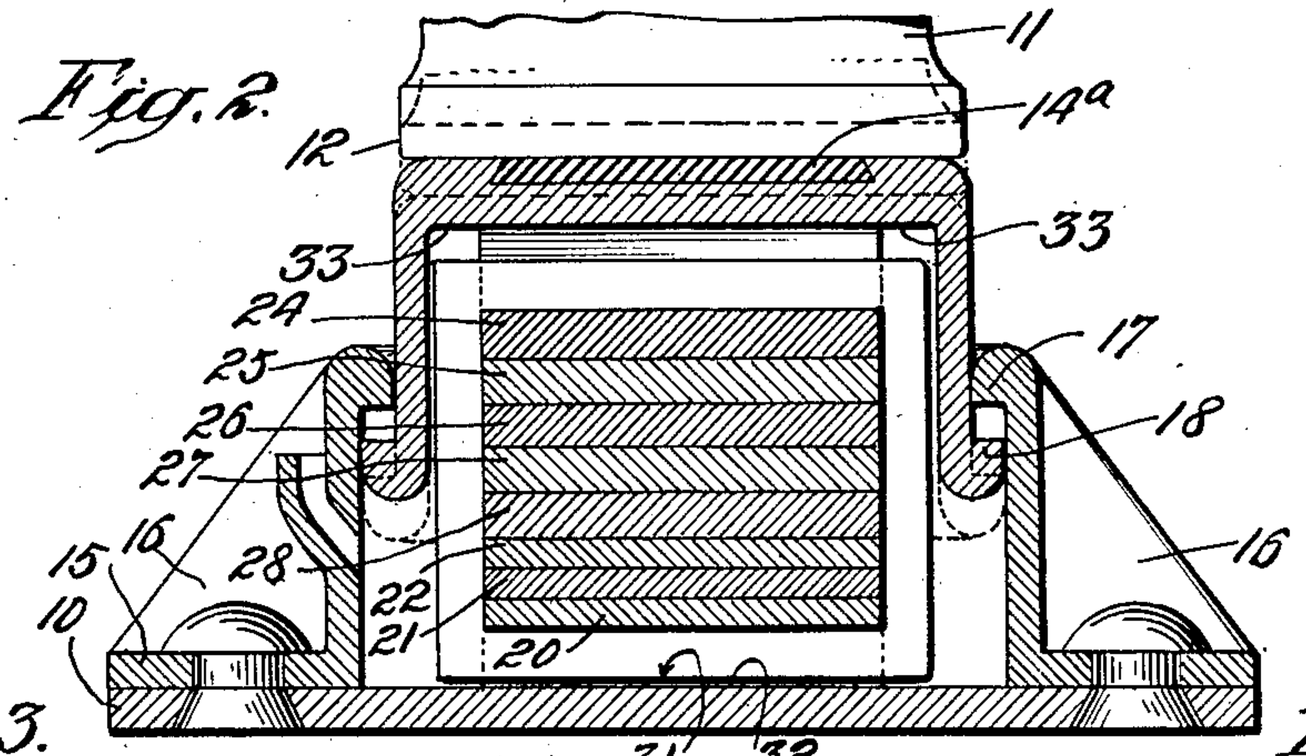


Fig. 3.

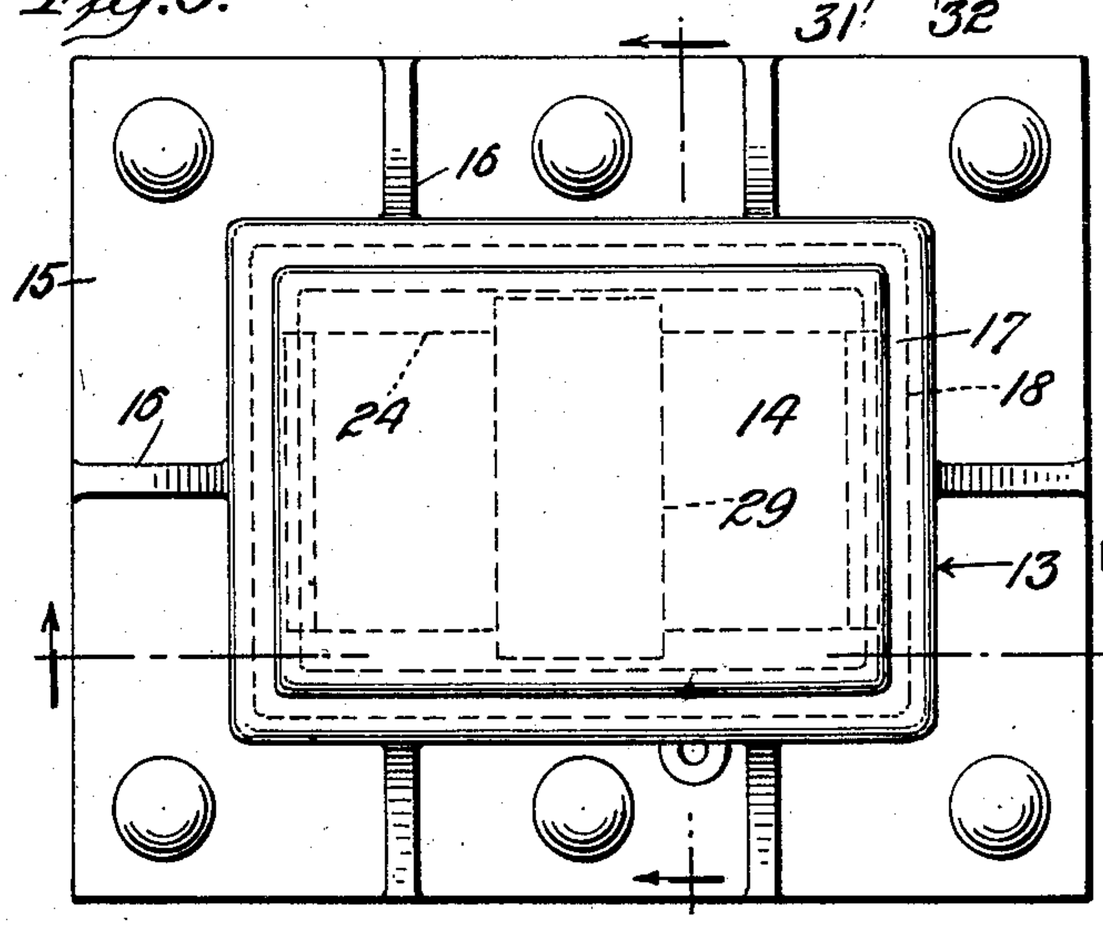
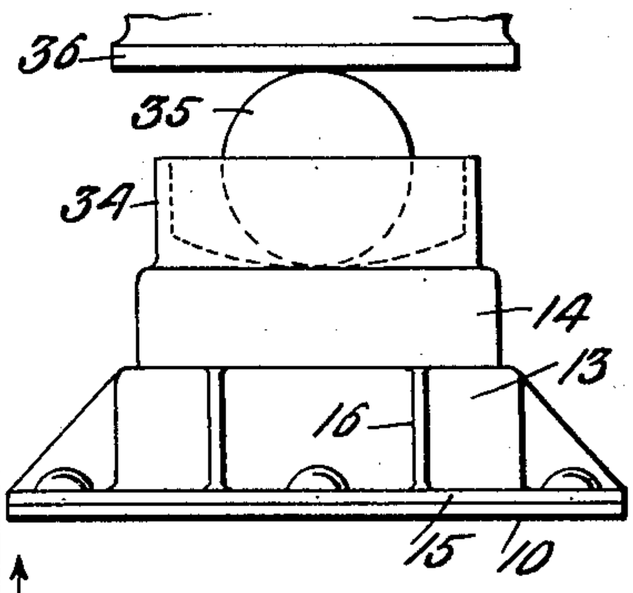


Fig. 4.



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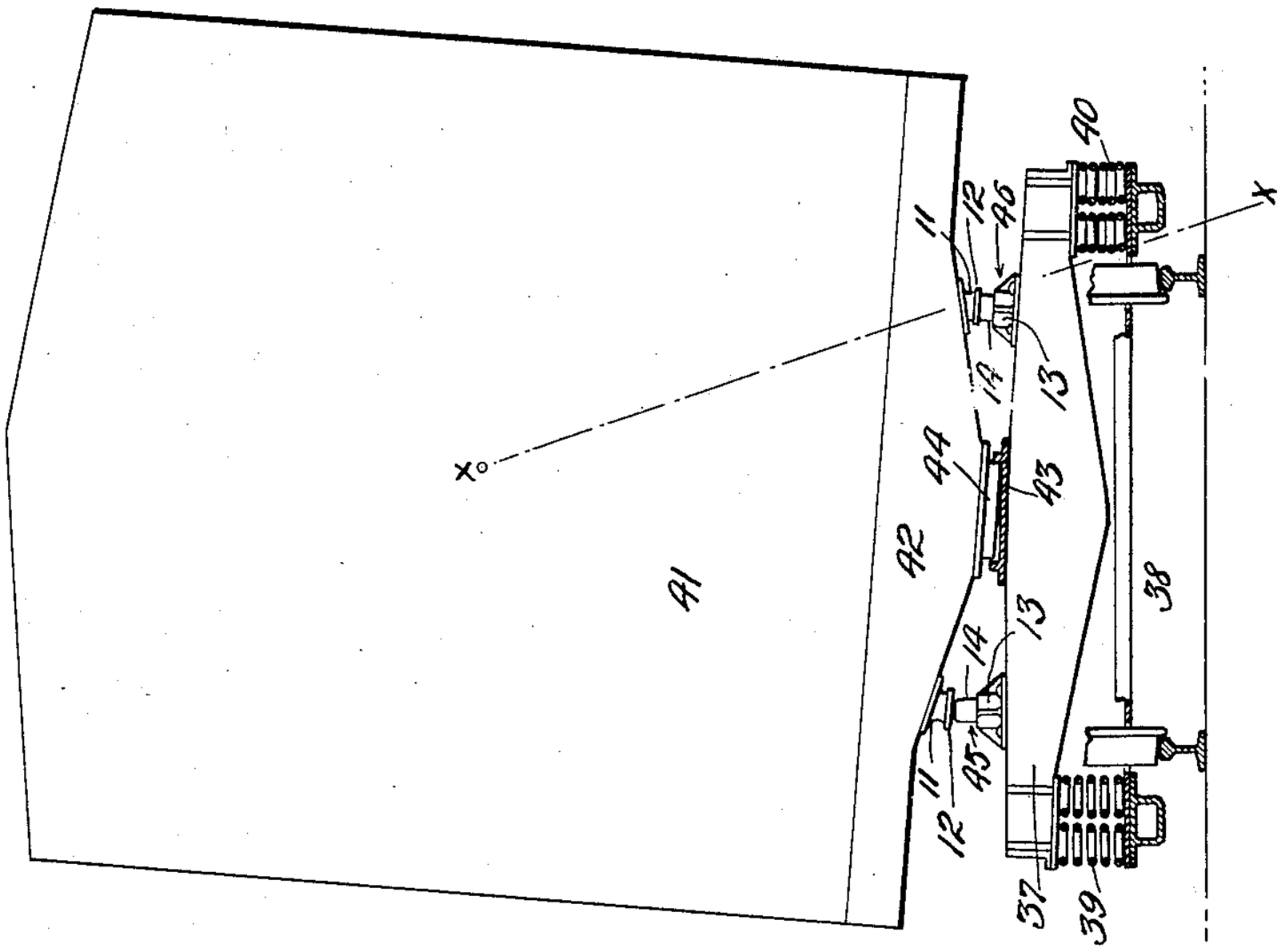


Fig. 5.

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SIDE BEARING FOR RAILWAY CARS

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The present invention relates to side bearings for railway cars, including the springs thereof, and as distinguished from the truck springs, they embody improvements which contribute very largely indeed to the life of the truck springs in service and to a more perfect and satisfactory action of the truck springs because, on the one hand, the improved side bearings have a tendency to overcome the dangerous set liable to occur in truck springs while on the other hand they relieve, equalize and reduce the sudden thrusts or loads to which truck springs are frequently subjected, and in both cases contribute to the safety and lives of railway employees as well as passangers.

At the present time there is a great lack of basic information pertaining to the prevention of derailments of railway cars and to the relation of car wheel loads to track stresses, and while the present invention does not supply the complete answer to these matters, it is believed to provide in a large measure a quite complete means for overcoming many of the difficulties for which satisfactory answers have not been found. Let it be noted that the objects of the invention are to overcome faults inherent in present day railway cars and which result in derails and serious accidents, and not to overcome derailments due to obstructions on the track.

While that which has been stated is important, yet there are other involved considerations to be observed. A present railway car when in service moving along a track has a tendency to roll or sway sidewise, which tendency is especially apparent when the car is approaching curves or is leaving them, or when the car is moving on a track which is not in the best condition, as where low rail joints are prevalent and where the tracks are soft, and on account of the rail joints being staggered. The present railway car is also a rigid car because of its steel construction, its extreme height above the rails, and its high capacity as with a coal car. The center of gravity of the present railway car is many feet above the trucks of the car so that this fact also tends to cause side-sway when the car is in motion, which motion is aggravated by the high speeds at which the cars are run. The entire load of the body of the car and its contents are carried on a center plate upon each truck, the load being more or less balanced on each side of the center plate by two side bearings (two to each truck) which are now used on all cars of different designs, but all of these side bearings work only with a clearance. This clearance however slight also allows the car to more greatly roll or sway sidewise, and, when the bearings come in contact with any part of the car-body, to immediately transfer the load to the truck springs, so that these are broken, or in most cases go solid, that is, caused to partake of a set. When solid truck springs occur the load becomes static and is transferred from the center plate to a point beyond and outside the wheels. The opposite side bearing being out of contact with the load, the opposite wheels rise up from their rails in a tipping motion, and when the car rolls back the said opposite wheels may not engage their rails, thus causing derailment of the car or broken truck parts.

One of the objects of the present invention is to provide a side bearing which is located on the truck bolster or truck frame, or the body bolster or transom, or the combination of both, so as to act as an equalizer to the body and/or load and the car truck, and which side bearing has spring means for preventing roll or side-sway of the car body, because there is no clearance between the side bearing and the body or between it and the truck, as the case may be.

The improved side bearing also has additional spring means to absorb and equalize the static load and to normalize the car body with the trucks on uneven tracks, curves and the like, while the car is in motion, so that the static load is removed from the truck springs, the journal bearings, and the wheel flanges, thereby effecting a saving in these parts of the car. The combination of such spring means in a side bearing insures traction of the wheels on the light side of the car, when it rolls or sways sidewise to thus throw all the weight on one side of

the car. While the bearing on the heavy side compresses to accept the heavy load, the bearing directly opposite it expands considerably and exerts a downward pressure in excess of the weight of the truck thereunder and insures traction, and thus avoids the present common condition of car derailments with their attendant results.

Having thus briefly recited some of the objects and advantages of the present invention, the same will now be described and claimed with reference to the accompanying drawings, illustrating a preferred embodiment of the invention, in which:

Figure 1 is a longitudinal sectional view, partly in elevation, of the improved side bearing showing the same applied and in normal position;

Fig. 2 is a transverse section thereof, partly in elevation, showing the side bearing in two other positions, one position in full lines and the other position in broken lines;

Fig. 3 is a plan of the side bearing;

Fig. 4 is an elevation of the side bearing provided with a bearing roller;

Fig. 5 is an elevation of a railway car on track and which is provided with the present improvements, the body of the car being shown as swayed sidewise but the wheels staying put on the two track-rails.

Referring to Figs. 1 and 2, the truck bolster or frame 10 and the rigid bearing casting 11 of the body bolster or transom are illustrated partially, the casting 11 having a chafing plate or surface 12 of hard steel. The bolster or frame 10 forms the bottom wall of the base member 13 of a housing or casting of the side bearing which includes a top or cap member 14. The base member 13 has a reinforced flange 15 through which extend fastenings 16, preferably in the form of rivets, and these also extend through the bolster or frame 10 and rigidly and permanently mount the housing in the desired position, on the truck in the present instance.

The housing section or base member 13 is provided with an inward shoulder 17 (see also Fig. 3) at that edge which is spaced away from the bolster or frame 10, while the cap member 14 has at its adjacent edge an outward shoulder 18, the cap member in this case telescoping in the base member 13 and being guided inwardly and outwardly by reason of its shoulder 18 having a sliding bearing relation with the inner surface of the base member. In the extreme outward position of the cap member the shoulder 18 abuts against the shoulder 17, and thus the cap member is limited in its outward movement and cannot separate from the base member. The abutting relation of these two shoulders is illustrated in Fig. 1.

Enclosed in the housing 13, 14, are at least two steel springs, the spring 19 being laminated, that is, it is composed of semi-elliptic leaves 20, 21 and 22, assembled face to face in well known manner, such leaves being of gradually decreasing length in the order named. The other spring 23 is also laminated and comprises semi-elliptic leaves 24, 25, 26, 27 and 28 assembled face to face, and which also gradually decrease in length, in the order named. There is a greater number of leaves to spring 23, and each of these leaves is thicker and hence less flexible or resilent than the leaves of the spring 19.

It will be observed that the curvature of each spring 19, 23, is away from the other spring and that the adjacent leaves of the springs have a mutual bearing relation and opposition with each other, the two springs being firmly and permanently united together in such relationship by means of a strong, encircling, metal band 29 preferably in the form of a metal forging which is shrunk or sweated onto the springs so as to unite them as a spring unit, to be enclosed as a whole in the housing of the side bearing. The described spring device or unit is assembled in the housing before the side bearing is permanently fixed in position, the ends of the longest leaf 24 of spring 23 being first inserted in the housing so that they may bear upon the inner surface of the cap member 14 whereas the ends of the longest leaf 20 of spring 19 will bear upon the truck bolster or frame 10 when the housing is fastened in the desired position. In Fig. 1, the free height of the cap member 14 is shown before the car body is applied to the truck, that is the springs are shown as fully expanded, and subsequently herein the spring 19 will be termed the "primary" spring and the spring 23 the "secondary" spring.

To permit the primary and secondary springs to accomplish their respective and combined mechanical functions they are fully expanded and a free clearance space 30, as shown in Fig. 1, separates the surface 31 of the uniting band 29 from the adjacent surface of the truck bolster or frame and a free clearance space 32 also separates the opposite surface of the band from the surface 33 of the cap member. The primary and secondary springs of the two-fold spring device may now perform their duties in the improved side bearing, and the springs may work in opposite directions to each other, but will perform separate and distinct mechanical duties in opposite directions.

Before further explaining the operation of the spring device other features both old and new will first be described. The chafing plate 12 preferably moves on a dovetailed insert 14ª in the cap member 14, the said insert being composed of wear resisting

material, for instance cast iron. Furthermore, to reduce wear and friction caused by constant contact with the chafing plate, the side bearing may be modified as shown in Fig. 4, to include a pocket 34 for a roller 35 with which the chafing plate 36 is in constant contact.

Referring to Fig. 5, the improved side bearings are shown as applied to a freight car. The parts illustrated comprise the following: bolster or frame 37 of car truck 38; truck springs 39 and 40; car body 41; body bolster 42; center wear plates 43, 44; and the improved side bearings 45, 46. In this figure it will be observed that the car body has rolled or swayed sidewise and that the bearings at each side maintain a working relation (with no clearance) with the car body, and that due to the improvements the wheels at both sides of the truck remain in running contact with both rails of the car track, for reasons now to be explained.

The purpose of the primary spring 19, Figs. 1 and 2, is to compress when the body 41 of the car (Fig. 5) is placed on the trucks 38, of which one is shown, in order to bring the center wear plates 43, 45, in bearing relation with the side bearings 45, 46, in such a manner as to allow no clearance between the wear plates and the side bearings; and said primary spring is made in such manner as to allow free turning radius to the trucks. The object is to prevent roll or side sway of the car body because there is no such clearance. An incidental advantage is, that machining of the center plates and side bearings is eliminated, and that wear on the center plates of the body and trucks will be compensated for. When the body is placed on the trucks, the cap member 12 will be depressed as shown in Fig. 2 and the primary spring 19 compressed until the abutment 32 strikes the bottom 10 of the housing. When the car body is light or loaded, and the condition as shown in Fig. 2 is established, the center plates 43, 44 take all ordinary loads, if the car body is not rocking as in Fig. 5.

The object of the less resilient secondary spring 23 is to absorb and equalize the static load and to normalize the car body with the trucks on uneven tracks, track curvatures and the like while the car is in motion. The combination of the primary spring 19 and the secondary spring 23 in the manner described insures traction of the wheels on the light side of the car when the car side sways or rolls so as to throw all the weight on one side of the car as shown in Fig. 5, inasmuch as the side bearing on the heavy side is caused to compress the heavier secondary spring 23 as shown in broken lines, Fig. 2, to accept the heavy load, while the bearing at the other side of the truck expands proportionately and its springs exert a downward pressure in excess of the weight of the truck thereunder, thus insuring traction as shown in Fig. 5, and avoiding the present condition of car derailments. As the side bearing on the light side of the car expands it follows the chafing plate 12 at that side as is maintained in contact with it due to the combined actions of the side bearings at both sides of the truck.

What ordinarily happens at the present time when a car rolls or side sways is, that the truck is tipped as well as the body of the car, the truck springs being compressed at the heavy side and the truck springs at the light side of the car being expanded, and the center wear plates being subjected to increased load, and the body bearings at the depressed side of the car being forced unduly against the usual side bearing, while the body bearing at the lifted side of the car is not bearing at all on the opposite side bearing but is separated therefrom by considerable clearance, thus lifting the wheels at that side of the car off from their rail and encouraging derailment of the car. In Fig. 5 the line X indicates that of the static load, and points out very clearly that when a car rolls or side sways, the truck springs at the heavy side of a car provided with the improved side bearings are saved and are not caused to break or become set as when the present side bearings are employed.

It is thus apparent that the improved side bearing will greatly increase the spring capacity of the car, and overcome objections due to extreme loads causing the truck springs to go solid. The spring device of the present invention affords two springs of different capacity and which work as a unit, the binding member of the springs being of given thickness allowing the binding member to carry the overload without permitting the spring leaves to be strained to the limit of elasticity and lose their life by going flat.

Obviously the invention is susceptible to a wide range of modification by those skilled in the art without departing from the spirit of the invention as defined in the appended claims.

What I claim as new and of my invention is:

1. In a side bearing for railway cars, a two-fold spring device comprising a primary laminated spring and a secondary laminated spring of less resiliency than the primary spring, the two springs being arranged for mutual opposition, and the primary spring serving as a cushion for excess weights and the secondary spring serving to maintain a permanent bearing relation between the side bearing and the car body.

2. In a side bearing for railway cars, a two-fold spring device comprising a primary laminated spring and a secondary lam-

inated spring of less resiliency than the primary spring and assembled as a unitary device, the two springs being arranged for mutual opposition, and the primary spring serving as a cushion for excess weights and the secondary spring serving to maintain a permanent bearing relation between the side bearing and the car body.

3. In a side bearing for railway cars, bearing surfaces, and a two-fold spring device located between and bearing on such surfaces, and comprising a primary spring and a secondary spring of less resiliency than the primary spring, each spring having free ends having a sliding engagement with their own bearing surface, and each spring comprising semi-elliptic leaves curved reversely to the leaves of the other, the two springs being arranged for mutual opposition.

4. In a side bearing for railway cars, bearing surfaces, and a two-fold spring device located between and bearing on such surfaces, and comprising a primary spring and a secondary spring of less resiliency than the primary spring, each spring having free ends having a sliding engagement with their own bearing surface, and each spring comprising semi-elliptic leaves curved reversely to the leaves of the other, and a uniting band binding the two springs together, the two springs being arranged for mutual opposition.

5. In a side bearing for railway cars, the combination of a housing comprising a base member and a cap member which are movable relatively to each other, a spring unit arranged in the housing and including a primary, laminated, semi-elliptic spring and a secondary, laminated, semi-elliptic spring of less resiliency than the primary spring, one spring curved oppositely to the other, and means for uniting the springs.

6. In a side bearing for railway cars, the combination of a housing comprising a base member and a cap member which are movable relatively to each other, and a two-fold spring device arranged in the housing and comprising a primary spring and a secondary spring of less resiliency than the primary spring, the two springs being arranged for mutual opposition.

7. In a side bearing for railway cars, the combination of a housing comprising a base member and a cap member which are movable relatively to each other, and a two-fold spring device arranged in the housing and comprising a primary spring and a secondary spring of less resiliency than the primary spring, the two springs being arranged for direct mutual opposition.

8. In a side bearing for railway cars, the combination of a housing comprising a base member and a cap member which are movable relatively to each other, and a two-fold spring device arranged in the housing and comprising a primary spring and a secondary spring of less resiliency than the primary spring, and assembled as a unitary device, the two springs being arranged for mutual opposition.

9. In a side bearing for railway cars, the combination of a housing comprising a base member and a cap member which are movable relatively to each other, and a two-fold spring device arranged in the housing and comprising a primary spring and a secondary spring of less resiliency than the primary spring, each spring comprising semi-elliptic leaves curved reversely to the leaves of the other, the two springs being arranged for mutual opposition.

10. In a side bearing for railway cars, the combination of a housing comprising a base member and a cap member which are movable relatively to each other, and a two-fold spring device arranged in the housing and comprising a primary spring and a secondary spring of less resiliency than the primary spring, each spring comprising semi-elliptic leaves curved reversely to the leaves of the other, and a uniting band binding the two springs together, the two springs being arranged for mutual opposition.

11. In a side bearing for railway cars, the combination of a housing comprising a base member and a cap member which are movable relatively to each other and stop means for the outward limit of movement of the two members, and a spring unit arranged in the housing and including a primary, laminated, semi-elliptic spring and a secondary, laminated, semi-elliptic spring of less resiliency than the primary spring, one spring curved oppositely to the other, and means for uniting the springs.

12. In a side bearing for railway cars, the combination of a housing comprising a base member and a cap member which are movable relatively to each other and stop means for the outward limit of movement of the two members, and a two-fold spring device arranged in the housing and comprising a primary spring and a secondary spring of less resiliency than the primary spring, the two springs being arranged for mutual opposition.

13. In a side bearing for railway cars, the combination of a housing comprising a base member and a cap member which are movable relatively to each other and stop means for the outward limit of movement of the two members, and primary and secondary springs of relatively different resiliency within the housing, and being in mutual opposition, the primary spring bearing upon the base member and the secondary spring upon the cap member.

14. In a side bearing for railway cars, the combination of a housing comprising a base

member and a cap member which are movable relatively to each other and stop means for the outward limit of movement of the two members, and primary and secondary springs of relatively different resiliency within the housing, and being in mutual opposition, the primary spring bearing upon the base member and the secondary spring upon the cap member, and means to prevent the springs when under extreme compression from developing a "set."

15. In a side bearing for railway cars, the combination of a housing comprising a base member and a cap member which are movable relatively to each other and stop means for the outward limit of movement of the two members, and primary and secondary springs of relatively different resiliency within the housing, and being in mutual opposition, the primary spring bearing upon the base member and the secondary spring upon the cap member, the springs including semi-elliptic leaves curved away from each other, and means uniting the springs and providing abutments against the base member and cap member respectively.

16. In a railway car, in combination, a frame member of the truck and a frame member of the body of the car and side bearing means interposed between such frame members, and including a primary spring and a secondary spring of less resiliency than the primary spring, the two springs being arranged in mutual opposition, and respectively mechanically functioning one with closer proximity to the body frame-member and the other with closer proximity to the truck frame-member, for substantially the purposes set forth.

17. In a railway car, in combination, a frame member of the truck and a frame member of the body of the car, and side bearing means interposed between such frame members, and including a primary spring and a secondary spring of less resiliency than the primary spring, and assembled as a unitary device, the two springs being arranged in mutual opposition, and respectively mechanically functioning one with closer proximity to the body frame-member and the other with closer proximity to the truck frame-member, for substantially the purposes set forth.

18. In a railway car, in combination, a frame member of the truck and a frame member of the body of the car, and side bearing means interposed between such frame members, and including a primary spring and a secondary spring of less resiliency than the primary spring, each spring comprising semi-elliptic leaves curved reversely to the leaves of the other, the two springs being arranged in mutual opposition, and respectively mechanically functioning one with closer proximity to the body frame-member and the other with closer proximity to the truck frame-member, for substantially the purposes set forth.

19. In a railway car, in combination, a frame member of the truck and a frame member of the body of the car, and side bearing means interposed between such frame members, and comprising a housing including a base member fixed to the truck frame member, a cap member having cooperative relation with the body frame-member, the base and cap members movable relatively to each other, a spring unit arranged in the housing and including a primary laminated, semi-elliptic spring bearing upon the base member and a secondary, laminated, semi-elliptic spring of less resiliency than the primary spring and bearing upon the cap member, the two springs being arranged in mutual opposition and curved outwardly with respect to each other.

20. In a railway car, in combination, a frame member of the truck and a frame member of the body of the car, and side bearing means interposed between such frame members, and comprising a housing including a base member fixed to the truck frame members, a cap member having cooperative relation with the body frame-member, the base and cap members movable relatively to each other, a spring unit arranged in the housing and including a primary, laminated, semi-elliptic spring bearing upon the base member and a secondary, laminated, semi-elliptic spring of less resiliency than the primary spring and bearing upon the cap member, the two springs being arranged in mutual opposition and curved outwardly with respect to each other and means for precluding separation of the base member and cap member.

21. In a railway car, in combination, the truck, the car body, expansible side bearings fixed to one of them, bearings having chafing plates and fixed rigidly to the other of them, center plates supporting the body upon the truck, each side bearing including a base and a cap, together with a two-fold spring device located between the base and cap, the spring device comprising a primary spring and a secondary spring of less resiliency than the primary spring and urging the cap to maintain a permanent bearing relation with the corresponding chafing plate, whereby wear takes place on the center plates without causing any abnormal weight to rest on the side bearings so that the car truck will freely move in a radius, and each primary spring being of high capacity working in tandem with the secondary spring, whereby the primary spring acts as a cushion for excess weights imposed and normalizes the car body and due to its location gives added spring capacity to the car.

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