Nov. 10, 1942. R. J. KIRSTEN ET AL 2,301,726

SWING MOTION TRUCK

Filed May 11, 1940 3 Sheets-Sheet 1

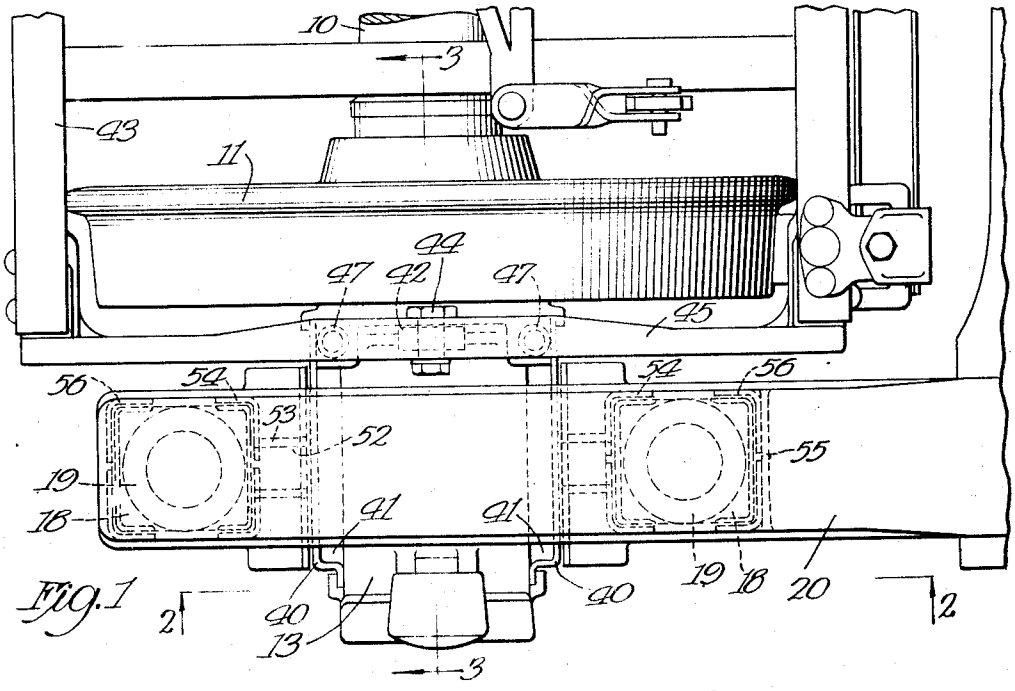
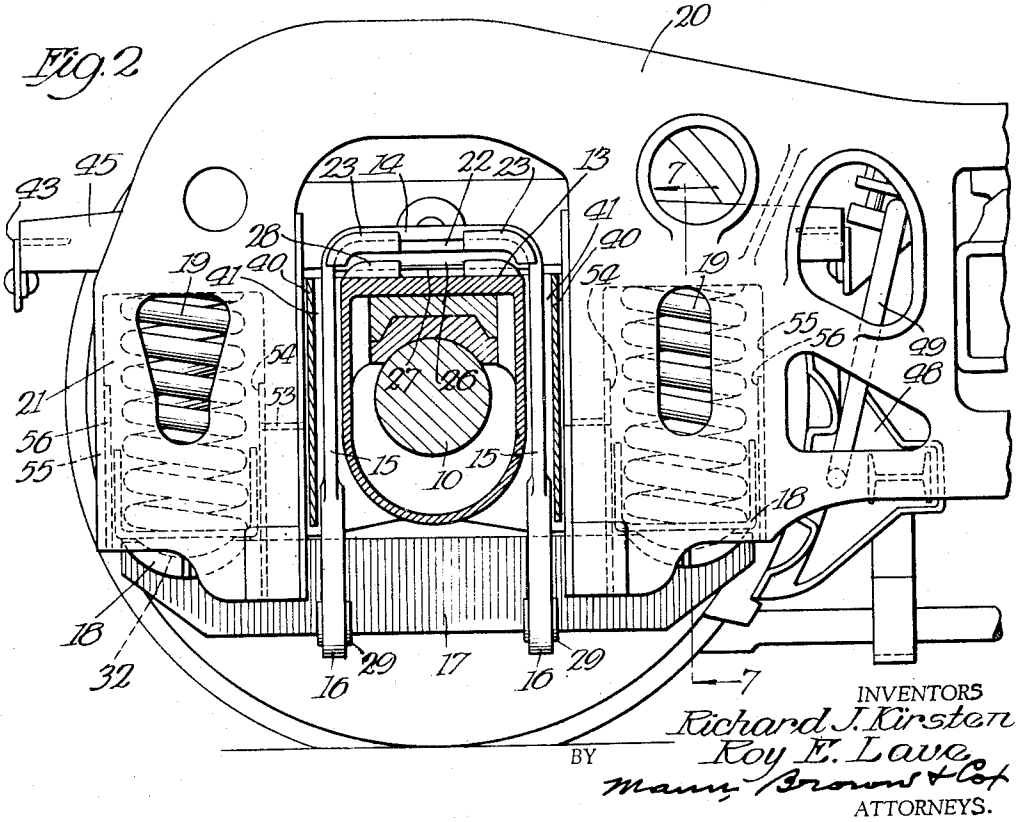


Fig. 1

Fig. 2



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Filed May 11, 1940 3 Sheets-Sheet 2

Fig. 3

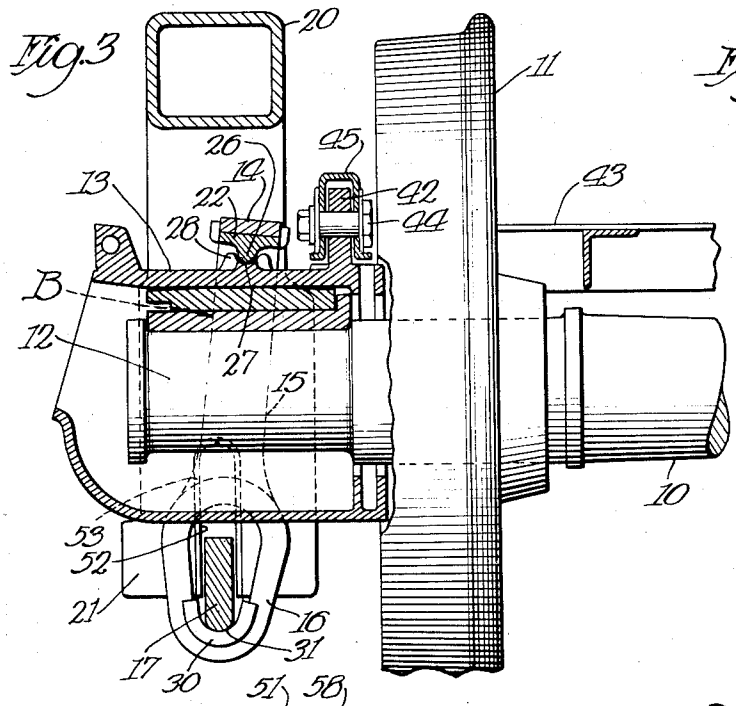


Fig. 6

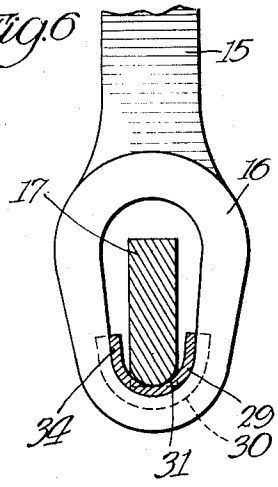


Fig. 5

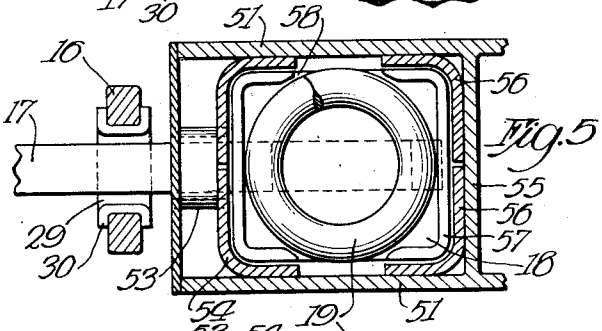


Fig. 4

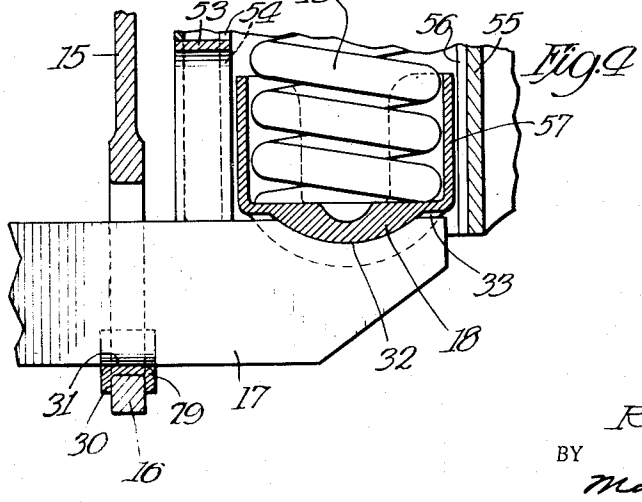
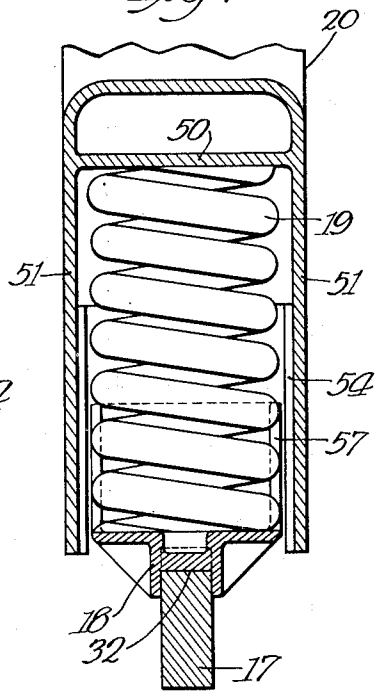


Fig. 7



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Filed May 11, 1940 3 Sheets-Sheet 3

Fig. 8

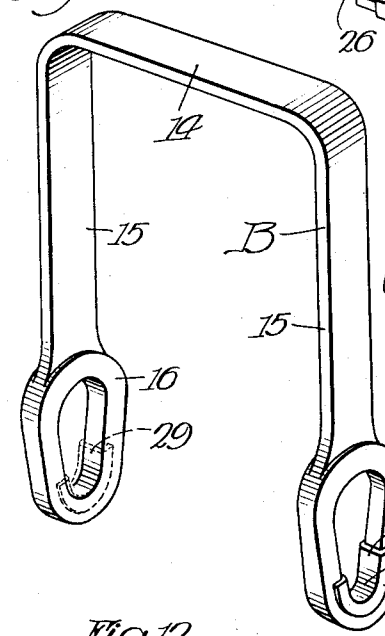


Fig. 9

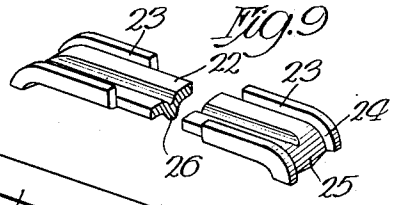


Fig. 11

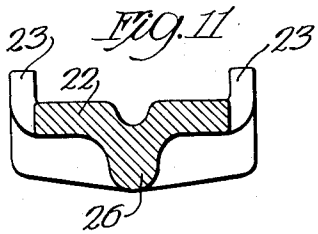


Fig. 10

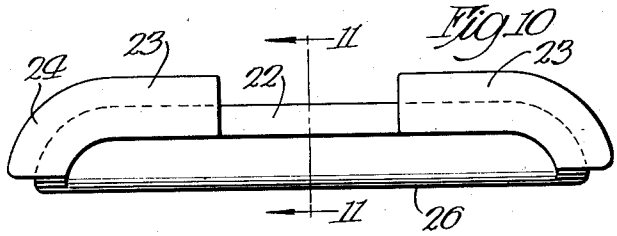


Fig. 13

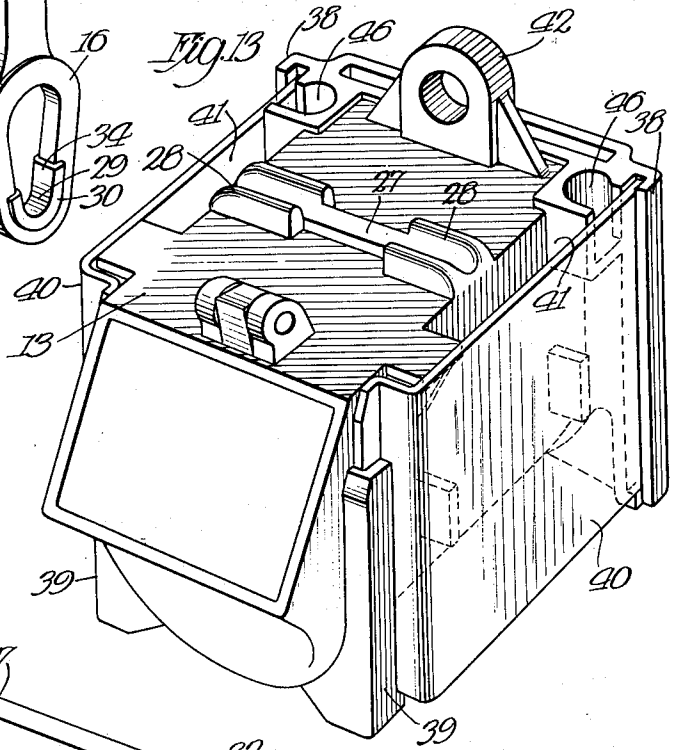


Fig. 12

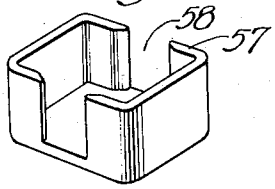
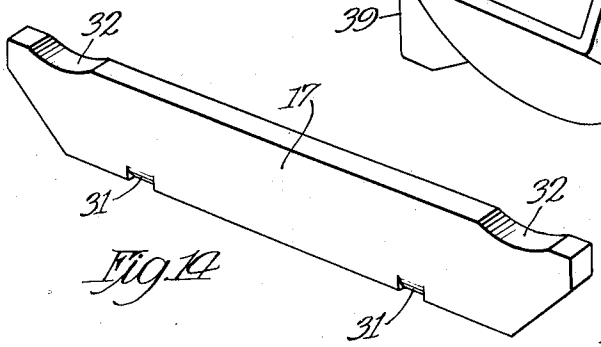


Fig. 14



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UNITED STATES PATENT OFFICE

2,301,726

SWING MOTION TRUCK

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Application May 11, 1940, Serial No. 334,550

5 Claims. (Cl. 105—222)

This invention relates to swing motion trucks and has for its principal object to reduce the cost of production, reduce the wear of the relatively moving parts and generally improve the construction. Further objects and advantages of the invention will appear as the disclosure proceeds and the description is read in connection with the accompanying drawings, in which

Fig. 1 is a plan view of a portion of a swing motion truck embodying the invention;

Fig. 2 is a section on the line 2—2 of Fig. 1;

Fig. 3 is a vertical cross section on the line 3—3 of Fig. 1, showing a swing hanger supporting the car frame on the journal box;

Fig. 4 is a detail of the spring support on the swing hanger;

Fig. 5 is a plan view of the same;

Fig. 6 is an enlarged view of the eye portion of the swing hanger showing a wear plate and spring seat bar in section;

Fig. 7 is a transverse section on the line 7—7 of Fig. 2 showing the arrangement of the springs within the truck frame;

Fig. 8 is a perspective view of a bow forming a part of the swing hanger;

Fig. 9 is a perspective view of a wear shoe for the bow, the intermediate portion thereof being broken away;

Fig. 10 is a side elevation of the wear shoe;

Fig. 11 is a cross section of the same taken on the line 11—11 of Fig. 10;

Fig. 12 is a perspective view of one of the spring seats;

Fig. 13 is a perspective view of one of the journal boxes and

Fig. 14 is a perspective view of one of the spring seat bars, forming a part of the swing hangers

But these specific drawings and the corresponding description are used for the purpose of illustrative disclosure and are not intended to place unnecessary limitations on the claims.

In the drawings, 10 indicates a wheeled axle, one of the wheels being indicated at 11 (Fig. 3) and one of the journals at 12. Each journal is equipped with a journal box 13 carrying a bow B including a bight portion 14 and arms 15 having large ovate eyes 16, receiving a spring seat bar 17, the ends of which project beyond the eyes and receive the spring seats 18 for coil springs 19, supporting the truck frame 20, having pedestals 21 straddling the journal boxes.

With such a construction it will be seen that the wheeled axle and its journal boxes may move laterally with respect to the truck frame and the car carried by it in accommodating itself to lateral irregularities in the track and in taking switches and turnouts without disturbing the smooth even motion of the car.

The bow B (Fig. 8) is preferably a forging from some suitable material such as low carbon steel and at the bight it is fitted with a wear shoe consisting of a body portion 22, having outwardly directed flanges 23 interrupted at the intermediate portion and curved at the ends 24, to conform with the curvature of the shoe end 25 and the bend of the bow B. On its inner side, in the middle, the shoe is equipped with a bearing rib 26 to rest in the bearing groove 27 on top of the journal box 13. The bearing groove is shallow, but is guarded at the ends by high flanges 28, whereby it is made self-cleaning while having sufficient depth to guard against involuntary separation. The bearing groove 27 is curved on a radius of 1" and the opposing surface of the rib 26 is curved on a radius of 3/8", by which means the supporting bearing for the swing hanger takes the form of a rolling or rocking bearing and the friction is very much less than where the one part slips along the surface of the other.

The eyes 16 of the bow are large as compared with the spring seat bar 17 and each is provided with a wear plate 29 of substantially U-shape, having out-turned flanges 30, between which the bow of the corresponding eye is received. The supporting surface of this shoe is curved on a radius of 1", whereas opposing surface 31 on the spring seat bar 17 is curved on a radius of 1/2", with the result that this bearing also becomes of the rocking or rolling type.

The upper portions 34 of the U-shaped wear plate 29 are substantially straight (Fig. 6) and are wedged into the narrowing portion of the ovate eye 16.

The wear shoe and the wear plates are here shown in a form suitable for drop forging from inexpensive steel, such as so-called spring steel or casting in familiar grades of cast steel. Making them separately from the bow proper simplifies the production of the swing hangers.

The spring seat bar 17 has curved seats 32 for the spring seats 18 which have rounded bottoms of like curvature, but the seats are shallower than the curved bottoms by 1/8" whereby they are afforded a clearance, indicated at 33 in Fig. 4, which, together with the free seating of the seat bar of the eyes in the bow, makes for flexibility, allowing the structure to accommodate itself to shocks and any inequalities of loading.

The journal box 13 is of familiar type and

corresponds in general to the Association of American Railroads standard 5½ by 10. At the sides there have been added up and down grooved flanges 38 and 39 adjacent to each end which receive a movable wear plate 40, whereby openings 41 are provided at each side of the box within which the arms of the bow B can swing freely and the pulling and braking stresses are transferred from the journal box to the pedestal through the wear plates 40.

The detail of the construction and its advantages are more fully disclosed in our co-pending application, Serial No. 334,549, filed of even date herewith.

The journal box also has an upstanding post 42 adjacent to its inner end, which is secured to a frame 43 by a bolt 44, passing through the post and the sides of a channel shaped longitudinal member 45 of the frame. At each side of the post 42 is a spring seat 46 receiving a spring 47, the two of which, acting upon the frame 43, serve to keep it in even balance on the bolts 44, but permit it to yield slightly when the brakes are applied.

The function of this frame 43 is to maintain the journal boxes in proper spaced relation and to support the brake mechanism always in proper relation to the wheels, whether they are moving laterally with respect to the truck frame or in the normal position. The structure and arrangement of the brake mechanism is a matter of selection, and is here indicated mainly by the brake heads 48 and hangers 49 (Fig. 2).

The truck frame 20 is here shown in a form suitable for molding in cast steel but, of course, it may be made of other materials and fabricated in many ways. It rests on the tops of the springs 19 by means of horizontal webs 50 extending between and connecting the side webs 51 of each side frame (see Fig. 7).

Each arm of the pedestal 21 is slotted vertically at 52 (Fig. 3) to receive the projecting ends of the spring seat bar 17, and the slots are of sufficient length to afford that bar ample clearance in moving upwardly against the compressing springs in passing over a rise in the track. The mass of the car is relatively so great with respect to the axle and journal boxes that it is accurate to say they move up and down with respect to the car in passing over vertical changes in the track. It is also correct to say that the wheeled axles and journal boxes move laterally with respect to the truck frame and the car in accommodating themselves to horizontal variations in the track, taking switches and turnouts and such like. In this lateral movement the lower rounded surfaces of the spring seat bar 17 become fulcra about which the swing hangers rock as their upper portions travel laterally with the journal boxes.

Each of the vertical slots 52 in the pedestal is bordered by a U-shaped rib or flange 53 to the free edges of which is welded wear plates 54 which extend vertically a suitable height for guiding the movement of the spring seats 18.

On the opposite side of each spring 19 the vertical webs 51 are connected by a transverse wall 55, and in the corners between it and the walls 51 angular wear plates 56 are fitted and welded to the truck frame. The wear plates 54 and 56, together with the associated walls, form spring casings of somewhat polygonal cross section, enclosing the springs but spaced from them so as to not interfere with the movement of the coils as they yield and extend. As shown and preferred, the wear plates are in the form of angles, one flange being welded to the rib 53 and the other welded to the web 51.

The spring seats 18 have upwardly directed flanges 57 which cooperate with the wear plates to guide the lower end of the springs in compression and to maintain the springs out of contact with the wear plates and the walls of the casing. The flange 57 is interrupted at the sides, indicated at 58 (Fig. 5) but, as will be seen, the opposed portions of the spring 19 are spaced from the walls 51 of the truck frame.

The wear plates 54 and 56, the flange 53, and the seat bar 17, are preferably made of some wear resisting material such as so-called Manten steel, manufactured by the United States Steel Corporation.

We claim:

1. In a device of the class described, a coil spring, a spring casing non-circular in cross section receiving the spring, said casing being continuous around said spring, and a spring seat having interrupted flanges of non-circular section at opposite sides of the seat for receiving the spring between them, the external diameter of said spring being greater than the inner surfaces of said flanges, whereby the turns of said spring will extend radially outward between said flanges.

2. In a railway truck, a journal box having a bearing groove extending across the top thereof, said groove being shallow at its intermediate portion and having upwardly extending flanges at its ends, a swing hanger comprising a transverse member and a depending arm at each end thereof, a bearing member having upwardly extending flanges curved at their ends for engaging at opposite sides of said arms and transverse member, the lower ends of said arms having ovate openings therethrough with their small ends turned down, bearings seated in the lower portion of said ovate openings and having curved flanges engaging the side and bottom walls of said openings, a spring bar engaging said last named bearings, spring seats on said bar, springs mounted on said seats, and a truck frame supported by said springs.

3. In a device of the class described, a wheeled axle having a journal, a journal box on the journal, a swing hanger including a bow with arms having their lower ends provided with ovate eye openings with their smaller ends down, U-shaped wear members seated in the lower portion of said eye openings, said wear members having outwardly extending flanges for engaging the bottom and side walls of said eye openings for holding said wear members in operative position, a spring seat bar having concave recesses in its upper edge at each end thereof, a spring seat for each recess, convex projections on said seats engaging in said recesses, each of said seats having upstanding segmental rectangular walls, a spring on each seat, the diameter of said seat inwardly of said segmental walls being less than the external diameter of said spring, each spring having its turns extending outwardly between the adjacent edges of said segments, and a truck frame on the springs, said frame having pedestals each provided with arms directly engaging said journal boxes for driving the axles, the bight of said bow having a rocking bearing directly on the journal box and said bar rockably engaging the U-shaped wear members seated in said eye openings.

4. In a truck, a wheeled axle having a jour-

nal, a journal box on the journal, a swing hanger on the journal box including a bow having eyes at the ends of the arms, U-shaped wear members seated within said eyes for receiving a spring seat bar having its end portions projecting beyond the eyes and provided with curved bearings, spring seats each having a curved bottom mounted on one of said bearings on the spring seat bar, each of said seats having upwardly extending segmental flanges arranged in rectangular form in cross-section, springs on the spring seats, the diameter of said springs being substantially the same as the overall width of said seats and having their turns extending between the adjacent edges of the segmental flanges of said seats, respectively, a truck frame mounted on the springs, said frame having rectangular recesses into which the upwardly extending flanges of said spring seat telescope and having pedestals for engaging the side faces of said journal boxes for propelling said wheeled axles, and means for providing space between each journal box and the corresponding pedestal for the free swinging movement of said swing hangers during the movement of the truck.

5. In a device of the class described, a swing hanger including a bow having an upper cross member and a pair of arms integral with the ends of said cross member and depending therefrom, and a wear shoe having upwardly and outwardly extending flanges spaced apart to form a segmental channel around the top and end portions of the shoe, each segment of the flange extending around one end and partially across the top of the shoe, the segments being spaced apart, said shoe having curved ends for receiving said cross member and arms between said flanges and for positioning said shoe on said cross member beneath the same, said shoe having an elongated downwardly extending bearing having its ends curved to conform to the curvature of said bow, said bearing having a straight lower surface transversely curved on a short radius to form a rocking pivot for said hanger.

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