Sept. 6, 1938. O. C. DURYEA 2,129,548

CAR CONSTRUCTION

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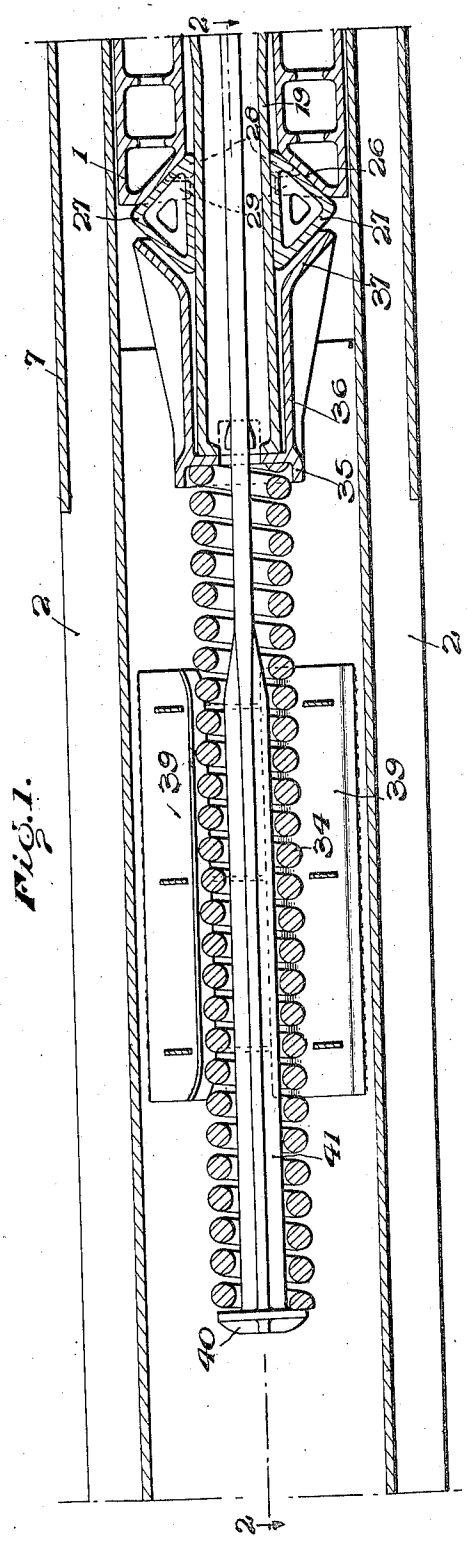


Fig. 1.

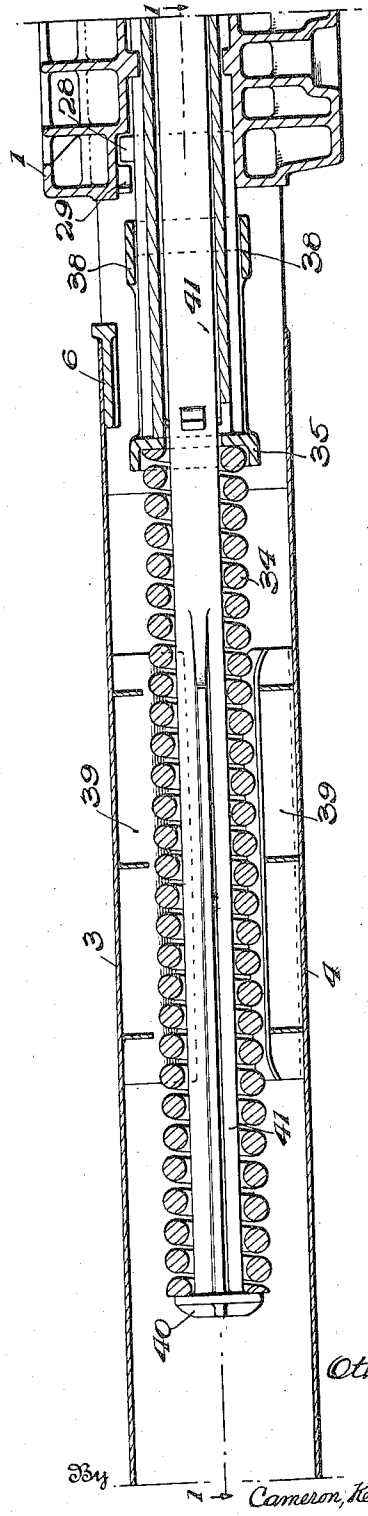


Fig. 2.

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Fig. 1a

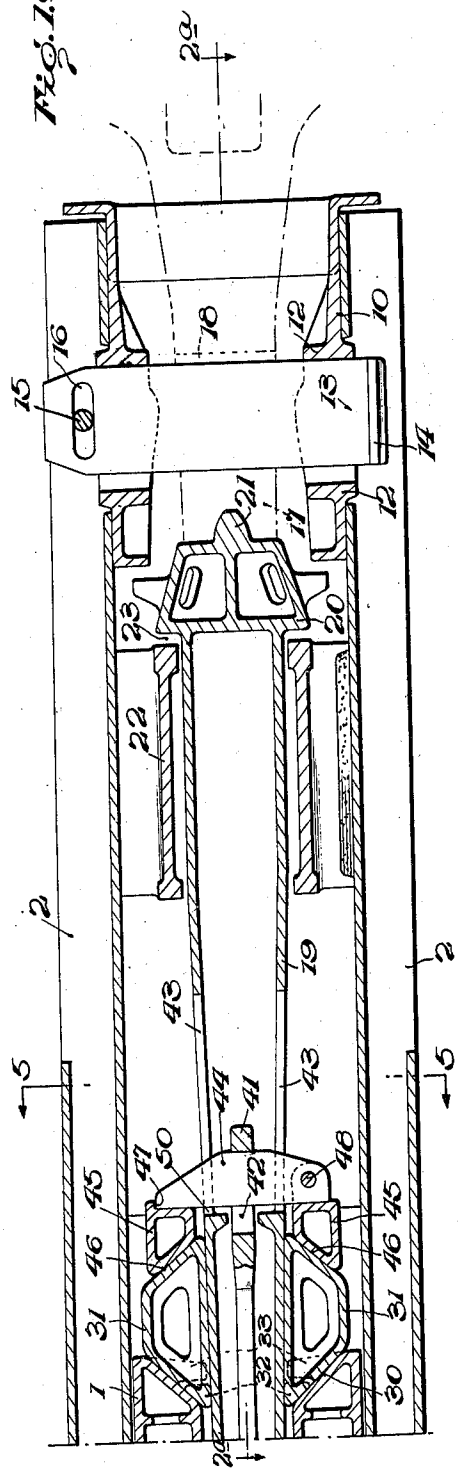
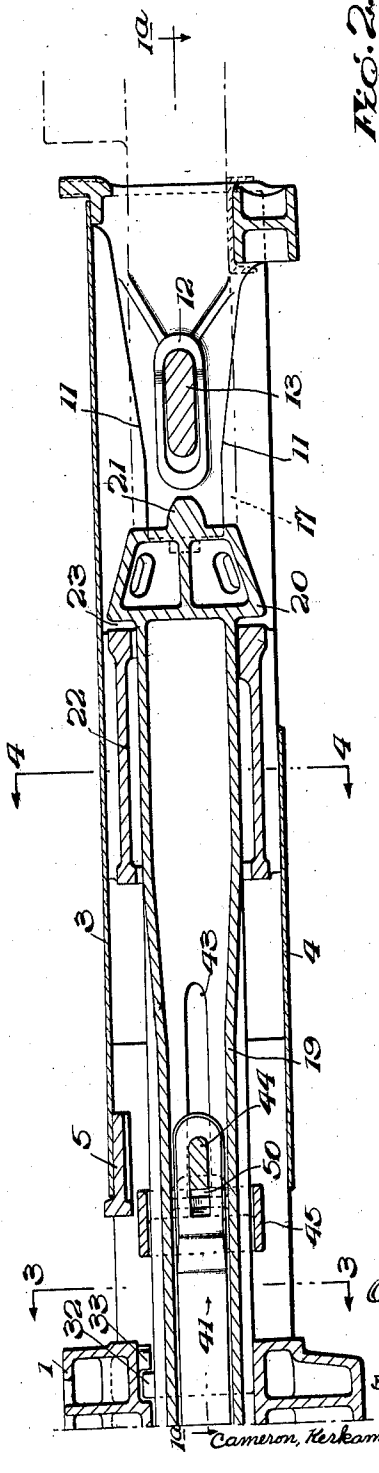


Fig. 2a



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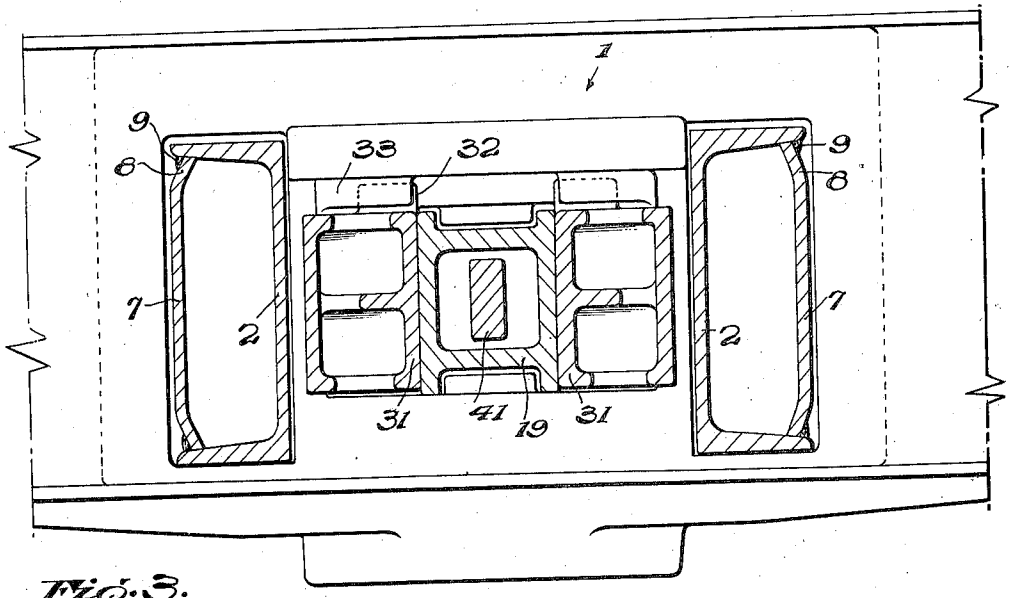


Fig. 3.

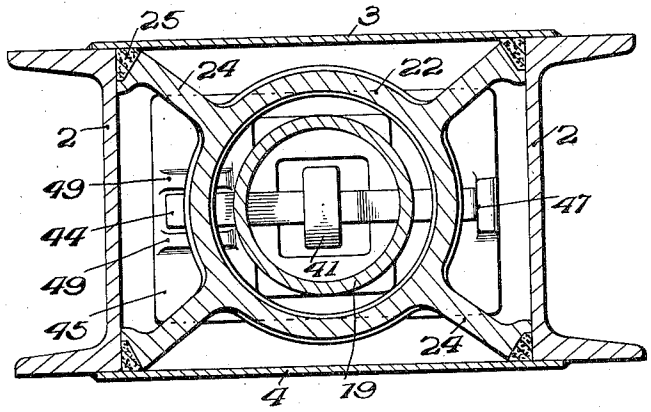


Fig. 4.

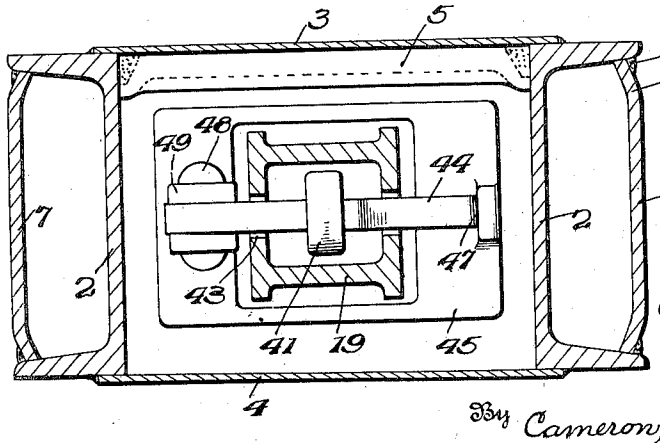


Fig. 5.

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UNITED STATES PATENT OFFICE

2,129,548

CAR CONSTRUCTION

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Application November 4, 1936, Serial No. 109,155

10 Claims. (Cl. 213—8)

This invention relates to railway car underframes of the Duryea type wherein long travel is provided for cushioning draft and buffing shocks with low forces, together with train slack that is predetermined independently of and is shorter than said long travel. In a well known form, the Duryea underframe embodies a draft and buffing column that extends longitudinally substantially the length of the car body and is slidable with respect to the car bolsters, relative movement between the column and bolsters being cushioned by suitable resilient long travel cushion gears which may if desired also embody frictional elements. Couplers are mounted for movement of limited extent relative to the draft and buffing column to provide train slack and this train slack movement of the couplers is cushioned either by separate coupler cushion gears or by the same long travel cushion gears that are provided for the draft and buffing column. The present invention relates more particularly to a Duryea underframe of the type wherein the train slack movement of the couplers and movement of the draft and buffing column relative to the bolsters are cushioned by the same long travel gears which are of the resilient and friction type, but it will be understood that the invention is not restricted to this particular use.

One of the objects of the invention is to provide a novel long travel cushion gear for use in a Duryea underframe which embodies both resilient and friction means for resisting the movement of the draft and buffing column and which is of novel construction providing greater strength and longer life.

Another object is to provide a novel long travel cushion gear for use in cushioning not only the movement of the draft and buffing column but also the train slack movement of the couplers relative to the column and wherein the friction means employed are constructed with particular respect to the wear encountered in train service due to slack between cars. Other objects of the invention will appear hereinafter as the description proceeds.

One embodiment of the invention has been illustrated in the accompanying drawings, but it is to be expressly understood that said drawings are for purposes of illustration only and are not to be construed as a definition of the limits of the invention, reference being had to the appended claims for this purpose.

In the drawings:

Figs. 1 and 1*a* constitute a plan view in section on the lines 1—1 and 1*a*—1*a* of Figs. 2 and 2*a*, respectively, of one end of a car underframe embodying the invention;

Figs. 2 and 2*a* constitute an elevation in section on the lines 2—2 and 2*a*—2*a* of Figs. 1 and 1*a*, respectively;

Fig. 3 is a section taken on the line 3—3 of Fig. 2*a*;

Fig. 4 is a section taken on the line 4—4 of Fig. 2*a*; and

Fig. 5 is a section taken on the line 5—5 of Fig. 1*a*.

Referring particularly to Figs. 1, 1*a*, 2 and 2*a*, a part of a suitable bolster at one end of the car is shown in section and comprises a center brace casting 1 of any suitable shape. A draft and buffing column of any suitable type is mounted slidably with respect to the bolster construction, said column in the form shown comprising a pair of spaced channel members 2, 2 connected at suitable intervals by top and bottom cover plates 3 and 4 respectively. Adjacent the bolster construction, said column is open at the top and bottom in order to permit its longitudinal movement, the channels 2, 2 embracing the casting 1, and the maximum extent of movement of the column relative to the bolster may be suitably limited as by the provision of stop plates 5 and 6 secured between the channels 2, 2 in any suitable manner as by welding and adapted respectively to engage the outer and inner faces of the casting 1. Adjacent the bolster, the column is preferably strengthened by plates 7 that are suitably secured between the flanges of the channels as shown more particularly in Fig. 3, said plates as shown having their edges bent inwardly at 8 and being welded at 9 to said flanges.

Draft and buffing forces are transmitted to the column 2, 2 by means of couplers at the ends of the car, said couplers being preferably mounted for movement of limited extent relative to the column in order to provide train slack. As shown particularly in Figs. 1*a* and 2*a*, cheek plates 10 are secured to the inner faces of the webs of the channels in any suitable manner as by welding the same along the upper and lower edges indicated at 11 in Fig. 2*a*. Said cheek plates are provided with ribs 12 which define the edges of slots through which extends a key 13 having a head 14 at one end and a retaining pin 15 in a slot 16 at the other end. The coupler shank 17 is provided with a slot 18 through which the key 13 extends. Said coupler and key are normally maintained in the position shown in Figs. 1*a* and 2*a* by the cushion gear described hereinafter. When draft forces are applied to the coupler, it moves the column

2, 2 outwardly through the key 13 and ribs 12 without relative movement so that no train slack is provided. In the case of buffing forces, however, said coupler may move inwardly with respect to the key 13 due to the fact that the slot 18 is larger than said key and thereafter said coupler and key may move inwardly together relative to the column 2, 2 through a further distance limited as hereinafter described, thus providing a predetermined amount of train slack in case of buff only..

The invention is illustrated herein in an underframe of the type wherein long travel cushion gears are arranged to yield to cushion the movement of the coupler 17 relative to the draft and buffing column and to yield further to cushion the movement of the draft and buffing column relative to the bolsters. The center brace casting 1 is provided with a center opening through which extends slidably a friction column 19 having tapered friction surfaces on its sides, said surfaces as shown diverging in opposite directions from the center portion of said column. The outer end of the column extends forwardly to a point adjacent the butt of the coupler where it terminates in a head 20 which in the form shown is cast integrally with said column. Said head 20 carries a boss 21 engaging in a recess in the butt of the coupler so that the column 19 is moved inwardly by the coupler. The initial inward movement of the coupler and friction column relative to the draft and buffing column provides cushioned train slack and the extent of this movement is limited by engagement of the head 20 with a casting 22 after the coupler has moved inwardly through a distance equal to the space 23 which determines the maximum possible train slack, coupler 17 and draft and buffing column 2, 2 thereafter moving inwardly together. Said casting 22 may be of any suitable type and may be secured to the draft and buffing column in any suitable manner. In the form shown, the casting has a cylindrical bore which surrounds and guides the outer end of the friction column 19, and said casting is provided with a plurality of arms 24 (Fig. 4) which extend radially therefrom and are welded to the channels 2, 2 at 25.

Longitudinal movement of the friction column 19 in either direction from its normal position is cushioned by resilient and friction means comprising friction shoes preferably associated with the center brace casting 1 and resilient means operatively interposed between said friction column and said shoes and effective to resist longitudinal movement of said friction column as well as to maintain the frictional engagement of said shoes. As shown in Fig. 1, the inner face of the center brace casting 1, at the sides of the center opening therethrough, is provided with inclined friction surfaces 26 which cooperate with correspondingly inclined friction surfaces of shoes 27, said shoes being substantially triangular in cross section and each having a surface in engagement with the tapered side of the friction column 19. Displacement of said friction shoes from the position shown in Fig. 1 is prevented in any suitable manner, said shoes as shown having upwardly extending lugs 28 which engage behind downwardly extending projections 29 formed on the casting 1. The outer face of the casting 1, at the sides of the center opening therethrough, is similarly provided with inclined friction surfaces 30 engaged by correspondingly inclined friction surfaces of shoes 31. Preferably said shoes 31, instead of being triangular in cross section like the shoes 27, are elongated so as to increase the extent of the friction surfaces thereof which engage the sides of the friction column. Displacement of shoes 31 from the position shown in Fig. 1 is prevented in any suitable manner and as shown, said shoes are provided with upwardly extending lugs 32 which engage behind downwardly extending projections 33 on the casting 1.

In order to maintain the frictional engagement of the shoes 27 and 31, resilient means is provided and arranged so as to be compressed against the shoes 27 on outward movement of the friction column 19 and against the shoes 31 on inward movement of the column 19. To this end a coil spring 34 is disposed between the channels 2, 2 inwardly of the bolster, the outer end of said spring being seated in a chair 35 engaging the end of the friction column 19 and having outwardly extending arms 36 terminating in vertical walls 37 having inclined surfaces parallel to but normally spaced from the adjacent surfaces of the friction shoes 27. The walls 37 extend vertically at each side of the friction column and to provide greater strength said walls are tied together at top and bottom by connecting arms 38, the chair 35, arms 36, walls 37 and tie connections 38 being preferably cast as one element.

Spring 34 may be supported and guided in any suitable manner as by means of the supports 39 and the inner end of the spring bears against a head 40 of a link 41 which preferably has the form of a cross in order to support and guide the spring. Said link extends longitudinally throughout the spring 34, passes freely through openings in the chair 35 and in the end of the friction column 19, and extends throughout the bolster construction, having at its outer end a slot 42 as shown in Figs. 1*a* and 2*a*. At this point and outwardly thereof the side walls of the friction column 19 are provided with horizontal slots 43 through which extends a slidable key 44 passing through the slot 42 in the end of the link 41. Said link 41 and key 44 are thus placed under the tension of the spring 34 to hold the friction shoes 31 in position, and to this end a casting 45 is provided having inclined surfaces 46 corresponding to and engaging the adjacent inclined surfaces of the friction shoes 31. Key 44 extends across the outer face of the casting 45, being preferably seated at one end in a notch 47 and having its other end pinned at 48 to ears 49 formed on the casting 45. As shown in Fig. 1*a*, the key 44 does not normally seat itself in the ends of the slots 43 in the friction column 19, a small space 50 being provided at this point.

Assuming a buffing force to be applied to the coupler 17 at the end of the car shown in the drawings, said coupler moves inwardly relative to the key 13 to the extent permitted by the slot 18 and thereafter said coupler and key move inwardly relative to the column 2, 2 through a further distance until the casting 20 engages the casting 22, the space 23 providing train slack. This train slack movement of the coupler is cushioned both resiliently and frictionally by the long travel cushion gear described above because any inward movement of the coupler is transmitted through the head 20 to the friction column 19. Such inward movement of friction column 19 moves the chair 35 to the left and compresses the spring 34 against the head 40 of the link 41, thereby increasing the tension of the key 44 against casting 45 and shoes 31. Hence inward movement of the friction column 19 is resisted resiliently by the compression of the spring and frictionally by the friction caused by the shoes

31. The spring maintains said shoes in frictional engagement with the sides of the friction column, and owing to the diverging surfaces of said column, the shoes 31 are moved outwardly or separated, thus causing additional friction between the surfaces 30 and 46. If the buffing force is great enough, further inward movement of the coupler 17 and draft and buffing column 2, 2 as a unit takes place resulting in further compression of the spring 34 and further friction of the shoes 31, the maximum extent of cushioning travel being limited when the stop plate 5 engages the outer face of the center brace casting 1. When the buffing force has been absorbed, the spring 34 is effective to return the parts to normal position shown in the drawings.

When a draft force is applied to the coupler at the end of the car shown in the drawings, said coupler moves outwardly carrying with it the draft and buffing column 2, 2 since no train slack is provided. The cushion gear at the end of the car shown in the drawings is ineffective until the casting 22 moves through the space 23 and engages the head 20, but during this interval the cushion gear at the other end of the car has been actuated by the inward movement of the coupler at that end of the car. Continued outward movement of the coupler at the end of the car shown in the drawings results in the friction column 19 being moved outwardly by the casting 22, the chair 35 following the friction column due to the compression of the spring. As soon as the friction column has moved outwardly a distance equal to the space 50, the ends of the slots 43 engage the key 44 and pull the link 41 outwardly, further compressing the spring 34 against the chair 35. In the meantime said chair 35 moves to the right sufficiently for its inclined walls 37 to engage the friction shoes 27 whereby said shoes are maintained in tight frictional engagement with the tapered sides of the friction column and also between the inclined friction surfaces 37 and 26, the action of these shoes being similar to the action of the shoes 31 as described above. The maximum travel of the gear for cushioning purposes is limited when the stop plate 6 engages the inner face of the center brace casting, and when the draft force has been absorbed, the spring 34 is effective to return the parts again to the positions shown in the drawings.

By engaging the friction shoes 27 and 31 directly with inclined friction surfaces formed as a part of the center brace casting itself, a separate housing for the friction shoes is rendered unnecessary. This construction provides maximum strength because of the relatively strong rigid construction of the center brace casting. Moreover in a device of this type, the greatest wear occurs during the train slack movement of the couplers relative to the draft and buffing column, since relative changes of speed between cars of a train will result in such slack movement. With a cushion gear of the type described and an underframe wherein train slack is provided on inward movement of the friction column, this wear due to train slack takes place on the outer friction shoes and for this reason shoes 31 are so constructed and arranged as to provide greater friction area than shoes 27.

While only one embodiment of the invention has been described and illustrated in the drawings, it will be apparent that the invention is capable of a variety of mechanical forms and that changes may be made in the form, details of construction and arrangement of the parts without departing from the spirit of the invention. Reference is to be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

1. In a railway car, the combination of a car bolster having an opening, a draft and buffing column extending slidably past said bolster, a friction member extending through the opening in said bolster independently of said column and movable longitudinally therein, means operatively connecting said column and member for longitudinal movement together, friction means between and in frictional engagement with said bolster and member, and resilient means operatively connected to said friction means and arranged to oppose movement of said member.

2. In a railway car, the combination of a car bolster having an opening, a draft and buffing column extending slidably past said bolster, a friction member extending through the opening in said bolster independently of said column and movable longitudinally therein, a coupler mounted for movement of limited extent relative to said column, said member being movable relative to said column by said coupler, means operatively connecting said member and column for longitudinal movement together, friction means between and in frictional engagement with said bolster and member, and resilient means operatively connected to said friction means and arranged to oppose movement of said member.

3. In a railway car, the combination of a car bolster having an opening, a draft and buffing column extending slidably past said bolster, a friction member extending through the opening in said bolster independently of said column and movable longitudinally therein, means operatively connecting said member and column for longitudinal movement together in both directions, said bolster having friction surfaces adjacent the inner and outer ends of said opening, friction means between and in frictional engagement with said surfaces and member, and resilient means operatively connected to said friction means and arranged to oppose movement of said member.

4. In a railway car, the combination of a car bolster having an opening, a draft and buffing column extending slidably past said bolster, a friction member extending through the opening in said bolster independently of said column and movable longitudinally therein, means operatively connecting said member and column for longitudinal movement together in both directions, said bolster having friction surfaces adjacent the inner and outer ends of said opening, friction means between and in frictional engagement with said surfaces and member, and resilient means compressed on movement of said member and operatively connected to said inner friction means on outward movement of said member and to said outer friction means on inward movement of said member.

5. In a railway car, the combination of a car bolster having an opening, a draft and buffing column extending slidably past said bolster, a friction member extending through said opening independently of said column and longitudinally movable therein, means operatively connecting said column and member for longitudinal movement together, friction means between and in frictional engagement with said bolster and member, and resilient means operatively interposed between said friction member and friction

means, said resilient means being compressed by movement of said member and operatively connected with said friction means.

6. In a railway car, the combination of a car bolster having an opening, a draft and buffing column extending slidably past said bolster, a friction member extending through said opening independently of said column and longitudinally movable therein, means operatively connecting said column and member for longitudinal movement together in both directions, said bolster having friction surfaces adjacent the inner and outer ends of said opening, friction means between and in frictional engagement with said surfaces and member, and resilient means operatively interposed between said member and friction means, said resilient means being compressed by movement of said member and operatively connected with one of said friction means on outward movement of said member and with said other friction means on inward movement of said member.

7. In a railway car, the combination of a car bolster having an opening, a draft and buffing column extending slidably past said bolster, a friction member extending through said opening independently of said column and longitudinally movable therein, means operatively connecting said column and member for longitudinal movement together, said bolster having friction surfaces adjacent said opening and inclined relative to the friction surfaces of said member, friction shoes each having wedge-shaped friction surfaces one in engagement with said member and another in engagement with said inclined surfaces, and resilient means operatively engaging said shoes and arranged to oppose movement of said member.

8. In a railway car, the combination of a car bolster having an opening, a draft and buffing column extending slidably past said bolster, a friction member extending through said opening and longitudinally movable therein, a coupler mounted for inward movement of limited extent relative to said column and for outward movement and further inward movement together with said column, said member being movable relative to said column by said coupler, means operatively connecting said column and member for longitudinal movement together in both directions, said bolster having friction surfaces adjacent the inner and outer ends of said opening, inner and outer friction means between and in frictional engagement with said surfaces and member, and resilient means operatively connected for maintaining frictional engagement of one friction means when the member moves inwardly and of the other friction means when the member moves outwardly, said friction means operative on inward movement having greater friction area than said other friction means.

9. In a railway car, the combination of a car bolster having an opening, a draft and buffing column extending slidably past said bolster, a friction member extending through said opening and longitudinally movable therein, a coupler mounted for inward movement of limited extent relative to said column and for outward movement and further inward movement together with said column, said member being movable relative to said column by said coupler, means operatively connecting said column and member for longitudinal movement together in both directions, said bolster having friction surfaces adjacent the inner and outer ends of said opening, inner and outer friction means between and in frictional engagement with said surfaces and member, and resilient means operatively interposed between said member and friction means, said resilient means being compressed by movement of said member and operatively connected with one friction means on outward movement of said member and with the other friction means on inward movement of said member, said other friction means having greater friction area than said one friction means.

10. In a railway car, the combination of a draft and buffing column movable longitudinally relative to the car body, a coupler mounted for movement of limited extent in one direction relative to said column to provide train slack and for movement with said column beyond said limited extent in said one direction and also in the opposite direction, and friction and resilient cushioning means comprising separate friction means operative in opposite direction of movement of said column, one of said friction means being also operative by said coupler on train slack movement and said one friction means having greater friction area than said other friction means.

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