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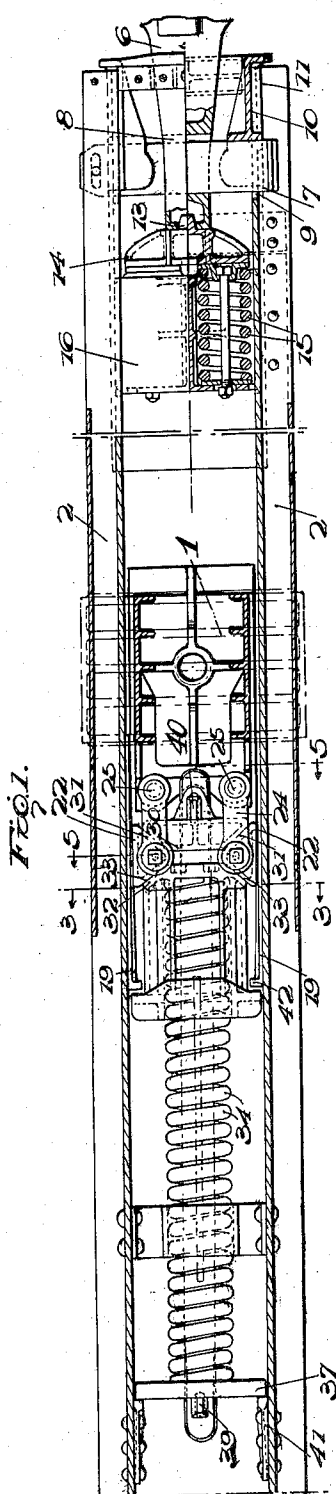
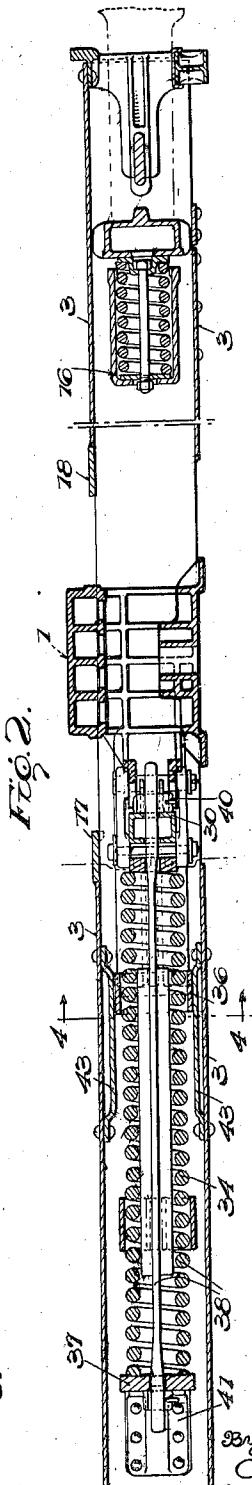
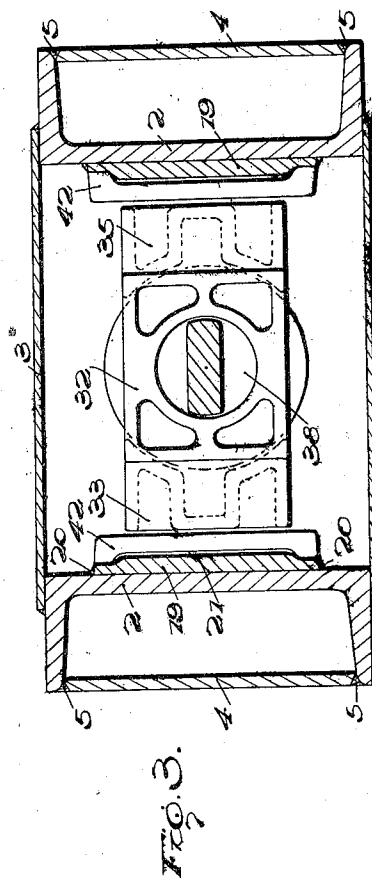
O. C. DURYEA

2,129,544

CAR CONSTRUCTION

Filed Aug. 13, 1936

2 Sheets-Sheet 1



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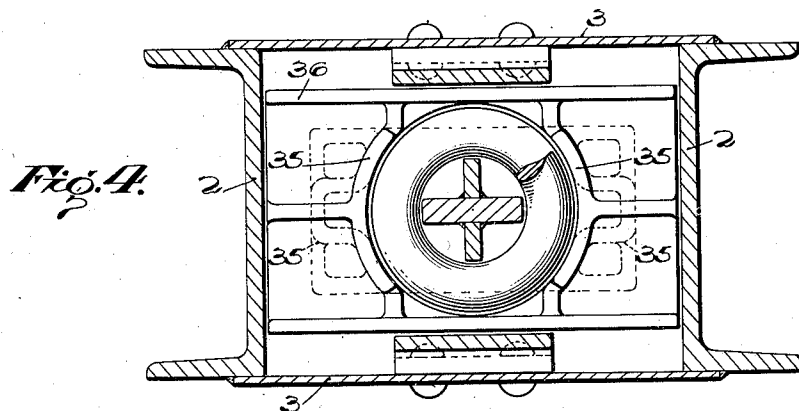
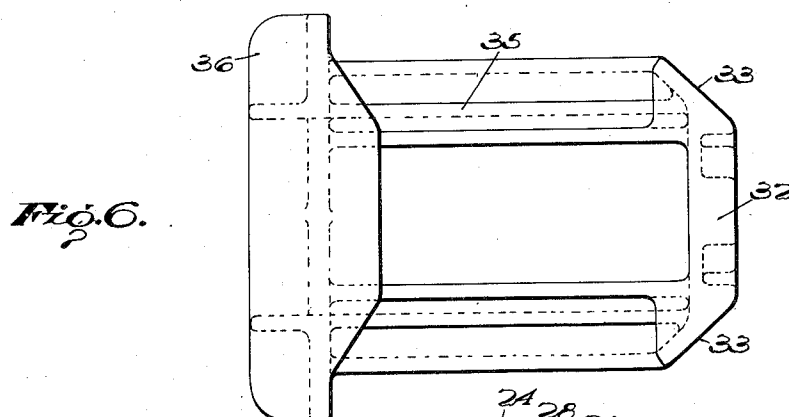
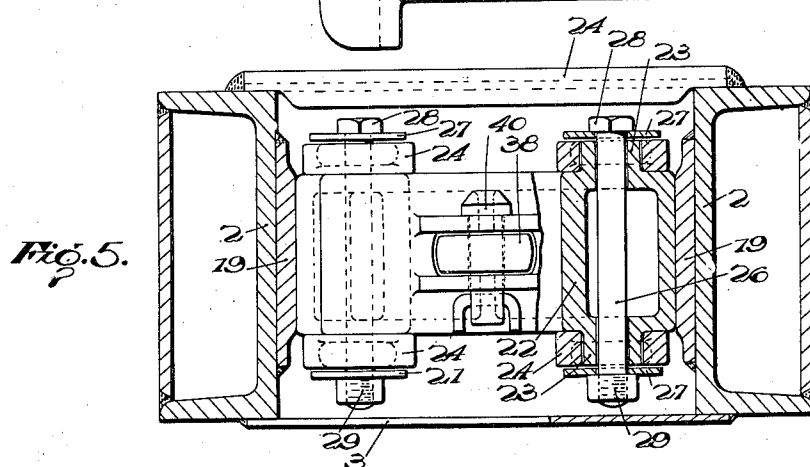
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2 Sheets-Sheet 2



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CAR CONSTRUCTION

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8 Claims. (Cl. 213—8)

This invention relates to railway car constructions having underframes of the Duryea type which provide long travel for resisting draft and buffing shocks with low forces together with train slack which is predetermined independently of and is less than said long travel. In a well known form, the Duryea under frame embodies a draft and buffing column or center member which extends slidably through or past the car body bolster, and long travel means are provided at or adjacent each bolster for yieldably resisting relative movement between the car body and the draft and buffing column to cushion the draft and buffing shocks. The present invention relates more particularly to such long travel cushioning means wherein drafting and buffing shocks are cushioned both resiliently and frictionally.

One of the objects of the invention is to provide novel long travel cushioning means for absorbing draft and buffing shocks both resiliently and frictionally which means is of rugged construction, inexpensive to manufacture and adapted for ready assembly and installation.

Another object is to provide, in combination with a draft and buffing column, cushioning means embodying novel long travel friction mechanism for frictionally resisting draft and buffing shocks and for frictionally resisting the return of said column to normal position.

A further object is to provide, in combination with a draft and buffing column, cushioning means adjacent the respective ends of the car and embodying novel long travel friction means which are complementary to provide substantially the same frictional resistance to draft and buffing shocks at either end of the car, and substantially the same frictional resistance to the return of said column to normal position from either direction.

Other objects of the invention will appear more fully hereinafter as the description proceeds.

One embodiment of the invention is 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,

Fig. 1 is a plan view, partly in section, of an underframe of the Duryea type embodying the invention;

Fig. 2 is a vertical section taken on the center line of the construction in Fig. 1;

Fig. 3 is a detail section taken on the line 3—3 of Fig. 1;

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

Fig. 5 is a detail section taken on the line 5—5 of Fig. 1; and

Fig. 6 is a detail view of a part of the friction mechanism.

Referring to Figs. 1 and 2, the end of the car body (not shown) is provided with the usual bolster having a suitable center brace casting 1 which is adapted to be mounted on the car trucks. Extending slidably past the center brace casting is a draft and buffing column which in the form shown extends substantially the entire length of the car body, only the right hand end of the car being shown in the drawings. As shown, this column comprises two spaced channel members 2, 2 which are connected together at various points by means of cover plates 3. Said channels extend through openings in the bolster construction and are preferably strengthened adjacent the bolster by the provision of plates 4 which are welded at 5 to the flanges of the channels 2 as shown in Fig. 3.

Draft and buffing forces are transmitted to the column 2, 2 by means of a suitable coupler 6 that is mounted in the end of the column, limited movement of the coupler with respect to the column being provided if desired for train slack purposes. As shown in Figs. 1 and 2, the shank of the coupler extends inwardly between the parallel channels 2, 2 and is provided with an opening through which passes a key 7, the opening being larger than the key by the amount of the space indicated at 8. Key 7 extends outwardly through openings formed in cheek plates 10 and in the channels 2, 2, said openings also being larger than the key by the amount of the space indicated at 9. Cheek plates 10 have ribs 11 which extend through slots in the ends of the channels and are welded or otherwise rigidly secured to the channels. The inner end of the coupler shank is provided with an opening which receives a lug or boss 13 formed on a spring follower casting 14 that engages a plurality of coil springs 15 seated in recesses formed in a casting 16 that is rigidly secured to the channels 2, 2 in any suitable manner. The springs 15 normally maintain the coupler 6 and key 7 in the positions shown in Figs. 1 and 2 so that in the case of a draft force there is no slack between the coupler 6 and the column 2, 2 but in case of a buffing force the coupler may move inwardly relatively to the column through a distance equal

to the sum of the spaces indicated at 8 and 9. The extent of this train slack may be determined independently of the travel that is provided for cushioning the car body against draft and buffing forces and may be made as small as desired, preferably being in the neighborhood of one inch or less.

In the case of draft and buffing forces, the column moves outwardly and inwardly respectively, the maximum extent of its movement being limited by means of the tie plates 17 and 18 which are adapted to engage the center brace 1. Within limits determined by the spacing of these tie plates from the center brace, relative movement between the car body and the draft and buffing column is cushioned both resiliently and frictionally by means of the cushion gear interposed between the center brace casting 1 and the draft and buffing column 2, 2. Wedges 19 are secured to the inner faces of the webs of the channels 2 in any suitable manner, as by welding at 20 (Fig. 3), and are provided with inclined surfaces 21 which diverge with respect to one another in a direction toward the end of the car. The wedge surfaces 21 are engaged by cooperating friction surfaces of a pair of friction shoes 22, and means are provided for mounting said friction shoes so that they are held against longitudinal movement with respect to the car body but are capable of lateral movement between wedges 19 in such a manner that their friction surfaces remain parallel to the wedge surfaces 21 and constantly in engagement therewith. In the form shown, said friction shoes 22 are substantially triangular in cross section and are provided at their upper and lower ends with trunnions 23 (Fig. 5) that are pivotally connected with links 24, the other ends of said links 24 being pivoted at 25 to the center brace 1. By this means lateral movement of the friction shoes is provided by swinging the links 24 about the centers 25 and parallelism between the friction surfaces is maintained by pivotal movement of the shoes on the trunnions 23. The assembly of the friction shoes 22 and links 24 may be secured in any suitable way and in the form shown, rods 26 extend through the shoes 22 and are provided at their ends with washers 27 and with a head 28 and nut 29.

Suitable resilient means are provided for yieldably resisting draft and buffing forces and for maintaining the frictional engagement between the wedge surfaces 21 and the friction shoes 22, said resilient means preferably engaging said shoes through friction members which have friction surfaces engaging cooperating friction surfaces on the shoes 22. As shown in Fig. 1 a casting 30, on that side of the shoes next to the bolster is provided with inclined surfaces 31 which cooperate with the surfaces of the friction shoes 22, the inclination being such that as said casting is urged toward the shoes, a camming or wedging action causes the shoes to be urged outwardly into engagement with the wedge surfaces 21. On the opposite side of the shoes is a similar friction member 32 that is provided with similar inclined surfaces 33 that engage cooperating surfaces on the friction shoes and exert a similar camming or wedging action. The member 32, which is shown in detail in Figs. 3, 4 and 6, is also adapted to form a seat or follower for a coil spring 34, and to this end is provided with longitudinally extending walls 35 terminating in a head 36 preferably of rectangular shape which fits within the channels 2, 2. As shown in Figs.

4 and 5, the walls 35 may be shaped to provide suitable strengthening ribs to give the necessary strength with the least possible weight and also to provide an opening or recess which is substantially circular in cross section to receive the coils of the spring 34, the spring bearing at its end against the friction member 32 to maintain the frictional engagement between the surfaces 33. The other end of the spring is adapted by any suitable connections to engage the friction member 30 and to maintain the frictional engagement between the surfaces 31, and in the form shown, a follower plate 37 is provided at the end of the spring and a link 38 extends through the follower 37, the spring 34, the friction member 32 and the friction member 30, said link having at one end a key 39 and at the other end a key 40 whereby the spring can be installed under initial compression and maintains the assembly of friction shoes 22 and friction members 30 and 32 in tight engagement.

Means are also provided for operatively connecting the column 2, 2 with the spring 34 whereby the spring is compressed in one direction as the column moves outwardly under a draft force and in the other direction as the column moves inwardly under a buffing force. As shown, stops or lugs 41 are secured in any suitable manner to the channels 2, 2 in a position to engage the spring follower 37 when the column moves outwardly and thereby to compress the spring 34 against the friction member 32. Similarly stops are provided whereby the column engages the friction member 32, which also acts as a spring follower, when the column moves inwardly under a buffing force and in the form shown this engagement is effected by means of lugs 42 formed as part of the wedges 19 and adapted to engage the head 36 and to compress the spring 34 against the follower 37 and key 39, the tension of the spring being transmitted by means of the link 38 and key 40 to the friction member 30. The head 36 of the spring follower may be guided or supported if desired by the provision of guides 43 secured to the cover plates 3 as shown in Fig. 2.

In operation, when a draft force is applied to the coupler 6 at the end of the car shown in the drawings, the column 2, 2 is moved outwardly with respect to the bolster and car body and the spring 34 is compressed against the friction member 32. In addition to the resistance afforded by the compression of the spring 34, the draft force is yieldably resisted by friction between the wedge surfaces 21 and the cooperating surfaces of the friction shoes 22. Also the wedge surfaces cause inward movement of the friction shoes 22 which results in additional friction between the cooperating friction surfaces 33. This action continues, if the draft force is of sufficient magnitude, throughout the maximum travel of the cushion gear until the tie plate 17 comes into solid engagement with the center brace 1. The travel of the gear may be made as large as is desired, since it is independent of the train slack as described above. In order to provide for resisting large draft shocks with relatively low forces on the car body, the travel of the cushion gear is made large as compared with the limited travel of the conventional draft gear which is in the neighborhood of $2\frac{3}{4}$ inches. For example, cushion gear travel in the neighborhood of 7 to 9 inches or more has been found desirable.

After the limit of gear travel is reached in any particular case, as determined by the magnitude

of the draft force, the spring 34 tends to restore the column 2, 2 to its normal position shown in the drawings by expanding against the follower 37 and the stops 41. The frictional resistance to return movement is less than described above, however, due to the fact that the wedge surfaces 21 are moving in the opposite direction and permit the friction shoes 22 to move outwardly instead of forcing them inwardly.

It will be understood that the cushion gear is duplicated at the other end of the car, or that a similar cushion gear is provided, and that the action of said other gear is complementary to the action of the gear at the end of the car shown in the drawings. At the opposite end of the car, the action under the conditions described above is that of a buffing force such as will now be described in connection with the cushion gear shown in the drawings. When a buffing force is applied to the coupler 6 and the column 2, 2 moves inwardly with respect to the car bolster, the lugs 42 engage the head 36 and compress the spring 34 against the follower 37 and key 39 which are held against movement by the link 38 and the engagement of the key 40 with the friction member 30. In addition to the resistance afforded by the compression of the spring 34, the buffing force is yieldably resisted by friction between the friction shoes 22 and the wedge surfaces 21. During the inward movement of the column, however, the friction is not as great as in the case of a draft force because the wedge surfaces 21 move in such a direction as to permit outward movement of the shoes 22 under the action of the spring 34 instead of forcing said shoes inwardly. Greater frictional resistance, however, is provided at the other end of the car at which the gear is acting as if subjected to a draft force as described above. The limit of movement of the column is determined by the magnitude of the buffing force or limited by engagement of the tie plate 18 with the center brace 1. When the limit of travel of the cushion gear is reached, the spring 34 again tends to restore the column to the normal position shown in the drawings by expanding against friction member 32 and lugs 42. During such return movement, the wedge surfaces are moving in a direction to force the friction shoes 22 inwardly, so that the return movement is frictionally resisted by friction between the shoes 22 and wedge surfaces 21 and also between the cooperating friction surfaces 31.

From the foregoing it will be seen that the combined action of the cushion gears at the two ends of the car is the same in the case of a draft or a buffing force at either end of the car, and is also the same during the return movement of the car to its normal position from either direction. The combined resilient and frictional resistance effectively cushions the draft and buffing forces, and since the energy transmitted to the car is absorbed over a long travel of the cushioning mechanism, the forces transmitted to the car body are kept low. The frictional resistance to the return movement of the column to its normal position acts to prevent excessive recoil due to the springs and snubs the return movement.

While only one embodiment of the invention has been illustrated and described, it is to be expressly understood that the invention is not limited to this particular embodiment but is capable of a variety of mechanical forms and that various changes which will be apparent to one

skilled in this art may be made in the form of the individual parts and in the details of the construction and arrangement of the mechanism without departing from the spirit of the invention. Reference is accordingly 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 wedge means movable longitudinally relative to the car body and having laterally spaced inclined wedge surfaces, friction shoes between said wedge surfaces and in engagement therewith, said friction shoes being held against longitudinal movement but mounted for lateral movement, each of said shoes having a friction surface angularly related to said wedge surface, friction means having cooperating friction surfaces in engagement with the friction surfaces on said shoes, and resilient means engaging said friction means for maintaining frictional engagement between said cooperating friction surfaces and between said shoes and wedge surfaces, said resilient means being operatively interposed between said friction means and said wedge means and compressed on movement of said wedge means from normal position.

2. In a railway car, the combination of a draft and buffing column movable longitudinally relative to the car body and having laterally spaced inclined wedge surfaces, friction shoes between said wedges, each shoe having a friction surface parallel to and in frictional engagement with the adjacent wedge surface and a second friction surface at an angle to said first surface, means for mounting said shoes on the car body for lateral movement but holding said shoes against longitudinal movement, a friction member having surfaces in engagement with said second surfaces of said shoes, resilient means engaging said friction member at one end to maintain the same in engagement with said shoes and said shoes in engagement with said wedges, and means operatively connecting said column with the other end of said resilient means for compressing the same on movement of said wedges.

3. In a railway car, the combination of a draft and buffing column movable longitudinally relative to the car body and having laterally spaced inclined wedge surfaces, friction shoes between said wedge surfaces, each shoe having three friction surfaces, one of which is in engagement with the adjacent wedge surface, means for mounting said shoes on the car body for lateral movement but holding said shoes against longitudinal movement, two friction members one engaging the friction surfaces on one side of said shoes and the other engaging the friction surfaces on the other side thereof, resilient means operatively engaging said friction members for maintaining the same in frictional engagement with said shoes and said shoes in frictional engagement with said wedges, and means operatively connecting said resilient means and column for compressing said resilient means against one friction member on movement of the column in one direction and against the other friction member on movement of the column in the opposite direction.

4. In a railway car, the combination of a draft and buffing column movable longitudinally relative to the car body and having laterally spaced inclined wedge surfaces, friction shoes between said wedge surfaces, each shoe having a friction surface parallel to and in frictional engagement with the adjacent wedge surface and another

surface at an angle to said first surface, link means pivotally connected to the car bolster and carrying said shoes pivotally mounted thereon, a friction member having surfaces in engagement
 5 with said second surfaces of said shoes, resilient means engaging said friction member at one end to maintain the same in engagement with said shoes and said shoes in engagement with said wedges, and means operatively connecting said
 10 column with the other end of said resilient means for compressing the same on movement of said wedges.

5. In a railway car, the combination of a draft and buffing column movable longitudinally relative to the car body and having laterally spaced inclined wedge surfaces, each shoe having three friction surfaces one of which is in engagement with the adjacent wedge surface, link means pivotally connected to the car bolster and carrying
 15 said shoes pivotally mounted thereon, two friction members one engaging friction surfaces on one side of said shoes and the other engaging friction surfaces on the other side thereof, resilient means operatively engaging said members for
 20 maintaining the same in frictional engagement with said shoes and said shoes in frictional engagement with said wedges, and means operatively connecting said resilient means and column for compressing the resilient means against one
 25 friction member on movement of the column in one direction and against the other friction member on movement of the column in the other direction.

6. In a railway car, the combination of a draft and buffing column movable longitudinally relative to the car body and comprising a pair of spaced parallel members slidably embracing a portion of the car bolster, wedges formed on the inner sides of said members adjacent to the car bolster,
 35 friction shoes each having three friction surfaces one of which is in engagement with one of said wedges, means for mounting said shoes on the car bolster for lateral movement but holding the same against longitudinal movement, a pair of
 40 friction members each having friction surfaces in engagement with surfaces on said shoes, said friction members being disposed between said parallel members on opposite sides of said shoes, resilient means between said parallel members and operatively engaging said friction members to maintain the same in frictional engagement with said shoes and said shoes in frictional engagement with said wedges, and means operatively connecting said resilient means and column for
 50 compressing said resilient means against one

friction member on movement of the column in one direction and against the other friction member on movement of the column in the opposite direction.

7. In a railway car the combination of a draft and buffing column movable longitudinally relative to the car body and comprising a pair of spaced parallel members slidably embracing a portion of the car bolster, wedges formed on the inner sides of said members adjacent to the car bolster, friction shoes each having three surfaces one of which is in engagement with one of said wedges, link means pivotally connected to the car bolster and carrying said shoes pivotally mounted thereon, a pair of friction members disposed between said parallel members on opposite sides of said shoes and in frictional engagement therewith, resilient means operatively engaging said friction members to maintain them in engagement with said shoes and said shoes in engagement with said wedges, and means operatively connecting said resilient means and column for compressing said resilient means against one friction member on movement of the column in one direction and against the other friction member on movement of the column in the opposite direction.

8. In a railway car, the combination of a draft and buffing column movable longitudinally relative to the car body and comprising a pair of spaced parallel members slidably embracing a portion of the car bolster, wedges formed on the inner sides of said members adjacent to the car bolster, friction shoes substantially triangular in cross section and having three friction surfaces, one of which is in engagement with one of said wedges, each of said shoes being provided with upper and lower trunnions, upper and lower links pivoted at one end to the car bolster and at the other end to said trunnions, a pair of friction members each having friction surfaces in engagement with surfaces on said shoes, said friction members being disposed between said parallel members on opposite sides of said shoes, resilient means between said parallel members and operatively engaging said friction members to maintain the frictional engagement between said members and shoes and between said shoes and wedges, and means operatively connecting said resilient means with said column for compressing the resilient means against one friction member on movement of the column in one direction and against the other friction member on movement of the column in the opposite direction.

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