Sept. 6, 1938. O. C. DURYEA 2,129,545

CAR CONSTRUCTION

Original Filed Sept. 8, 1936 3 Sheets-Sheet 1

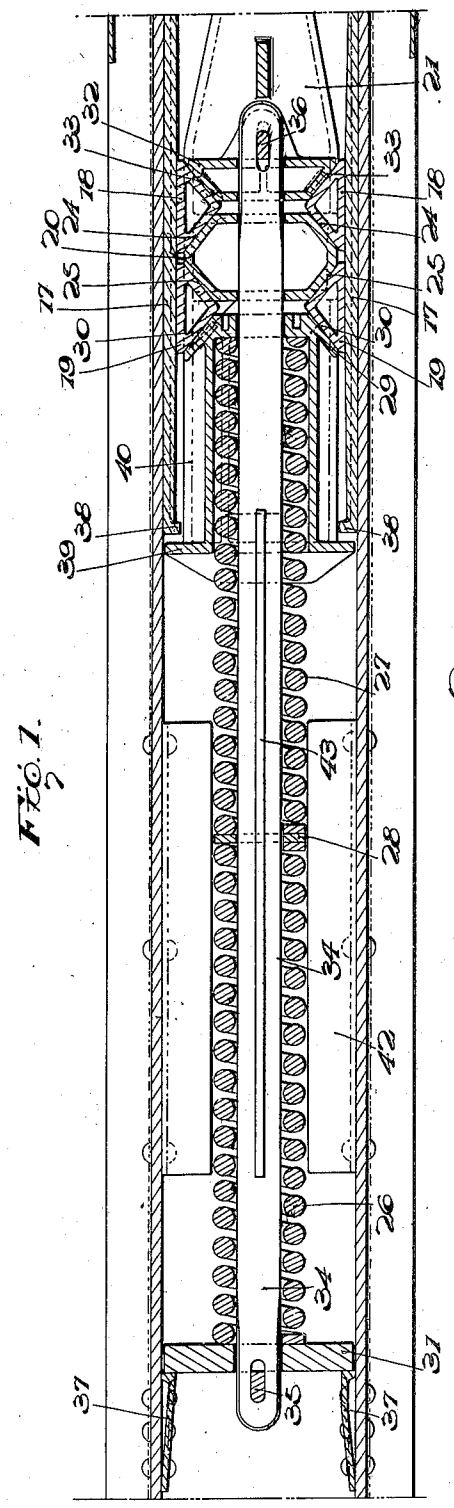


FIG. 1.

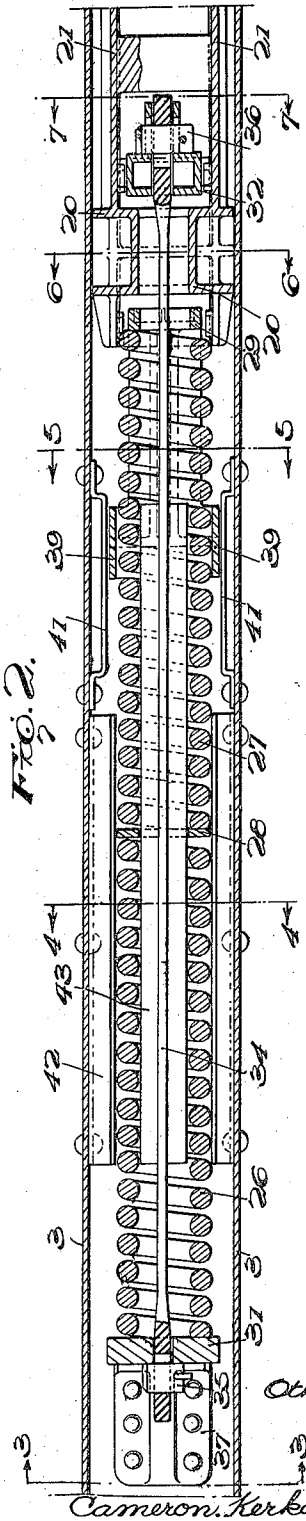


FIG. 2.

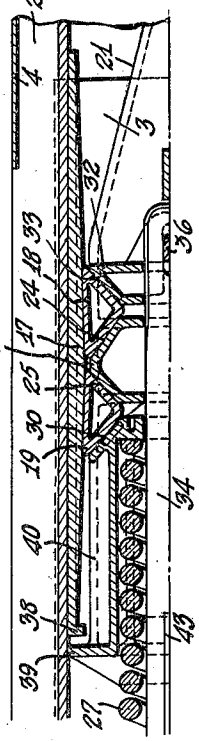


FIG. 3.

Inventor

Otho C. Duryea

Cameron, Kerkam & Sutton Attorneys.

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CAR CONSTRUCTION

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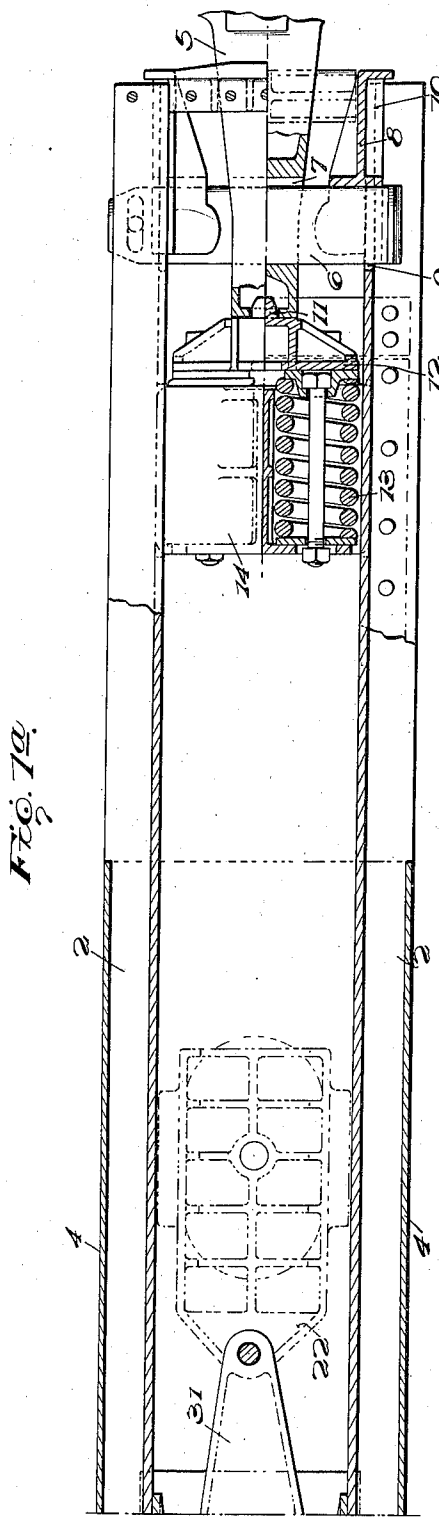


Fig. 1a.

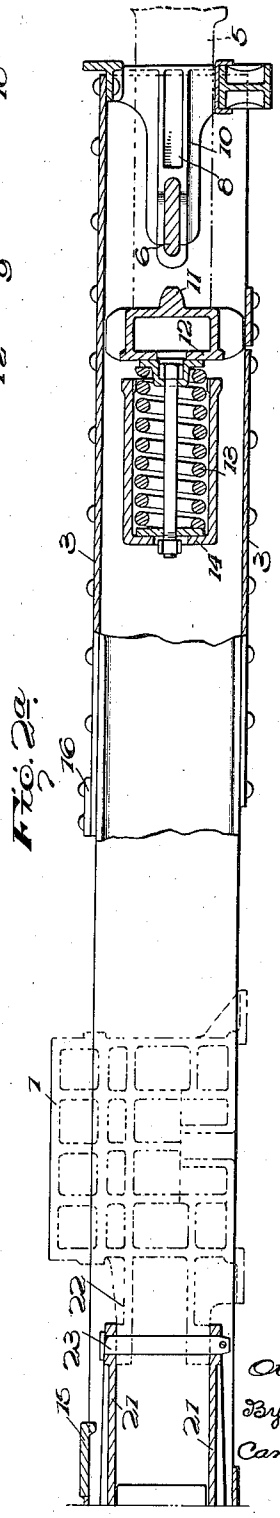


Fig. 2a.

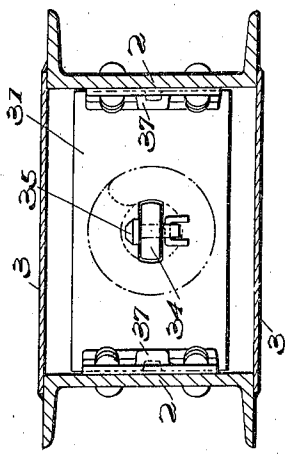


Fig. 3.

Inventor

Otho C. Duryea.

By

Cameron, Kerkam & Sutton

Attorneys

Sept. 6, 1938. O. C. DURYEA 2,129,545

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FIG. 5.

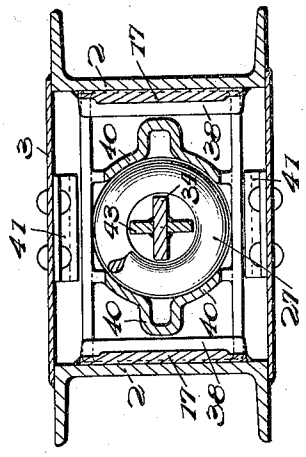


FIG. 7.

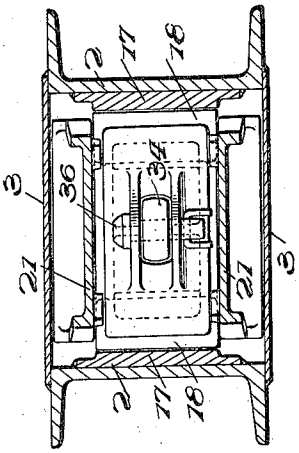


FIG. 4.

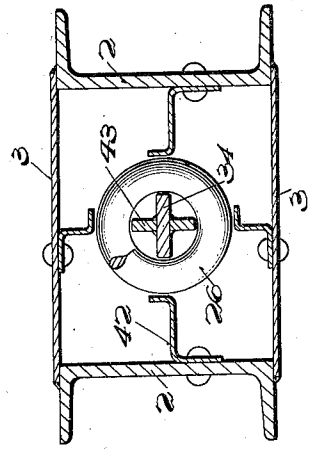
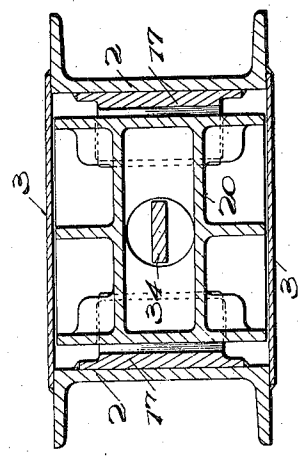


FIG. 6.



Inventor

Otho C. Duryea.

By Cameron, Kerkam & Sutton.

Attorneys

Patented Sept. 6, 1938 2,129,545

UNITED STATES PATENT OFFICE

2,129,545

CAR CONSTRUCTION

Otho C. Duryea, Waterbury, Conn., assignor to O. C. Duryea Corporation, Wilmington, Del., a corporation of Delaware

Application September 8, 1936, Serial No. 99,812
Renewed February 2, 1938

9 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 underframe embodies a draft and buffing column which extends longitudinally and slidably with respect to the car body and bolsters, and long travel cushioning means interposed between said column and the car body or bolsters to cushion the draft and buffing shocks. The present invention relates more particularly to such long travel cushioning means wherein draft 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, said means being constructed and arranged so as to provide a rugged construction that is inexpensive to manufacture and can be readily assembled and installed on a car.

Another object is to provide novel long travel cushioning means embodying resilient and friction mechanism providing the same yielding resistance to draft and buffing shocks at both ends of the car, said means in the form of a single cushioning gear being adapted for use as the sole cushioning means for a car or for use in combination with other cushioning means.

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 understood that said drawings are for purposes of illustration only and are not to be taken 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* comprise a plan view, partly in section, of a portion of a car underframe embodying the invention;

Figs. 2 and 2*a* comprise a vertical sectional view on the center line of the construction of Figs. 1 and 1*a*;

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

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

Fig. 5 is a section taken on the line 5—5 of Fig. 2;

Fig. 6 is a section taken on the line 6—6 of Fig. 2;

Fig. 7 is a section taken on the line 7—7 of Fig. 2; and

Fig. 8 is a partial section corresponding to Figs. 1 and 1*a* and showing the taper of certain parts exaggerated for clearness of illustration.

Referring to Figs. 1, 1*a*, 2 and 2*a*, the car body (not shown) is provided with a suitable bolster construction including a center brace casting 1 adapted to be mounted on the car trucks. Extending slidably through or past the bolster is a draft and buffing column which in the form shown comprises two spaced parallel channel members 2, 2 that are connected together at various points by means of cover plates 3. Said channel members extend through openings formed in the bolster construction and embrace the casting 1, and adjacent the bolster construction are preferably strengthened by the provision of plates 4 welded or otherwise suitably secured to the flanges of the channel members.

Draft and buffing forces are transmitted to the column 2, 2 through a suitable coupler 5 that is mounted in any suitable manner in the end of the column for limited movement relative thereto to provide train slack. In the form shown, the shank of the coupler extends inwardly within the column and is provided with an opening through which passes a key 6, the opening in the coupler shank being larger than the key by the amount of the space indicated at 7. Key 6 extends outwardly through openings or slots formed in the webs of the channel members 2, 2 and also in cheek plates 8 suitably secured to the inner faces of said channel members, said openings being larger than the key 6 by the amount of the space indicated at 9. As shown, cheek plates 8 are secured to the channel members by means of ribs 10 disposed in slots formed in the webs of the channels, the ribs being welded in the slots. The butt of the coupler is provided with an opening which receives a projection 11 formed on a spring follower casting 12 that engages a plurality of coil springs 13 seated in recesses in a casting 14 that is rigidly mounted in the column 2, 2 in any suitable manner as by welding or riveting. Said springs normally maintain the coupler and key in the position shown in the drawings, so that in the case of a draft force applied to the coupler, there is no movement of the coupler relative to the column whereas in the case of a buffing force applied to the coupler, the same may move inwardly with respect to the column through a distance equal to the sum of the spaces 7 and 9 to provide train slack. Since such train slack movement is independent of the means provided

for cushioning the car body against draft and buffing forces, it may be made as small as desired or omitted entirely. Ordinarily maximum slack movement of one inch or less is desirable.

Under draft and buffing forces, the column 2, 2 moves outwardly and inwardly with respect to the car body and bolster, the maximum extent of such movement being suitably limited as by tie plates 15 and 16 that are adapted to engage the center brace casting 1. Within these limits, movement of the column relative to the bolster is cushioned both resiliently and frictionally by a long travel cushion gear which is constructed and arranged so that it provides equal yielding resistance to the movement of the column in either direction from its normal position, and equal resistance to the return of said column to normal position from either direction. Hence a cushion gear embodying the present invention is well adapted for use as the sole cushioning means on a car, or it may be used in combination with other gears of the same or similar types. The gear is so constructed and designed as to provide cushioning throughout the maximum range of movement of the column as determined by the spacing of the tie plates 15 and 16 from the center brace, and this movement or gear travel is made long as compared with the conventional draft gear. Gear travel of the order of 7 to 9 inches is generally desirable and in some instances longer travel may be preferable.

A construction embodying the invention is shown in Figs. 1 and 2 and in the detail Figures 3 to 7 inclusive. Referrings to Figs. 1 and 2, wedge means are provided which move longitudinally with the column 2, 2 under draft and buffing shocks, said wedge means having surfaces which decrease in thickness in opposite directions to provide equal frictional resistance to movement of spaced column in either direction. As shown, wedges 17 are secured to the inner faces of the webs of the channels 2, 2 in any suitable manner as by welding or riveting, said wedges having their greatest thickness or height at their central portions and decreasing in thickness or height toward both ends. In Fig. 8, the taper of the wedges 17 has been shown exaggerated for the sake of clearness of illustration. Friction shoes are disposed in frictional engagement with said wedge surfaces, and means are provided for restraining said shoes against longitudinal movement but permitting lateral movement in engagement with the inclined wedge surfaces. Preferably each wedge surface is engaged by two friction shoes which lie closely adjacent but on opposite sides of the central portion thereof, and a stationary member interposed between these shoes and suitably connected with the car body serves to prevent movement thereof toward each other. As seen in Fig. 1, a pair of friction shoes 18 are provided on the right hand side of the high central portions of the wedges 17, and a pair of friction shoes 19 are provided on the left hand side thereof. Longitudinal movement of said shoes toward one another is prevented by a stationary casting 20 provided with outwardly extending upper and lower arms 21 that are connected to an extension 22 of the center brace casting by means of the pin 23. Preferably the engagement between the member 20 and the shoes 18 and 19 is such as is to provide additional friction in case of lateral movement of said shoes, and to this end shoes 18 are provided with friction surfaces 24 which cooperate with corresponding surfaces of the member 20 and shoes 19 are provided with friction surfaces 25 which also cooperate with corresponding surfaces on the member 20.

Suitable resilient means is provided for maintaining shoes 18 and 19 in engagement with the member 20 and wedge 17 and for preventing movement of said shoes away from the member 20, said resilient means being arranged to be compressed on movement of the column 22 and wedges 17 to urge one or the other pair of shoes 18 or 19 against the member 20 as the column moves in one or the other direction. As shown, said resilient means is in the form of a compression spring comprising two sections 26 and 27 and an interposed washer 28, this assembly constituting in effect a single spring. One end of the spring engages a combined wedge member and spring seat or follower 29 that is provided with inclined friction surfaces 30 engaging corresponding friction surfaces on the shoes 19 whereby said wedge member 29 normally maintains said shoes 19 in tight frictional engagement with the member 20 and the wedges 17. The other end of the spring engages a follower plate 31 which is operatively connected in any suitable way with a wedge member 32 disposed between the arms 21 and having friction surfaces 33 which engage cooperating friction surfaces on the shoes 18 and maintain said shoes 18 in engagement with the member 20 and the wedges 17. In the form shown, this connection is effected by means of a link 34 extending longitudinally through the spring sections 26 and 27, the wedge member 29, the member 20, and the wedge member 32, said link being provided at one end with a key 35 engaging the follower plate 31 and at the other end with a key 36 engaging the wedge member 32.

When the column 2, 2 and wedge 17 move outwardly under a draft force, suitable means such as the lugs or tops 37 secured to the channel member 2, 2 engage the follower plate 31 and compress the springs 26, 27 against the combined wedge member and spring seat 29, thereby maintaining frictional engagement between the friction shoes 19 and the wedges 17 and also between the cooperating friction surfaces 25 and 30. As shown, the surfaces 25 and 30 are angularly disposed to form recesses or pockets in which the shoes 19 engage and which tend to wedge the shoes outwardly and to maintain them in engagement with the wedges 17. When the column 2, 2 and wedges 17 move inwardly under a buffing force, suitable means are provided whereby the column engages and moves the combined wedge member and spring follower 29 to compress the spring 26, 27 against the follower plate 31 which is held against movement by the link 34 whereby the compression of the springs 26, 27 urges the wedge member 32 toward the shoes 18 and maintains frictional engagement between said shoes 18 and wedges 17 and also between the cooperating friction surfaces 24 and 33, the surfaces 24 and 33, like the surfaces 25 and 30, forming wedge pockets or recesses for the shoes 18. In the form shown, this engagement is effected by means of lugs 38 formed as part of the wedges 17, said lugs being adapted to engage an extension of the spring follower 29. To this end a head 39 is connected integrally with the combined wedge member and spring follower 29 by longitudinally extending walls 40 which are shaped to provide a recess that is substantially circular in cross section to receive the coils of the spring section 27, these longitudinally extending walls 40 being

shown in cross section in Fig. 5. As shown, in Fig. 1, said head 39 extends outwardly almost to the webs of the channel members 2, 2 so as to be engaged by the lugs 38. The longitudinal movement of the spring follower assembly 29, 39, 40 may be guided if desired by means of guide members 41 (Figs. 2 and 5) secured to the top and bottom cover plates 3 and between which the head 39 is adapted to slide. The spring sections 26 and 27 may also be supported and guided by means of angle irons 42 secured to the top and bottom cover plates 3 and to the webs of the channels 2, 2 and also by means of the link 34 and by bars 43 secured to said link, as shown in Fig. 4.

In operation, when a draft force is applied to the coupler 5, the column 2, 2 and the wedges 17 move outwardly and the stops 37 engage the follower plate 31 and compress the spring 26, 27 against the combined follower and wedge member 29. As the outward movement takes place, the wedge surfaces move in such a direction that the shoes 19 move outwardly under the influence of the spring and are maintained in frictional engagement with the wedge surfaces, whereas the shoes 18 are relatively ineffective since there is no spring tension against the wedge member 32. The draft force is thus yieldingly resisted by the compression of the spring and also by the frictional action of the shoes 19, the extent of travel of the column being determined by the magnitude of the draft force. Thereafter the spring tends to expand against the follower 31 and stops 37 and thus returns the column to normal position. During this return movement, the wedges 17 are moving in such direction as to cause the shoes 19 to move inwardly and the spring maintains the frictional engagement between the shoes 19 and the wedges 17 and also between the friction surfaces 25 and the friction surface 30, thus snubbing the return movement of the column and preventing excessive recoil. When the column moves inwardly under a buffing force, the action of the gear is substantially the same as described above except that the functioning of shoes 18 and 19 is reversed. Lugs 38 engage the head 39 and move the spring follower 29 inwardly thereby compressing the spring against the follower 31 and key 35. Through the link 34 and key 36, the spring maintains the wedge member 32 in engagement with shoes 18 and the action that takes place is the same as described above in connection with a draft force, since the arrangement of the wedges 17, shoes 18 and 19, member 20 and wedge members 29 and 32 is symmetrical.

While only one embodiment of the invention has been illustrated in the drawings it will be understood that the invention is capable of a variety of mechanical forms, many of which will be apparent to those skilled in the art and that changes may be made in the details of construction and arrangement of the parts 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 bolster and having wedge surfaces extending in both directions from the central portion of said wedge means and decreasing in height in opposite directions, friction means normally engaging said wedge surfaces adjacent said central portion, means for holding said friction means against substantial longitudinal movement with respect to said bolster including a member stationary with respect to the bolster and wedge members in engagement with said friction means on the extreme inward and extreme outward sides thereof and resilient means maintaining said engagement, and means operatively connecting said resilient means and wedge means whereby the resilient means is compressed against one or the other wedge member as said wedge means moves in one or the other direction.

2. In a railway car, the combination of wedge means movable longitudinally relative to the car bolster and having wedge surfaces extending in both directions from the central portion of said wedge means and decreasing in height in opposite directions, friction shoes engaging said wedge surfaces on both sides of said central portion, means stationary with respect to said bolster and transversely interposed between said shoes and holding said shoes against substantial longitudinal movement with respect to said bolster, and means normally maintaining said shoes in engagement with said stationary means and wedge surfaces and comprising members engaging said shoes on their outer sides and resilient means normally maintaining said engagement, said resilient means being compressed against one or the other of said members as said wedge means moves in one or the other direction.

3. In a railway car, the combination of wedge means movable longitudinally relative to the car bolster and having wedge surfaces extending in both directions from the central portion of said wedge means and decreasing in height in opposite directions, friction shoes engaging said wedge surfaces on both sides of said central portion, means stationary with respect to said bolster and transversely interposed between said shoes and holding said shoes against substantial longitudinal movement with respect to said bolster, and means normally maintaining said shoes in engagement with said stationary means and wedge surfaces and comprising members engaging said shoes on their outer sides and resilient means normally maintaining said engagement, said resilient means being compressed against one or the other of said members as said wedge means moves in one or the other direction, said members and shoes having cooperating friction surfaces at an angle to said wedge surfaces and resisting lateral movement of said shoes by said wedges.

4. In a railway car, the combination of wedge means movable longitudinally relative to the car bolster and having wedge surfaces extending in both directions from the central portion of said wedge means and decreasing in height in opposite directions, friction shoes engaging said wedge surfaces on both sides of said central portion, means stationary with respect to said bolster and transversely interposed between said shoes and holding said shoes against substantial longitudinal movement with respect to said bolster and means normally maintaining said shoes in engagement with said stationary means and wedge surfaces and comprising members engaging said shoes on their outer sides and resilient means normally maintaining said engagement, said resilient means being compressed against one or the other of said members as said wedge means moves in one or the other direction, said stationary means comprising friction surfaces at an angle to said wedge surfaces and engaging said

shoes for resisting lateral movement of said shoes by said wedges.

5. In a railway car, the combination of wedge means movable longitudinally relative to the car bolster and having wedge surfaces extending in both directions from the central portion of said wedge means and decreasing in height in opposite directions, friction shoes engaging said wedge surfaces on both sides of said central portion, wedge means stationary with respect to said bolster and transversely interposed between and holding said shoes against substantial longitudinal movement with respect to said bolster, wedge members engaging said shoes on their outer sides, and resilient means maintaining said stationary wedge means, friction shoes and wedge members in frictional engagement and adapted to be compressed against one or the other wedge member as said wedge means moves in one or the other direction.

6. In a railway car, the combination of wedge means movable longitudinally relative to the car bolster and having wedge surfaces extending in both directions from the central portion of said wedge means and decreasing in height in opposite directions, friction shoes engaging said wedge surfaces on both sides of said central portion, wedge means stationary with respect to said bolster and transversely interposed between said shoes and holding said shoes against substantial longitudinal movement with respect to said bolster, wedge members engaging said shoes on their outer sides, said means and members having friction surfaces disposed at an angle to each other for frictionally engaging a portion of each of said shoes, and resilient means engaging said members for normally maintaining said members, shoes and means in frictional engagement, said resilient means being compressed against one or the other wedge member as said wedge means moves in one or the other direction.

7. In a railway car, the combination of a draft and buffing column movable longitudinally relative to the car bolster, wedge means carried by said column and having wedge surfaces extending in both directions from the central portion of said wedge means and decreasing in height in opposite directions, friction shoes engaging said surfaces on both sides of said central portion, stationary means transversely interposed between said shoes and connected with the car bolster for holding said shoes against substantial longitudinal movement with respect to said bolster, members engaging said shoes on their outer sides and cooperating with said interposed means to form wedge pockets preventing substantial lateral movement of said shoes away from said wedge surfaces, resilient means engaging said members, and means operatively connecting said resilient means and column whereby said resilient means is compressed against one or the other of said members as said column moves in one or the other direction.

8. In a railway car, the combination of a draft and buffing column movable longitudinally relative to the car bolster, wedge means carried by said column and having wedge surfaces extending in both directions from the central portion of said wedge means and decreasing in height in opposite directions, friction shoes engaging said surfaces on both sides of said central portion, stationary means transversely interposed between said shoes for holding said shoes against substantial longitudinal movement with respect to the car bolster and having arms connected to the car bolster, members engaging said shoes on their outer sides and cooperating with said interposed means to form wedge pockets preventing substantial lateral movement of said shoes away from said wedge surfaces, a compression spring operatively engaging said members at its opposite ends, and means operatively connecting said column with one or the other end of the spring as the column moves in one or the other direction.

9. In a railway car, the combination of a draft and buffing column movable longitudinally relative to the car bolster and comprising a pair of spaced members slidably embracing part of the car bolster, said members being connected by cover plates spaced from said bolster to permit said longitudinal movement, and cushioning means for resisting said movement comprising wedge surfaces on the inner faces of said members within said cover plates and decreasing in height in both directions from their central portion, friction shoes engaging said wedge surfaces on both sides of said central portion, stationary means transversely interposed between said shoes within said cover plates for holding said shoes against substantial longitudinal movement with respect to the car bolster, said means having longitudinally extending arms connected to the car bolster, and means normally maintaining said shoes in engagement with said stationary means and wedge surfaces and comprising members engaging said shoes on their outer sides and resilient means normally maintaining said engagement, said resilient means being compressed against one or the other member on movement of said column in one or the other direction.

OTHO C. DURYEA.