April 18, 1933. O. C. DURYEA 1,904,293

CAR CONSTRUCTION

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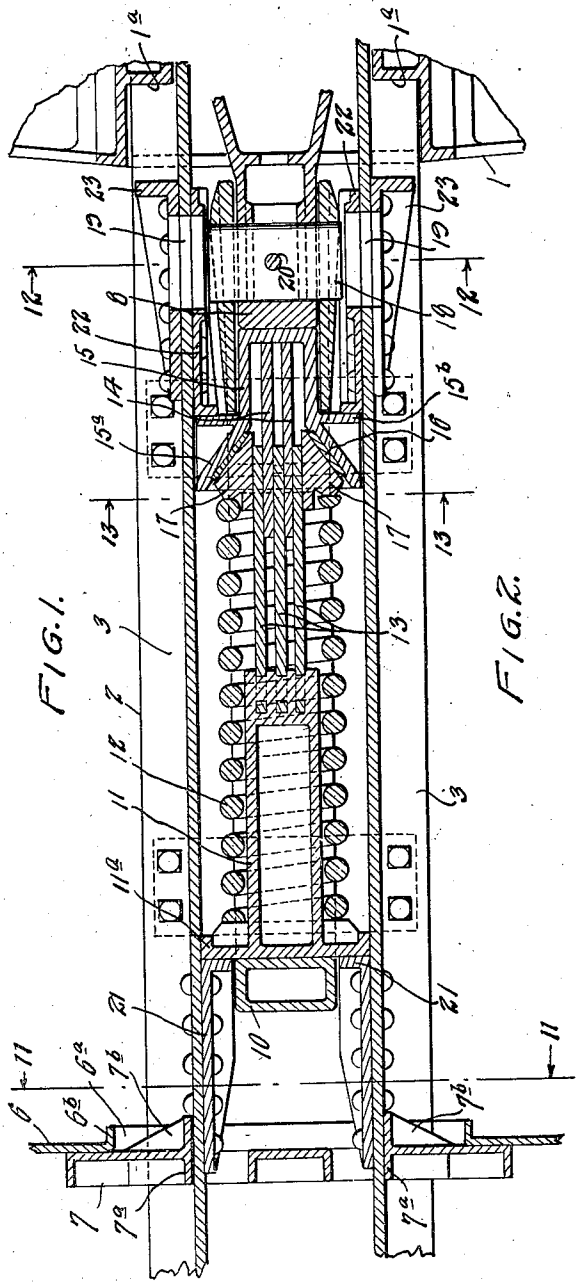


FIG. 1.

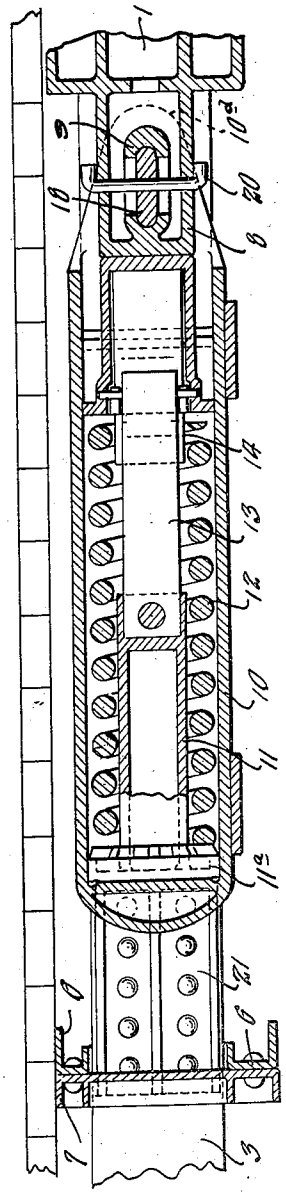


FIG. 2.

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CAR CONSTRUCTION

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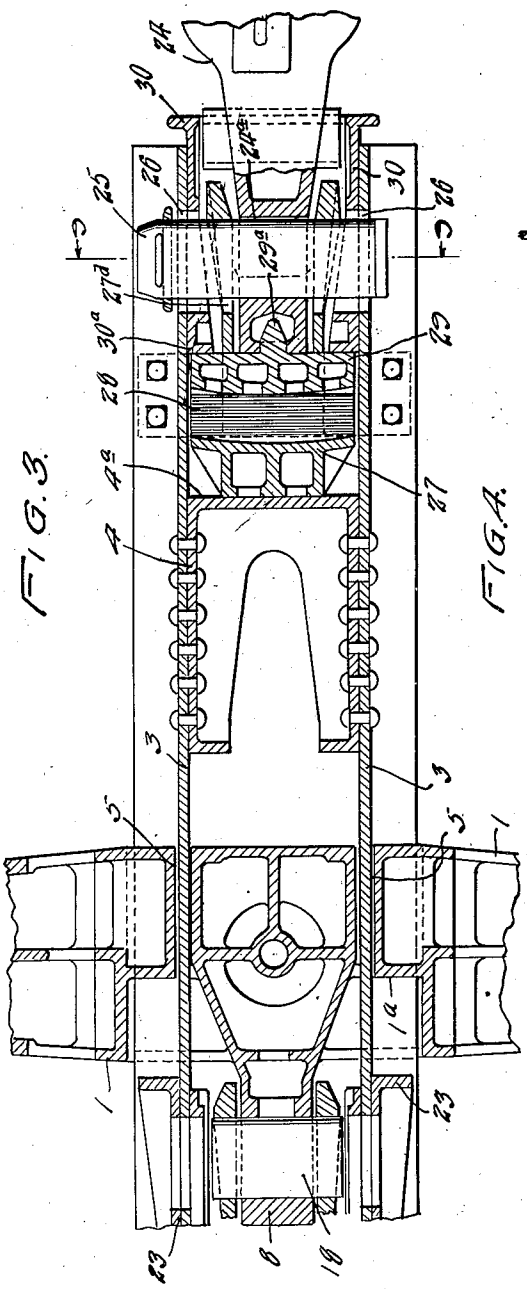


FIG. 3.

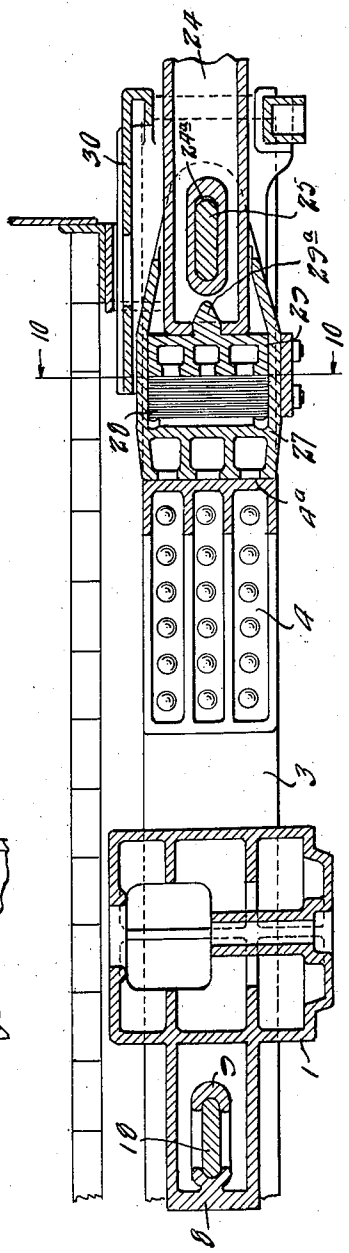


FIG. 4.

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April 18, 1933. O. C. DURYEA 1,904,293

CAR CONSTRUCTION

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FIG. 7.

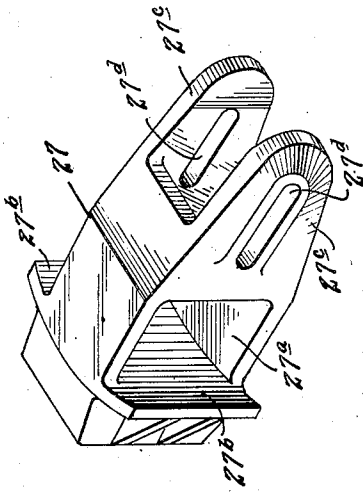


FIG 8.

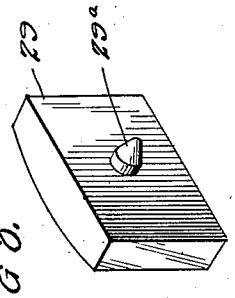


FIG. 6.

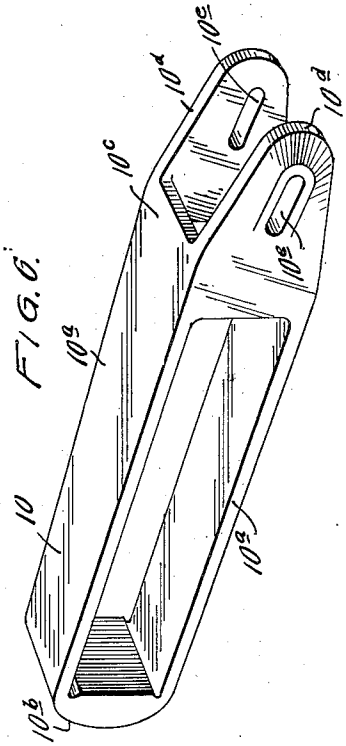
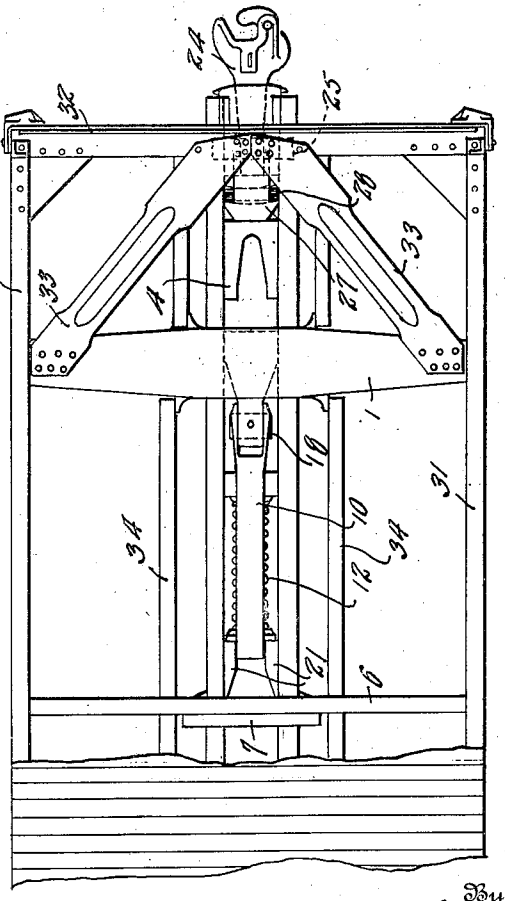


FIG. 5



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CAR CONSTRUCTION

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FIG. 9.

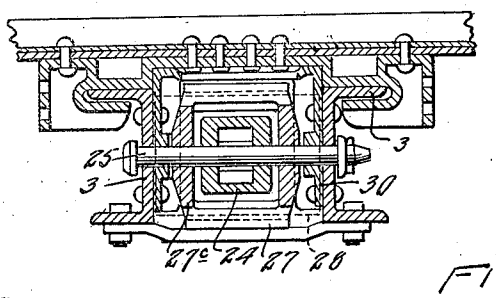


FIG. 10.

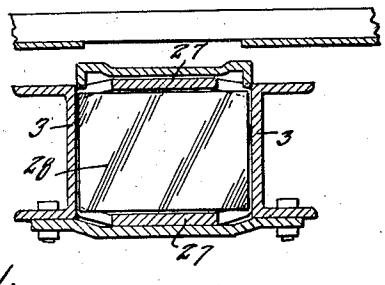


FIG. 11.

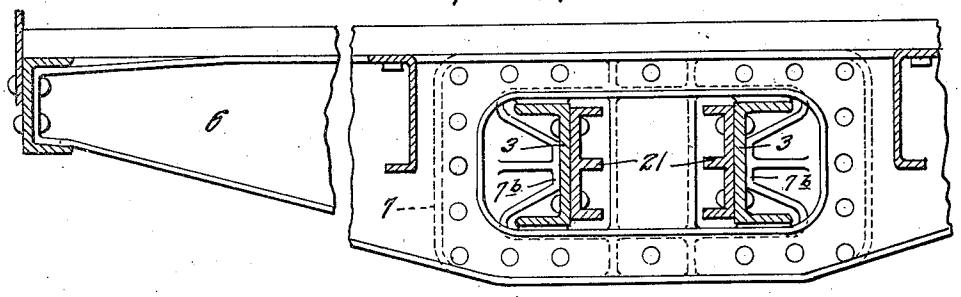


FIG. 12.

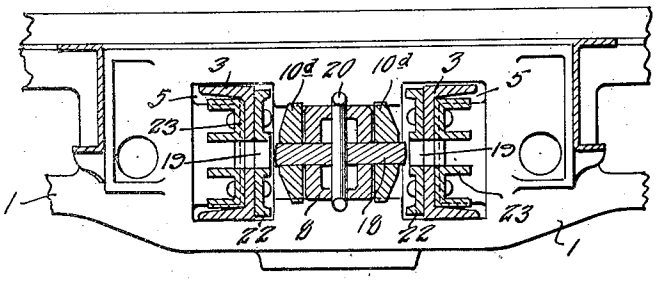


FIG. 13

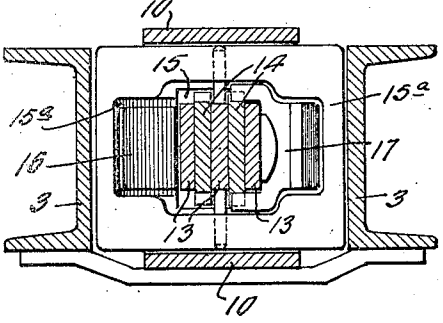


FIG. 14.a

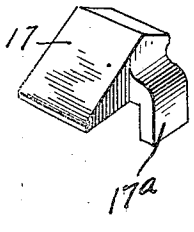
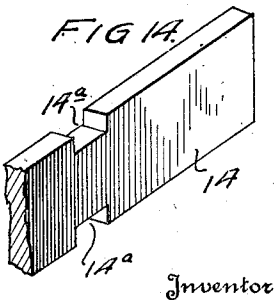


FIG 14.



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CAR CONSTRUCTION

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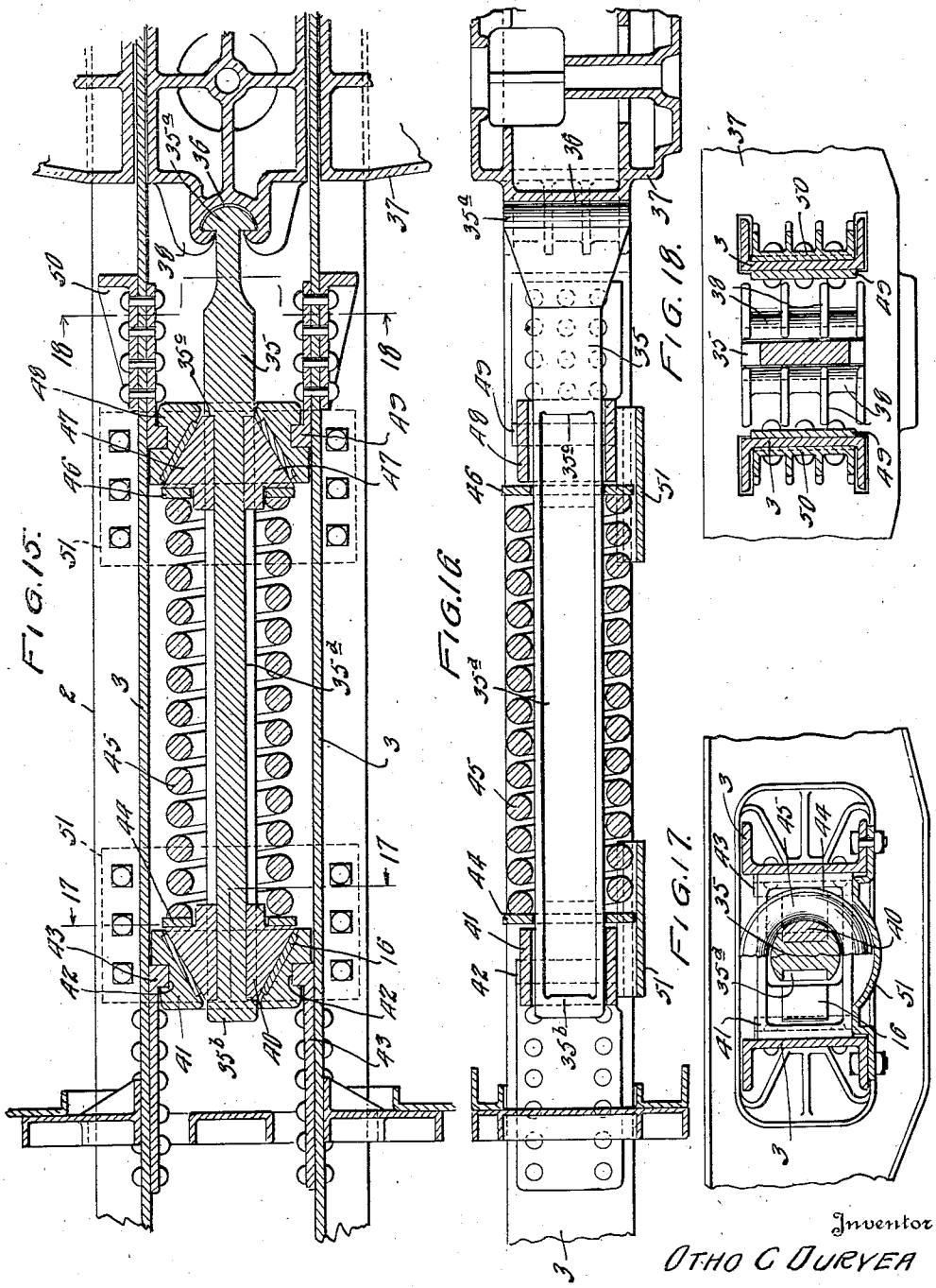


FIG. 15.

FIG. 16

FIG. 18.

FIG. 17.

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Patented Apr. 18, 1933 1,904,293

UNITED STATES PATENT OFFICE

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CAR CONSTRUCTION

Application filed January 5, 1926. Serial No. 79,449.

This invention relates to railway rolling stock, and more particularly to a railway car structure embodying novel means for preventing the shocks and impact stresses incident to operating conditions from damaging the structure, or its lading.

In ordinary train work, the elements of the usual draft gears, and particularly the friction elements thereof, are being continually worn due to the varying stresses placed on the gears, and due to the continual movements of the friction elements. Any given draft gear in a train of cars must sustain the draft of all the cars of the train in the rear of the same. The heavy loads placed on the draft gears, and the multitude of small movements imparted to the same, cause the dry surfaces of the friction elements to be so worn that after a comparatively short period of use the gears are ineffective to perform the functions for which they were designed.

In order to avoid excessive train slack the travel of draft gears now employed is very limited—so limited that said gears are ineffective to absorb the forces normally imparted to the car. Consequently these forces operate to damage the car structure and the lading.

In my co-pending application, Serial No. 26,267, filed April 27, 1925, Patent No. 1,693,194, November 27, 1928, there is disclosed an improved car structure of the type wherein longitudinal movement is provided between a center member and the remainder of the car structure, and yielding or enegy dissipating means are associated with the center member for resisting this movement. In that structure, forces, such for example as impact stresses due to buffing, are gradually absorbed without damage to the car or lading, the energy dissipating means being adapted for relatively long travel. The car structure also embodies novel coupler means of limited travel whereby train slack is provided for. Substantially no wear is placed on the energy dissipating means, employed for resisting relative movement of the center member, in train work because said means is only subjected to the inertia forces of a single car, the resistance or draft of the following cars in the train being thrown directly on the center member. The multitude of small movements, resulting from the heavy loads placed on the usual draft gears, are eliminated by the use of my improved car structure, and the energy dissipating means are adapted to last for the life of the car.

An object of the present invention is to provide a railway car, of the type disclosed in the above named application, comprising novel energy dissipating means for yieldingly resisting relative longitudinal movement between the center member and the remainder of the car structure.

Another object of this invention is to provide a novel car structure including means for yieldingly absorbing draft and buffing shocks, said structure being so constituted that slack between cars in a train is relatively short or decreased relative to the slack which results from the use of the standard type of draft gears.

Another object of the invention is to provide novel means of relatively great length of travel for yieldingly resisting relative movement between the center member and the remainder of the car structure, said means including energy dissipating means, and being adapted to normally maintain the relatively movable parts in a predetermined position.

A further object is to provide novel yielding means including resilient and friction elements which are effective for resisting relative movement of the center member in either direction.

A further object is to provide novel means for associating the yielding means with the elements of the car that are adapted for relative movement.

A further object is to provide one or more of the transverse supporting members, such as the bolsters, with novel means for securing the resilient and friction elements thereto.

A still further object is to provide energy dissipating means for resisting relative movements of the car elements, said means being adapted for installation as a unit.

Further objects are to provide a car of

this type which conforms closely to the construction at present employed in standard railway rolling stock; and to provide a combination of elements which are adapted for ready assembly, which are rugged, and which are relatively inexpensive to manufacture

Two forms which the inventive idea may assume are shown in the accompanying drawings, which drawings, however, are for the purpose of illustration only and are not to be taken as defining the limits of the invention, reference being had to the appended claims for this purpose.

In the drawings,

Fig. 1 is a detail sectional top plan view illustrating one form of energy absorbing means which may be employed for resisting movement of the center member relative to a bolster;

Fig. 2 is a sectional side elevation of the parts shown in Fig. 1;

Fig. 3 is a top plan view, in section, illustrating one form of yielding means, for securing a predetermined amount of train slack, that may be employed in combination with the yielding means of Fig. 1, certain parts being broken away to enable the use of a large scale;

Fig. 4 is a sectional side elevation of the parts shown in Fig. 3;

Fig. 5 is a detail top plan view illustrating one manner in which the yielding means of Figs. 1 and 3 may be operatively associated with the car structure;

Fig. 6 is a perspective view illustrating one form of yoke which may be employed in the apparatus illustrated in Fig. 1;

Fig. 7 is a perspective view illustrating one form of yoke which may be employed in the yielding means illustrated in Fig. 3;

Fig. 8 is a perspective view illustrating one form of a follower member which may be employed in the yielding means shown in Fig. 3;

Fig. 9 is a sectional detail view taken on the line 9—9 of Fig. 3;

Fig. 10 is a detail sectional view taken on the line 10—10 of Fig. 4;

Figs. 11, 12 and 13 are sectional views taken on the lines 11—11, 12—12, and 13—13, respectively, of Fig. 1;

Fig. 14 is a perspective view illustrating one manner in which certain of the friction elements may be formed;

Fig. 14*a* is a perspective view of one type of friction shoe that may be employed;

Fig. 15 is a detail plan view, in section, illustrating a second form of energy dissipating means which may be employed for resisting movement of the center member relative to a bolster;

Fig. 16 is a sectional side view of the parts shown in Fig. 15; and

Figs. 17 and 18 are sectional detail views taken on the lines 17, 17 and 18, 18 respectively, of Fig. 15.

Referring to the drawings, and more particularly to Figs. 1 to 14 inclusive, one form of car structure constituting the subject matter of the present invention preferably includes a body bolster 1 and a center member 2 that is mounted for longitudinal movement relative to said bolster. While only one bolster is illustrated in the drawings, it will be understood that the present standard car construction is closely followed in the present invention, two body bolsters preferably being employed and mounted on trucks of any suitable type. The trucks, the brake elements, and the body structure proper of the car, all of which may assume various forms, constitute no part of the present invention and accordingly are not illustrated.

As shown, the center member 2 is preferably formed of a pair of vertically disposed channel members 3, 3 (Fig. 11) that are suitably secured together and braced, as by means of one or more members 4 (Fig. 3), each of which may be termed a stop and filler casting. In the embodiment illustrated, the center member is mounted in the horizontal plane of the bolster 1 and the latter is provided with suitable openings 5 (Fig. 12) through which the channel members 3 extend, and are adapted for movement. If desired, said center member may also extend through, and be adapted for movement, relative to one or more transverse supporting members or cross-bearers 6. As illustrated, said cross-bearers are provided with a central opening 6*a* suitably flanged as at 6*b*. If desired, a plate or casting 7 may be secured to the cross-bearers 6 to serve the double purpose of strengthening the cross-bearers and to constitute a guiding means or surface for the longitudinally movable center member 2. In the form shown, the plate 7 which is secured in any suitable manner as by means of rivets to the transverse member 6, is provided with integrally formed and vertically disposed bearing surfaces 7*a* for the channel members 3, said bearing surfaces being suitably strengthened as by means of ribs 7*b*.

In order to obviate the necessity for providing large openings through the bolsters, to facilitate casting of the same, and the assembly of the parts, said bolsters may each be provided with a laterally projecting portion or lug 8, which, as shown, is formed integrally with the inner lateral face of the bolster and is provided with a horizontal and transversely extending opening 9.

Suitable means are interposed between the center member and the bolster for yieldingly resisting relative longitudinal movement of the center member, and preferably said yielding means is adapted to dissipate energy and resist the movement of the center member

in both directions, i. e., for both draft and buffing. The yielding means are also adapted to maintain the relatively movable parts in normal position. In the form shown, said means includes a yoke 10 (Fig. 6) which may be formed as a casting if desired. Preferably said yoke is constituted by a U-shaped portion including upper and lower longitudinal portions 10*a* and a connecting end portion 10*b* therefor. The longitudinal portions 10*a* are connected at their forward ends by a substantially rectangular box-shaped section 10*c* and projecting from the forward or outer end of the box-shaped section are a pair of vertically disposed ears 10*d* which, as shown, are provided with registering openings 10*e*. A member 11 that constitutes a follower for a resilient element 12, and a supporting member for a plurality of friction elements 13, is positioned between the portions 10*a* of the yoke 10. If desired, the friction elements may be constituted by a suitable number of plates which are cast integrally with the follower member 11, said plates projecting forwardly from the latter in substantially parallel planes and in interleaving relation with a suitable number of plates 14 which extend, at their outer ends, into a housing member 15. Normally, the forward end of the housing member 15 is in abutting engagement with the projection or lug 8 on the bolster. As illustrated in Figs. 1 and 13, the housing 15 is provided with a pair of diverging portions 15*a*, and suitably secured on the inner surface of these diverging portions are a pair of wear plates 16 which are formed of a suitable metal, such as bronze.

Normally maintained in engagement with the wear plates 16, as by means of the resilient member 12, which in the present instance is shown as a coil spring, are a plurality of friction shoes 17, that are preferably provided with lugs 17*a* which are adapted to extend into openings 14*a* (Fig. 14) formed in the friction plates 14. As shown more clearly in Fig. 1, the resilient member 12 has engagement at its outer end with the friction shoes 17 and at the opposite end with a flange 11*a* formed on the follower member 11. The yoke 10 extends around the follower member 11, the resilient member 12, friction elements 13, 14, 17, and the housing 15, and is held in operative relation with the bolster 1 by means of a key 18 which extends through the openings 10*e* in said yoke and the opening 9 in the projecting portion 8 of the bolster 1. Openings 19 are provided in the sides of the center member 2 to enable the key 18 to be readily inserted into position, and preferably a vertically disposed pin 20 passes through a central opening in the key 18 and has its opposite ends bent into engagement with the upper and lower surfaces of the projecting portion 8 (Fig. 2) to retain the key in position. Suitable follower stops, such as ribbed angle-shaped plates 21, are secured to the inner faces of the channel members 3 in a position to normally engage the inner face of the flange 11*a* of the follower member 11, for a purpose to be described hereafter.

A pair of members 22 are suitably secured to the inner faces of the channel members 3 in such position as to constitute follower stops for the flanged portion 15*b* of the housing 15, and normally said follower stops 22 are in engagement with the outer face of said flanged portion 15*b*. The follower stops 22 are provided with registering openings, which openings are in register with the openings 19 formed in the center member 2, and said members 22 also constitute strengthening means for the center member. Secured to the outer faces of the channel members 3 in substantially the same vertical plane as the members 22, are suitable stop members 23 which are also provided with openings in register with the openings 19 in the center member. The stop members 23 are adapted for engagement with the bolster 1 and preferably with portions 1*a*, of said bolster, which are shown as being located at a short distance from the inner lateral face of the bolster.

Suitable coupler mechanism is provided for the car and preferably said mechanism includes resilient means of limited travel for yieldingly maintaining the couplers in coupling position, and to provide a predetermined amount of train slack, the travel of said yielding means being less than the travel of the energy dissipating means. In the form shown, this mechanism includes a coupler 24 of standard type provided with an opening 24*a* in the shank thereof for receiving the usual coupler key 25, the opposite ends of the latter being adapted to extend through openings 26 in the channel members 3. As shown in Fig. 3, the openings 26 are larger in width than the width of the key, and said key normally occupies a central position therein. Suitable yielding mechanism is preferably associated with the coupler 24. The yielding means employed may be of various forms, but preferably said means is of limited travel, and is adapted to "go solid" when a relatively light load is placed thereon as in coupling, the draft and buffing forces being absorbed by the energy dissipating means previously described. As shown, said yielding means includes a yoke 27 (Fig. 7) which may be formed as a casting, if desired, and which is preferably provided with a transverse opening 27*a* therethrough. The inner wall 27*b* of said opening is concave, and positioned within the opening are a plurality of plates 28 constituting resilient members. Positioned in said opening 27*a* between the plates 28 and the outer edges of the opening, is a follower plate 29 (Figs. 3 and

8) which is convex on the inner face thereof and which normally has abutting engagement with the inner end of the coupler 24. If desired, the follower 29 may be provided with a centering pin 29*a* for cooperation with a suitable opening formed in the inner end of the shank of the coupler 24. The outer end of the yoke 27 is provided with a pair of vertically disposed ears 27*c* having registering openings 27*d* therein to receive the key 25. As shown, the openings 27*d* are greater in width than the key 25. A striking plate 30 (Figs. 3 and 4) of any suitable type is secured to the extremity of the center member 2, and in the form shown, said striking plate extends inwardly beyond the key, the inner end 30*a* of said plate constituting a stop for the follower 29. The inner end of the yoke 27 is normally in engagement with the outer face of the transverse portion 4*a* of the member 4. It will be understood that while only one bolster is illustrated in the accompanying drawings, the novel car structure constituting the subject matter of the present invention is provided adjacent each end with a bolster, and the yielding means illustrated in Figs. 1 and 3, for example, are preferably associated with each bolster.

The remaining structural elements of the car may vary within wide limits since the present invention is not limited to any particular type of railway car, such as a box car. When applied to the latter type of car, however, the remaining structural elements of the same preferably include side sills 31, end sills 32 (Fig. 5), diagonal bracing members 33 and longitudinal floor supporting members 34 of any suitable, or standard, type. Members 34 are preferably secured to the bolsters and the cross bearers 6 and constitute means for preventing longitudinal movement of the center member from deflecting the cross bearers.

Operation.—Normally, the parts are in the position illustrated in the drawings. Any force exerted on the car for placing it in motion, for changing its rate of motion, or for coupling the same to another car, if exerted on the coupler in a direction tending to move said coupler to the right as viewed in Fig. 3, is transmitted by the key 25 and yoke 27 to the resilient plates 28 and the follower 29. The latter is normally in abutting engagement with the stop member 30*a* constituted by the striking plate 30, which striking plate is rigidly attached to the center member. The force is therefore yieldingly transmitted to the center member, and by giving the coupler a limited movement relative to the center member, the desired "train slack" is secured. If the force is sufficiently great to overload the resilient members 28, the coupler means goes solid, i. e., the plates 28 are bent to conform with the concave surface 27*b* of the yoke 27 and the convex surface of the follower 29, and the key is pulled outwardly until its outer edge contacts with the outer edges of the openings 26 formed in the channel members 3, it being obvious that the follower 29 is held against motion by its engagement with the stop 30*a*. Preferably the yielding means associated with the coupler is so designed as to go solid before any relative movement is imparted to the center member.

If the force is transmitted to the coupler in a direction to move the latter to the left as viewed in Fig. 3, the force is transmitted by the coupler shank to the follower, moving the latter away from the stop 30*a*, and bending the plates 28. At the same time, the coupler may force the inner edge of the key 25 into engagement with the inner edges of the openings 26 formed in the center member 2, longitudinal movement of the yoke 27 being prevented by its engagement with the member 4. The yielding mechanism associated with the coupler, which is of limited travel, serves to maintain the coupler in coupling position.

If the force exerted on the coupler is so great that the capacity of the coupler yielding mechanism is insufficient to absorb said force, said coupler mechanism, as stated, goes solid and the remainder of the force is transmitted to the center member, tending to cause the latter to move longitudinally relative to the bolsters. This relative longitudinal movement is resisted by the yielding, energy dissipating means illustrated more particularly in Figs. 1 and 2. The capacity of the coupler yielding means is very small compared to the capacity of the energy dissipating means.

If the force tends to move the center member to the left, as viewed in Fig. 1, the follower stops 21 are moved away from the flange 11*a* of the follower member 11, and simultaneously the follower stops 22 force the housing 15 to the left, together with the friction plates 14 and the shoes 17. Movement of the follower 11 and the friction plates 13 to the left at this time is prevented by the yoke 10, which is keyed to the projecting portion 8 of the bolster 1. As the housing 15 is thus forced to the left by the elements 22, the spring 12 is compressed and resists said movement due to its engagement with the friction shoes 17. The engagement of the latter with the inclined surfaces of the housing 15, causes said shoes to be forced inwardly thereby increasing the friction generated between the plates 13 and 14, which friction assists the resilient member 12 in resisting force tending to produce relative movement between the center member and the bolster. The friction between plates 13 and 14 dissipates the energy tending to produce the relative movement.

If the force tending to produce the relative movement is sufficiently great, the member 4 which also constitutes a stop member, moves into engagement with the outer face of the bolster thereby positively limiting the relative movement of the center member. It is particularly pointed out that the distance between the inner end of the member 4 and the outer face of the bolster is such that said stop member engages the bolster before the resilient member 12 or the friction elements 13, 14 can "go solid", i. e., before the convolutions of the spring contact one with the other and before the outer ends of the plates 13 can engage the housing 15 . Permanent setting or injury to the resilient member 12 and the friction plates 13, 14 is thereby avoided.

If the force exerted on the coupler 24 is such as to produce relative movement of the center member 2 to the right, as viewed in Fig. 1, the follower stops 22 move with said center member out of engagement with the housing 15. Follower stops 21, on the other hand, force the follower member 11 to the right to compress the resilient means 12, and to force the plates 13, by means of shoes 17, into closer engagement with the friction elements or plates 14. Movement of the housing 15 to the right is prevented by engagement of the latter with the projecting portion 8 of the bolster 1. If the force tending to move the center member to the right is sufficiently great, the stops 23 will contact with the portions 1*a* of the bolster, the distance between said stops and said portions being such that the same will contact before the energy dissipating mechanism can go solid.

The embodiment of the invention illustrated in Figs. 15 to 18 inclusive, is shown as comprising a column 35 provided on the end thereof adjacent the bolster, with a T-shaped shank, the head 35*a* of the latter being positioned in a pocket 36 suitably formed in the bolster 37. In the form shown, the pocket 36 is formed in a projection or lug 38 cast integrally with the bolster. The opposite end of the column 35 is preferably T-shaped to provide a head 35*b*, and in engagement with the shoulders of the head 35*b*, are friction shoes 40 which are positioned in a housing 41 surrounding the end of the column 35. The outer faces of the friction shoes 40 are normally in engagement with wear plates 16 secured in a suitable manner to the inner inclined faces of the housing 41. The outer surface of the housing 41 is substantially rectangular in form and, on the opposite lateral faces thereof, is provided with recesses 42. Extending into said recesses are lugs 43 which are rigidly secured in any suitable manner, as by rivets, to the opposite channel members 3 of the center member 2.

Surrounding the column 35 and in engagement with the inner faces of the shoes 40, is a follower ring 44 for a purpose to be described hereinafter. A suitable resilient member 45, which in the form shown is a coil spring, surrounds the column 35 and has abutting engagement at one end thereof with the follower ring 44, and at its opposite end with a similar ring 46 which bears against friction shoes 47. In the embodiment illustrated, the shoes 40 and 47 are substantially similar in shape and construction as are the rings 44 and 46. The outer ends of the shoes 47 are normally in engagement with shoulders 35*c* formed in the opposite sides of the column 35 adjacent the "bolster" end thereof. Surrounding the shoes 47 is a housing 48 which may be similar in construction to the housing 41, and which is held against movement relative to the center member by means of lugs 49 projecting into suitable channels or grooves formed in the opposite side walls of the housing. The lugs 49 are secured to the center member 2 in any suitable manner, as by means of rivets. A pair of stops 50, which may be formed as castings, are secured to the outer faces of the channel members 3 and are adapted to engage with the lateral face of the bolster 37.

In order to insure that the column 35 will be maintained in operative position, any suitable means such as the carrier plates 51, may be provided for this purpose. As shown, the carrier plates are bolted or otherwise suitably secured to the lower surface of the channel members 3, said carrier plates extending transversely and having engagement on their upper faces with the housings 41, 48 and, as shown, with the resilient member 45. Preferably the column 35 is provided on the lateral faces thereof with longitudinally extending, recessed portions 35*d* to provide frictional bearing surfaces for the shoes 40 and 47.

Normally the parts are in the position illustrated in the drawings. If a force is applied to the center member tending to move the same to the left, as viewed in Fig. 15, relative to the bolster 37, the lugs 43 move with the center member 2 and carry therewith the housing 41 out of engagement with the shoes 40. Simultaneously the lugs 49 carry the housing 48 to the left, and, due to the inclined surfaces of the latter, the shoes 47 are forced inwardly to increase the frictional engagement of the same with the surfaces 35*d* of the column 35. This frictional engagement is further increased due to the resistance of the resilient member 45, which is compressed between the shoes 40 and 47. The end of the resilient member is in abutting engagement with the ring 44, carried by the shoes 40, and is held against movement by engagement of the shoes 40 with the shoulders formed on the head 35*b*, the column 35 and consequently the head 35*b* being held against movement by engagement of said column with the portion

38 of the bolster 37. The stops 50 are so positioned relative to the bolster 37 as to prevent the resilient member 45 from going solid.

If a force is applied to the center member in such a direction as to cause movement of the same to the right, relative to the bolster as viewed in Fig. 15, it will be apparent that said relative movement is resisted by the resilient member 45 and the energy is dissipated by the friction shoes 40 being forced inwardly to increase frictional engagement of the same with the column 35, the shoes 47 being held against relative movement by their engagement with the shoulders 35*c* formed on the column 35.

It is pointed out that the energy dissipating means is so constructed as to positively prevent seizing of the friction shoes. If, as the center member 2 is forced to the right, the shoes 40, for example, seize the column 35 on the surface 35*d*, the resilient member at the opposite end of the car is effective to return the center member to normal position. As said center member thus moves to the left to normal position, the housing 41 is moved out of engagement with the seized shoes 40, whereupon resilient member 45 acts through the follower ring 44 to slightly tilt the friction shoes 40 and break them away from sticking engagement with the column 35, whereupon said friction shoes return to normal position. It will be understood that the energy dissipating means shown in Figs. 15 to 18 are adapted for use in combination with suitable yielding coupler means, such for example, as is shown in Figs. 3 and 4.

It will thus be perceived that there is provided a novel car structure embodying energy dissipating means for yieldingly resisting the relative longitudinal movement between certain elements of said structure, said means being tied to the bolster, or bolsters, and the elements of the structure being so associated that a long travel is provided for the energy dissipating means. Such an arrangement greatly facilitates the dissipation of energy tending to damage the car and its lading. The energy dissipating means is so mounted relative to the bolster, or bolsters, that yielding coupler means is employed to provide train slack. The strength of the bolsters is not impaired and the elements are particularly adapted for ready assembly since the energy dissipating means is so constructed that it may be assembled and installed as a unit. No part of the bolster itself is employed as a friction element of the energy dissipating means.

The novel combination of elements constituting the subject matter of this invention therefore includes novel means for securing energy dissipating means of long travel to a transverse member of a car structure, particularly to the bolster thereof, which energy dissipating means is effective for both draft and buffing and which avoids the many objectionable features resulting from the use of the usual draft gears of limited travel. The novel energy dissipating means cannot go solid and may be so constructed that the friction shoes or elements are positively released in the event the same seize.

While the energy dissipating means disclosed herein are novel per se, it will be understood that one of the features of the present invention resides in the mounting and positioning of the energy dissipating means relative to the remaining elements of the car structure, and more particularly, in directly associating the energy dissipating means with one of the transverse members, such as a bolster, for draft and buffing. Train slack is provided for and is kept within the necessary limits and at the same time the center member has a relatively long travel with respect to the transverse members, thus insuring that the forces tending to damage the car or its lading will be dissipated in an effective manner. The travel of the energy dissipating means is always greater than the movement of the coupler relative to the center member and hence is always greater than the train slack.

While only two embodiments of the present invention have been illustrated in the drawings it is to be expressly understood that various changes may be made in the structural elements shown. For example, the type of resilient elements employed and the number of the same may be varied as well as the type and number of friction elements employed in the energy dissipating means. Changes may be made in the details of the connection between the bolster and the energy dissipating means. For example, the latter may be bolted to the bolster, if desired. Nor is the invention limited to the particular type of train slack means illustrated in the drawings. Preferably, however, the latter has less travel and less resistance than the energy dissipating means. While the yokes employed in the energy dissipating means and the yielding coupler means are shown as castings, it will be understood that the same may be made as forgings, may be fabricated, or may be constituted by suitable bolts. Preferably the energy dissipating means and the train slack means are provided for each end of the car, but in some instances this may be found to be unnecessary. Reference will therefore be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

1. A railway car comprising a plurality of transverse members including a bolster having a laterally projecting portion, a center draft member mounted for longitudinal movement relative to said bolster, stop means secured to said center member and adapted

to engage said bolster to positively limit said relative movement, and yielding means secured to said laterally projecting portion for resisting said longitudinal movement, said stops being effective to prevent said yielding means from going solid.

2. A railway car comprising a plurality of transverse supporting members including a bolster, a center draft member mounted for longitudinal movement relative to said bolster and extending through the latter, a yoke secured to said bolster, a housing, friction elements in said housing, follower means having engagement with said yoke, resilient means having engagement with said follower and one or more of said friction elements, and independently operable train slack means of short travel operatively connected to said draft member.

3. A railway car comprising a plurality of transverse supporting members including a bolster, a center draft member mounted for longitudinal movement relative to said bolster, and means for resisting said movement including a yoke, a key for rigidly securing said yoke to said bolster, a follower plate having friction elements attached thereto, a housing, friction elements in said housing having engagement with said first-named friction elements, and resilient means interposed between said housing and said follower, the latter normally having engagement with said center member.

4. A car structure of the class described comprising relatively movable elements including a center draft member extending substantially the length of the car, unitary energy dissipating means operatively connected to said elements for resisting said movement, and coupler means including a coupler keyed to and movable in both directions from a normal position relative to said draft member for securing train slack, the travel of the energy dissipating means being materially greater than the travel of the coupler relative to the draft member.

5. An underframe structure for a railway car comprising a pair of bolsters having openings therethrough, means associated with said bolsters including a center sill extending substantially the length of the car and adapted for longitudinal movement relative to said bolsters, means for resisting relative movement of said center sill, side sills secured to said bolsters, an end sill secured to said side sills, and means secured to said end sill and the end portions of the adjacent bolster for preventing said end sill from yielding under end stresses.

6. An underframe structure for a railway car comprising a pair of bolsters having openings therethrough, means associated with said bolsters including a long travel center draft member adapted for longitudinal movement relative to said bolsters, means for resisting relative movement of said center member, side sills secured to said bolsters, an end sill secured to said side sills, and diagonal braces secured to said end sill and the end portions of the adjacent bolster for imparting longitudinal stresses to the ends of the latter and for strengthening said end sill.

7. An underframe structure for a railway car comprising a pair of bolsters having openings therethrough, means associated with said bolsters including a center draft member extending substantially the length of the car and adapted for longitudinal movement relative to said bolsters, side sills secured to said bolsters, an end sill secured to the side sills, diagonal members secured to said end sill and the end portions of the adjacent bolster, a plurality of cross-bearers secured to the side sills, and means secured to said cross-bearers for guiding said center member in its longitudinal movement.

8. In a structure of the class described, the combination with a pair of body bolsters of a long travel center draft member mounted for longitudinal movement relative to said bolsters, means intermediate said bolsters for laterally guiding the center member, and means on the opposite sides of said bolsters for guiding said center member in its longitudinal movement.

9. A car structure of the class described comprising a bolster, means associated therewith including a center draft member constituted by channels adapted for longitudinal movement relative to the bolster and extending through openings in the latter, side sills secured to the bolster, an end sill secured to the side sills, cross bearers for guiding said center member, and means engaging the flanges of said channels and secured to the end sill for guiding and supporting said center member.

10. An underframe structure for a railway car including a bolster, a center draft member extending through the bolster and mounted for longitudinal movement relative thereto, said member being provided with flanges, means for resisting said relative movement, a cross-bearer for guiding the intermediate portion of the center member in its longitudinal movement, and a pair of jaws carried by said structure and having sliding engagement with the outer portion of the center member for guiding the latter in its longitudinal movement.

11. A railway car underframe comprising a pair of bolsters having openings therethrough, means associated with said bolsters including a center draft member adapted for longitudinal movement relative to said bolsters, side sills secured to the bolsters, a plurality of cross-bearers secured to said side sills intermediate said bolsters, and means secured to said cross-bearers and to one or more

of said bolsters for preventing longitudinal movement of said center member from deflecting said cross-bearers.

12. A railway car underframe comprising a pair of bolsters having openings therethrough, means associated with said bolsters including a center draft member adapted for longitudinal movement relative to said bolsters, side sills secured to the bolsters, a plurality of cross-bearers secured to said side sills intermediate said bolsters, means secured to said cross-bearers for guiding said center member, and means for preventing longitudinal movement of the center member from deflecting the cross-bearers.

13. A car structure comprising a bolster, side sills secured thereto, an end sill secured to the side sills, a center sill adapted for movement relative to said bolster and end sill, means for resisting movement of the center sill, and means secured to the central portion of the end sill and operatively secured to the ends of said bolster for strengthening said end sill.

14. In a railway car, a body structure including a bolster, a long travel draft member extending substantially the length of the structure and mounted for longitudinal movement relative thereto, said draft member extending through said bolster, means for yieldingly resisting said relative movement whereby excessive forces imparted to the center member are gradually resisted without damage to the car structure, and means including a coupler operatively connected to said draft member for securing train slack, said coupler being adapted for movement in both directions from a normal position relative to said center member, and means for yieldingly resisting movement of the coupler relative to the center member, the movement of the draft member relative to the car structure being greater than the movement of the coupler relative to said draft member.

15. In a railway car, a body structure including bolsters, a draft member extending substantially the length of the structure and mounted for movement relative thereto, said draft member extending through said bolsters, train slack means secured to said draft member including a coupler adapted for movement in both directions from a normal position relative to said draft member, means for yieldingly resisting the movement of a coupler, and means for yieldingly resisting the movement of the draft member relative to the car structure, the ratio of relative movement of the draft member to the relative movement of the coupler being greater than unity.

16. A railway car comprising a body structure including bolsters, a draft member extending substantially the length of the structure and mounted for movement relative thereto, said draft member extending through said bolsters, train slack means including couplers secured to the opposite ends of said draft member, said couplers being adapted for movement in both directions from a normal position relative to said draft member, and long travel means for yieldingly resisting movement of said draft member relative to said structure, the relative movement of the draft member being greater than the relative movement of the couplers.

17. In a car structure of the type embodying a body bolster and a draft member extending substantially the length of the car structure and mounted for movement relative to the bolster, cushioning means for yieldingly resisting relative movement of said member including wedges rigidly connected to and movable with said member, and friction and resilient elements adapted to coact with said wedges, one of said friction elements being connected to said body bolster and projecting laterally therefrom.

18. In a car structure, body bolsters, a center member extending substantially the length of the structure and mounted for movement relative to said body bolsters, cushioning means for yieldingly resisting relative movement of the center member comprising resilient and friction elements, certain of said friction elements being secured to and movable with said center member, and another of said friction elements being secured to one of the body bolsters and projecting laterally therefrom and between the friction elements secured to the center member.

19. In a car structure, a body bolster, channel members extending substantially the length of the structure and mounted for movement relative to said bolster, tie plates for connecting the flanges of said channels, wedges secured to the webs of the channels, and means adapted to coact with said wedges for resisting movement of said channels relative to said bolster, said means including a friction member attached to the bolster and projecting therefrom.

In testimony whereof I have signed this specification.

OTHO C. DURYEA.