

Sept. 18, 1934.

O. C. DURYEA

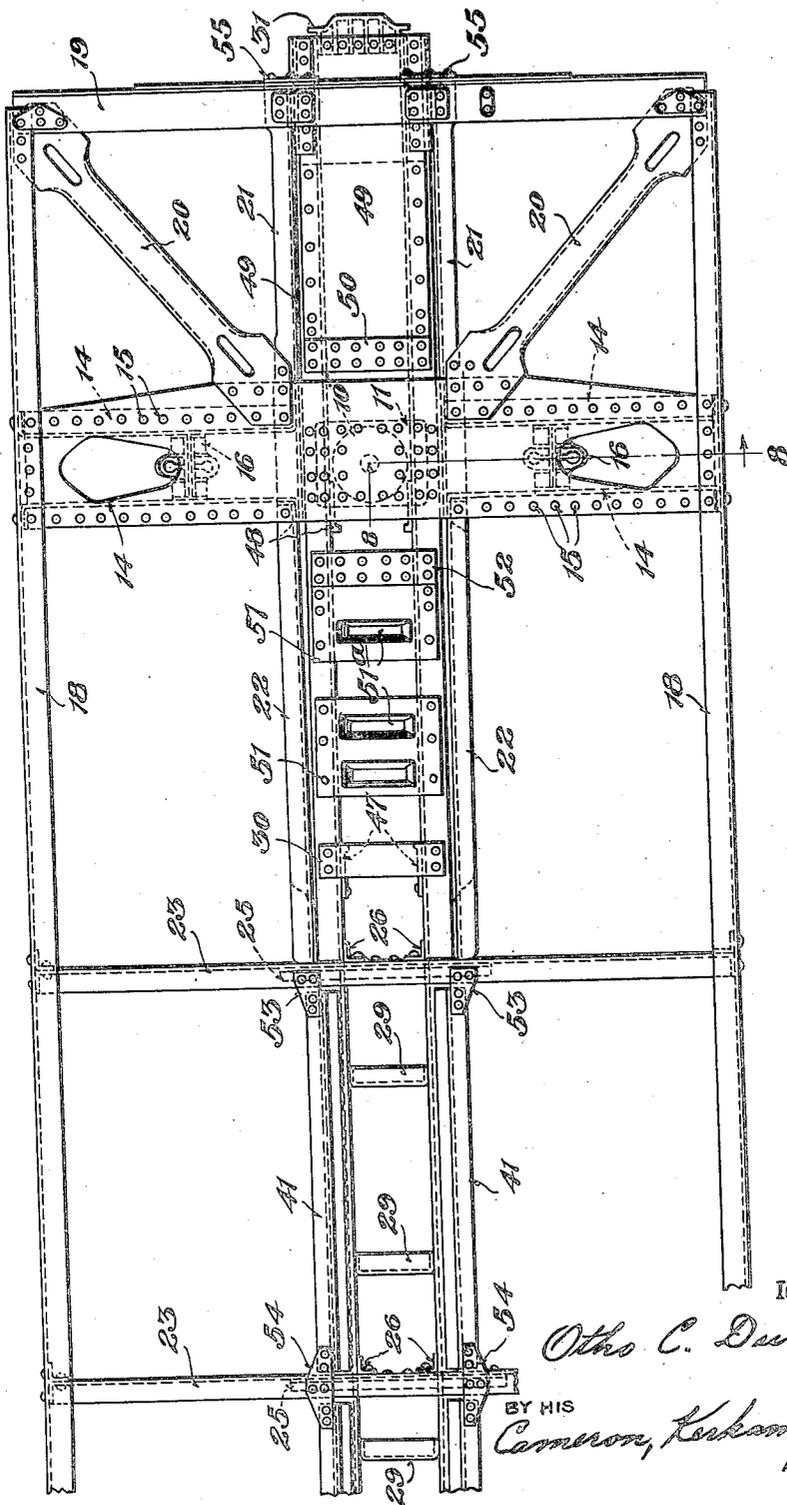
1,974,017

CAR CONSTRUCTION

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Fig. 1.



INVENTOR

Otto C. Duryea

BY HIS

Cameron, Kerkam & Sutton

ATTORNEYS

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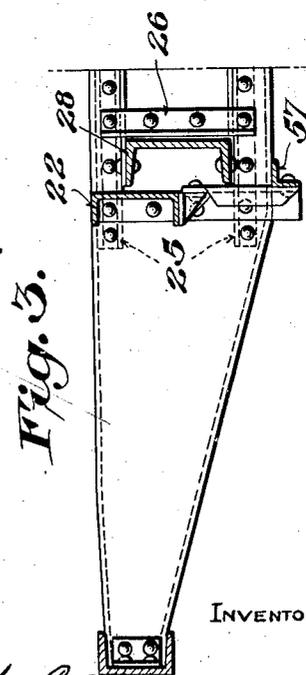
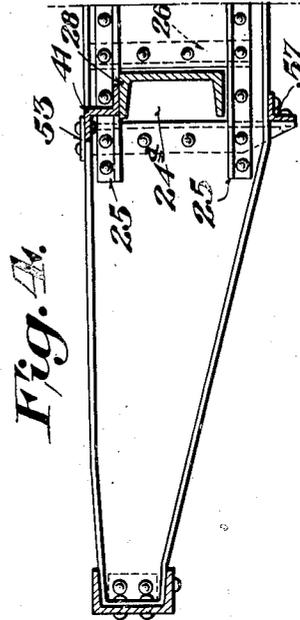
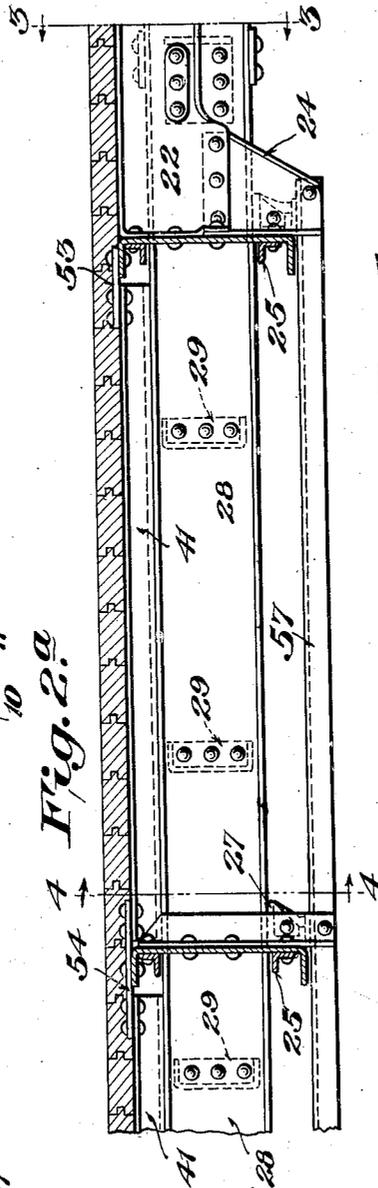
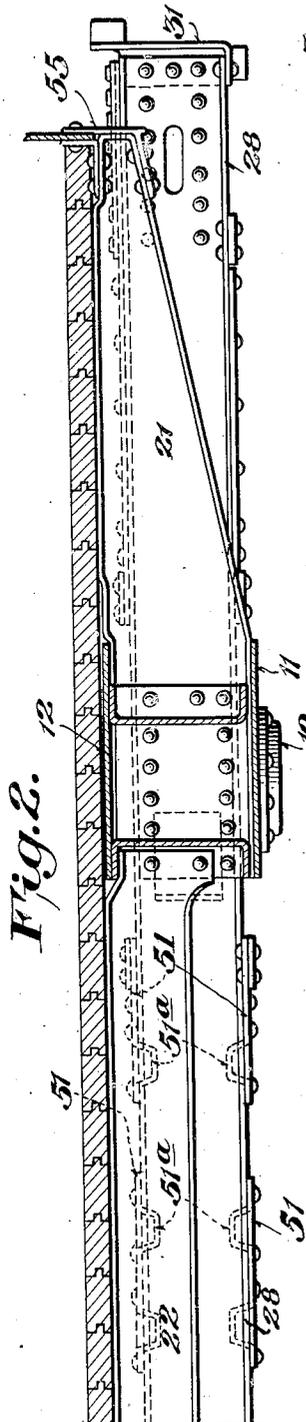
O. C. DURYEY

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INVENTOR

BY HIS *Otho C. Duryea*  
*Camera, Kebabian & Lutton*

ATTORNEYS.

Sept. 18, 1934.

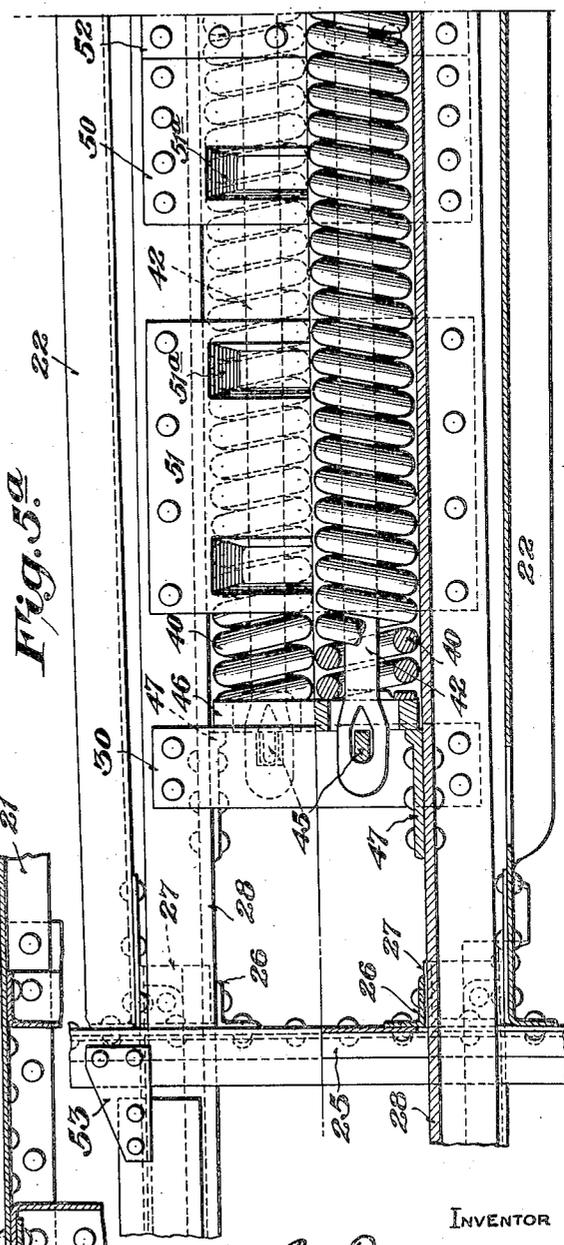
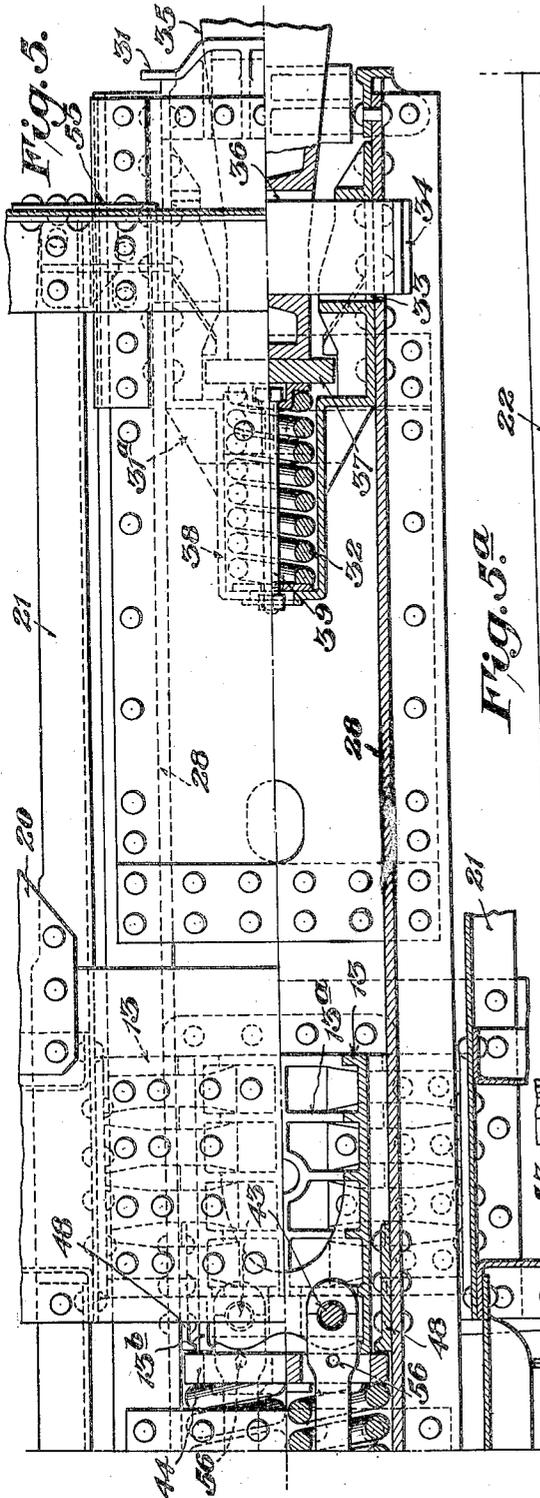
O. C. DURYEY

1,974,017

CAR CONSTRUCTION

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INVENTOR  
*Otho C. Duryea*  
 BY HIS  
*Cameron, Kerkham & Sutton*  
 ATTORNEYS

Sept. 18, 1934.

O. C. DURYEY

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CAR CONSTRUCTION

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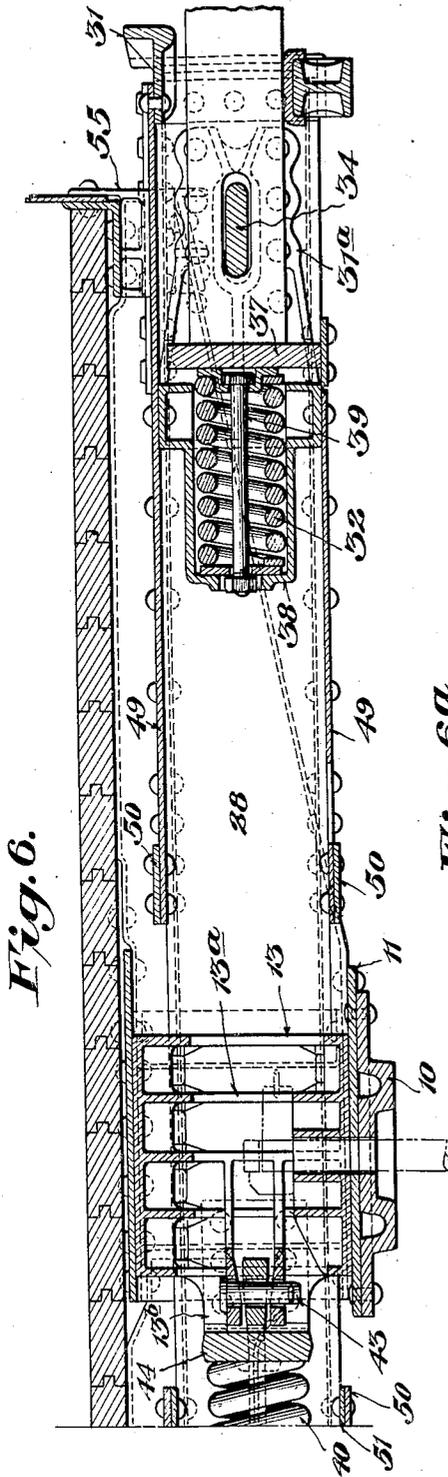
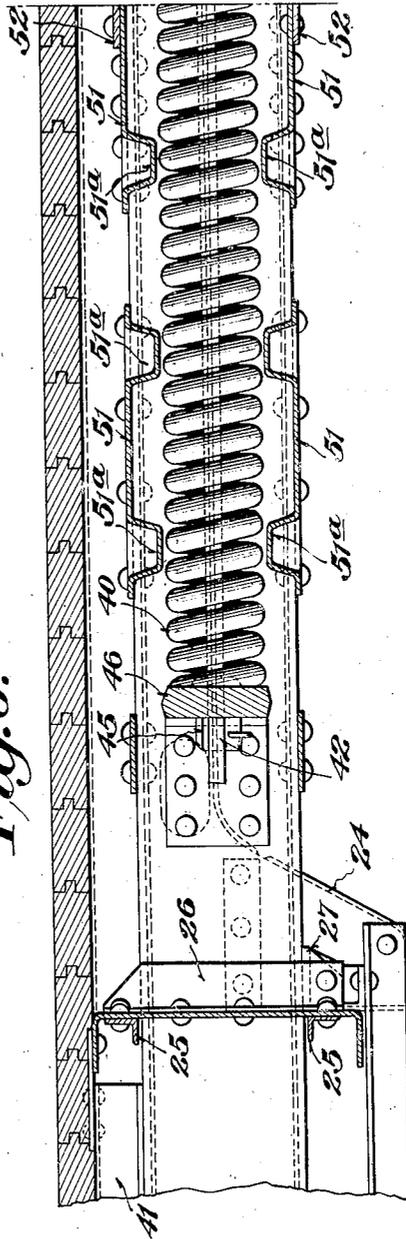


Fig. 6a



INVENTOR

Otho C. Duryea

BY HIS

Cameron, Kerkham & Sutton

ATTORNEYS

Sept. 18, 1934.

O. C. DURYEY

1,974,017

CAR CONSTRUCTION

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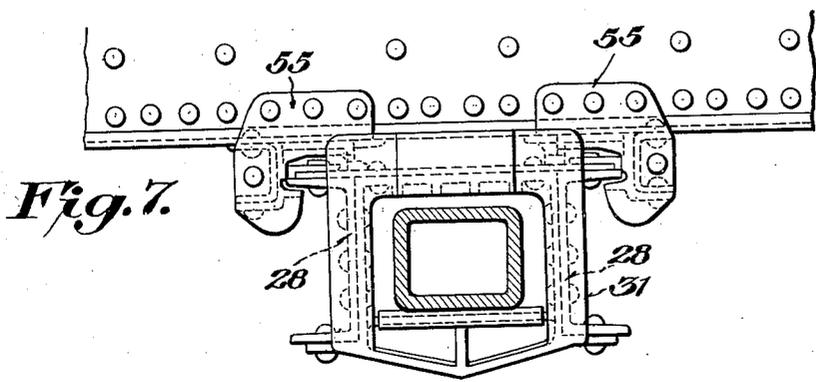


Fig. 7.

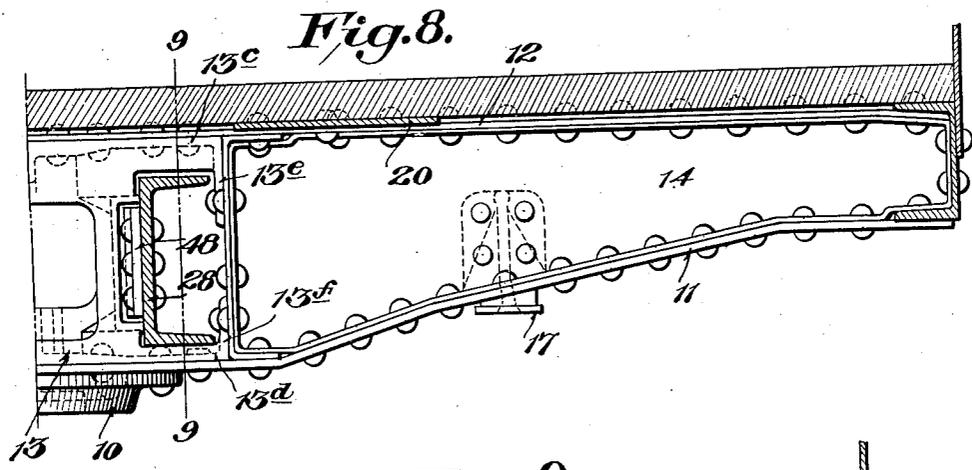


Fig. 8.

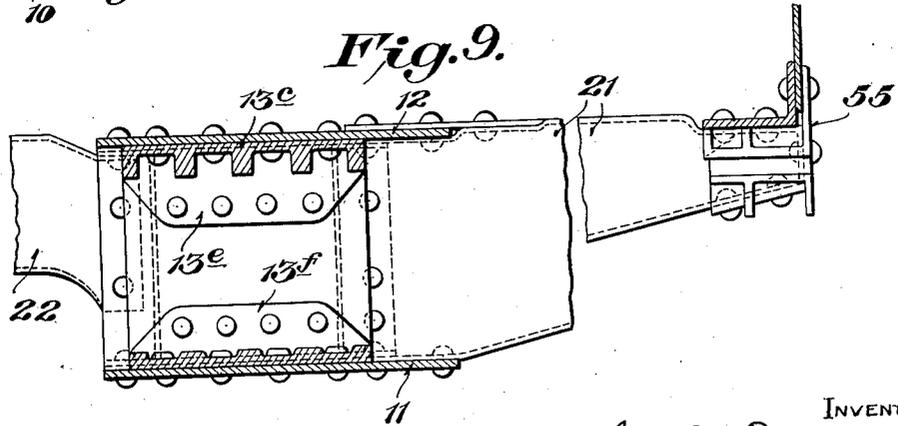


Fig. 9.

INVENTOR

Otho C. Duryea

BY HIS

Comeraw Kerkham & Sutton

ATTORNEYS.

# UNITED STATES PATENT OFFICE

1,974,017

## CAR CONSTRUCTION

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

Application October 29, 1928, Serial No. 315,876

3 Claims. (Cl. 213—8)

This invention relates to railway cars and more particularly to a car embodying means of long travel for absorbing draft and buffing forces.

One of the objects of the present invention is to provide a railway car having a draft and buffing column extending substantially the length of the car body and mounted for longitudinal movement relative to said body, in combination with novel yielding means for absorbing draft and buffing forces, the yielding means being of long travel in order that the end pressures may be maintained low whereby damage to the car structure or its lading is prevented.

Another object is to provide a car of the above character embodying a built up body bolster and novel torque resisting means operatively connected to the bolster.

A further object is to provide a novel car structure or underframe embodying long travel means for yieldingly resisting draft and buffing forces, the structure being so constituted that the train slack is maintained low and is independent of the travel of the yielding means. The above and other objects will appear more fully hereafter in the detailed description of the invention.

One embodiment of the present invention is illustrated in the accompanying drawings wherein like reference characters refer to like parts throughout the several views. It is to be expressly understood, however, that the drawings are for purposes of illustration only and are not designed 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 top plan view of a portion of a car frame embodying the present invention;

Figs. 2 and 2a constitute a side view, partly in section, of the central portion of the underframe structure shown in Figure 1;

Figs. 3 and 4 are detail sectional views taken on the lines 3—3 and 4—4 respectively of Figure 2a;

Figs. 5 and 5a constitute a top plan view, in half section and with parts broken away, of one form of shock resisting means which may be employed in accordance with the present invention;

Figs. 6 and 6a constitute a side view in section of the parts shown in Figs. 5 and 5a respectively;

Fig. 7 is a detail, end view illustrating one

manner in which the longitudinally movable draft and buffing column may be guided adjacent the end thereof;

Fig. 8 is a detail, sectional view taken on the line 8—8 of Figure 1; and

Fig. 9 is a sectional view, with parts broken away, taken on the line 9—9 of Figure 3 and illustrating the connection between one of the torque arms and the body bolster.

In the form illustrated, the car structure embodying the present invention is of the box car type but it will be understood that the invention is not limited to cars of this type. In order to employ large scale drawings, the structure at one end of the car only is shown, the opposite end being similarly constructed. As will be understood by those skilled in the art, the car underframe is adapted to support a suitable body (not shown) and is adapted to be mounted on suitable trucks by means of center plates, one of which is shown at 10 (Fig. 2). Center plate 10 is secured as by means of rivets to the lower central portion of a body bolster which is preferably of the build up type and includes a bottom cover plate 11 and a top cover plate 12. Positioned centrally between plates 11 and 12 is a center brace 13 which is preferably formed as a casting. As shown more clearly in Figs. 5 and 6, the center brace 13 is provided with a plurality of transversely extending webs 13a and with a portion 13b which projects inwardly from the inner face of the body bolster. The center brace is further provided with upper and lower laterally projecting portions 13c and 13d (Fig. 8) having the outer ends bent at substantially right angles to provide flanges 13e and 13f. Secured to flanges 13e, 13f, and extending outwardly therefrom between plates 11 and 12, are flanged members 14 which terminate in the plane of the outer ends of said plates and are secured thereto as by means of rivets 15. By this construction a pair of openings is provided in the body bolster on the opposite sides of the center thereof for a purpose to be described hereafter, one of said openings being shown more clearly in Figure 8. Located at suitable distances on the opposite sides of center brace 13 and secured to the flanged members 14 are stiffening elements 16 that are preferably formed as castings and constitute means for securing side bearing members 17 (Fig. 8) in position.

Secured in any suitable manner to the outer ends of the body bolsters are side sills 18 which are riveted to end sills, one of which is shown

at 19 in Figure 1. Diagonal bracing members 20 extend from the points of connection between the end sill and side sills to the central portion of the body bolster, the bracing members being  
5 secured at the inner ends to the bolster top plate 12 closely adjacent the center brace 13.

Torque arms or members are provided for bracing the built up body bolster against deflecting forces. Preferably said torque arms are con-  
10 stituted by flanged members 21 which extend from the end sill inwardly to the inner face of the body bolster. As shown more clearly in Figure 2, the upper edge of each torque arm 21 is disposed horizontally while a portion of the  
15 lower edge of the same is disposed at an angle to form a member of varying height, the narrow ends of said arms being secured to the end sill. The inner or bolster end of each arm 21 extends to the inner face of said bolster and is  
20 riveted to the flanges 13e and 13f of the center brace, occupying a position between said flanges and the adjacent flanges of members 14 of the bolster. Torque arms 21 also constitute floor supports, the car flooring being shown in section  
25 in Figure 2.

Secured to and extending inwardly from the body bolster is a pair of flanged members 22 which constitute floor supports and which are  
30 secured at their inner ends to a cross bearer 23. The floor supports 22 strengthen the cross bearer against deflecting forces and may be secured thereto as by means of gusset plates 24.

Any suitable number of cross bearers are provided intermediate the body bolsters at each  
35 end of the car, two only being shown in Fig. 1. Each of said cross bearers has formed therein two openings 24a which are in alignment with the openings in the body bolster. Angle irons 25 extend horizontally above and below  
40 the openings in the cross bearers and are secured to the latter to strengthen the same. Vertical angle irons 26 are also secured to the cross bearers on the opposite faces of the same to  
45 further strengthen the cross bearers adjacent openings 24a. Angle irons 26 have attached thereto bearing members 27 (Figs. 2a and 5a) which are preferably formed as castings and are for a purpose to be described hereafter.

A rigid draft and buffing column extends substantially the length of the car structure through  
50 the openings in the body bolsters and cross bearers and is mounted for relative longitudinal movement. In the form shown the draft and buffing column is constituted by a pair of vertically disposed channels 28 which are tied together at a plurality of points by means of  
55 flanged members 29 and tie plates 30. The outer ends of channels 28 are rigidly connected together by a member which is preferably formed as a casting 31 and which serves as a striking  
60 plate. Positioned between the webs of channels 28, closely adjacent striking plate 31 is member 31a constituting draft lugs and a carrier for a coupler spring 32. Member 31a is provided with  
65 openings 33 which are aligned with suitable openings in the webs of channels 28, and through these openings extends a coupler key 34 which serves to operatively connect the channels to a  
70 coupler 35 having a slot 36 in the shank thereof which is of greater width than the key. A follower 37 which has abutting engagement with the inner end of the coupler shank is movably mounted in a pocket in casting 31a and engages the outer end of coil spring 32, the opposite end  
75 of said spring being held against movement

by its engagement with the end wall of a pocket 38 provided in casting 31a. If desired an assembly bolt 39 and suitable washers may be employed for assembling spring 32, under an  
80 initial compression, with the remaining elements.

Spring 32 acts through follower 37 on the coupler shank and key 34 so that the outer edge of said key is normally maintained in engagement with the outer end walls of slots 33, and the inner end wall of the slot 36 in the coupler  
85 shank is maintained in engagement with the inner edge of said key. Spring 32 thus normally maintains the coupler 35 in coupling position but permits limited movement of the coupler inwardly relative to the buffing column or center  
90 member. The relative inward movement of the coupler is positively limited by the engagement of follower 37 with suitable shoulders formed in the casting 31. If desired, the parts may be so constructed that little or no strain is thrown  
95 on the coupler key by the inward movement of the coupler. Movement of the coupler relative to the center member 28, 28 determines the train slack, and, as will be apparent, this slack may be varied as desired but preferably the same is quite  
100 limited. As will be understood by those skilled in the art, the parts may be so arranged that the coupler has movement of short extent in both directions from a normal position relative  
105 to the center member.

Means are provided for yieldingly resisting movement of the center member relative to the  
110 body bolsters and said means are preferably of long travel whereby draft and buffing forces imparted to the car structure through the coupler and center member are gradually absorbed without damage to the car or lading. In the form  
115 shown, said yielding means includes coil springs 40, and friction elements 41 which are in the form of Z-bars (Fig. 4) and which have sliding engagement with the upper surface of the channel members 28.

Extending through each of the coil springs 40 is a rod 42 which is secured at its outer end, as  
120 by means of a headed pin 43, to suitable lugs which project inwardly from the inner face of the center brace 13. Slidably mounted on rods 42, intermediate the outer ends of the coil springs and the projections 13b of the center  
125 brace, is a follower 44. The inner end of each of the rods 42 is formed as an eye to receive a vertically disposed pin 45, which pins constitute a stop for a follower 46 that is slidably mounted on said rods and has abutting engagement with  
130 the inner ends of springs 40. Normally follower 46 engages follower stops 47 which are riveted or otherwise suitably secured to the inner faces of the webs of channels 28. Follower stops 48 are provided for follower 44, said stops being  
135 secured to the inner faces of the webs of channels 28 in a position such that the inner ends of the stops are normally in the same vertical plane as the inner ends of the projections 13b of center brace 13.

Means are provided for positively limiting  
140 movement of the center member 28, 28 relative to the bolster. As shown more clearly in Figs. 1, 6 and 6a, tie plates 49 are secured to the upper and lower flanges of channels 28 intermediate the end sill and the body bolster. The  
145 inner ends of tie plates 49 are so positioned relative to the bolster that the same may engage the center brace to prevent springs 40 from going solid and positively limit relative move-  
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ment of the center member to the left as viewed in Figs. 1 and 2. The inner ends of tie plates 49 are preferably reinforced by suitable plates 50. Movement of the center member to the right, as viewed in Fig. 1, relative to the bolsters, is positively limited by tie plates 51 which are secured to the upper and lower flanges of channels 28 in a position such that the outer ends of said plates are adapted to engage the inner face of the center brace casting 13. Preferably plates 51 are strengthened by means of stop plates 52 and in the form shown portions of the plates 51 are pressed inwardly, as at 51a, to form guiding surfaces for springs 40.

Means are provided for securing Z-bars 41, which coact with the resilient means 40 to resist relative movement of the center member, to the car body. In the form shown, said means are constituted by plates 53 and 54. Plates 53 are secured, as by means of rivets, to one end of the Z-bar and to the upper flange of the adjacent cross bearer 23 (Figs. 1, 2a and 4). Plates 54 are riveted to the ends of two Z-bars, the central portion of said plates being riveted to the upper surface of the flange of the adjacent cross bearer. Thus, in the form shown, the Z-bars do not extend through the cross bearers and are positively held against movement with the center member. As shown more clearly in Fig. 2a the lower surface of the flooring is preferably recessed to receive plates 53, 54 and the rivets therefor.

Means are provided in the plane of the end sills for guiding the center member in its relative longitudinal movement. In the form shown, said means are constituted by a pair of jaws 55 (Figs. 7 and 9) which are secured to the outer ends of torque arms 21 and to the end sills in a position to engage the upper flanges of channels 28. The outer ends of members 55 have the form of vertically disposed flanges which cover the ends of the torque arms 21, and extending inwardly from the vertically disposed portion of each member 55 is a ribbed part, as shown more clearly in Fig. 9, the ribs being horizontally disposed and constituting the guiding surfaces for engagement with the flanges of channels 28.

If a draft force is applied to coupler 35 the same moves to the right, as viewed in Fig. 5, and through key 34 this motion is transmitted to the draft and buffing column 28, 28. Movement of the draft and buffing column to the right is transmitted through follower stops 47, follower 46, springs 40 and follower 44 to the body bolster, whereby the car body is placed in motion. If the draft force is excessive relative movement takes place between the draft and buffing column and the bolster, and the same is yieldingly resisted by springs 40 and the friction elements 41. It will be noted that the amount of friction generated between Z-bars 41 and the flanges of the channels 28 will vary in accordance with the lading in the car. Since the travel which the center member may have relative to the bolster is of large extent, the draft force is absorbed without damage to the car structure or lading, the end pressures at all times being low. In the event that the draft force is extremely large, relative movement between the center member and bolster may be such as to bring stops 51, 52 into engagement with the inner face of the center brace 13, whereby the relative movement is positively limited. The stops are so positioned with re-

spect to the bolster that the springs 40 cannot go solid.

If a buffing force is applied to coupler 35 the same moves inwardly against the tension of spring 32 relative to the center member and goes solid on key 34 as follower 37 goes solid on shoulders provided in casting 31a. If the buffing force is large, coupler 35 and center member 28, 28 now move as a unit to the left, as viewed in Fig. 5, relative to the body bolster. This movement is transmitted through stops 48 and follower 44 to springs 40, the inner ends of said springs being held against movement by follower 46, pins 45 and rods 42, which are rigidly connected to the body bolster. The buffing force is thus yieldingly transmitted to the car body and since the travel of the springs is large and the end pressures are low, no damage to the car structure or lading results. If the buffing force is excessive stops 49, 50 engage the outer face of center brace 13 and positively limit movement of the center member, the stops being so positioned as to prevent springs 40 from going solid.

Assembly of springs 40 and rods 42 with the remainder of the structure is facilitated by compressing the springs a sufficient distance to permit pins (not shown) to be inserted through small openings 56 (Fig. 5) in said rods closely adjacent the openings for pins 43. The pins in opening 56 are adapted to engage the outer face of follower 44 and hold the springs compressed between followers 44 and 46 so that the engagement of the pins 43 with the outer ends of rods 42 and the lugs on the center brace 13 is readily effected.

As shown more clearly in Figs. 2a and 6a, an angle iron 57 may, if desired, be secured to the lower portions of the cross bearers to strengthen the same against lateral movement due to the frictional engagement of the center member with the castings 27 mounted on said cross bearers. The center member is guided in its longitudinal movement by the body bolsters and the cross bearers and serves as a load carrying member or center sill.

The underframe described above is particularly adapted for ready assembly and is extremely strong and durable. Due to the rigidity of the draft and buffing column the jaw members 55 do not have excessive loads thrown thereon and may be made of relatively light material. The length of springs 40 and hence the movement of the center member relative to the body bolster may be varied within wide limits, but the travel of the coupler relative to the center member is always maintained less than the travel of the center member relative to the bolsters. It will be understood that the opposite ends of the car are similarly constructed and that the resilient means adjacent each bolster coact to resist relative movement of the center member in both directions from normal position. The use of torque arms 21 enables a relatively light built up body bolster to be employed, and the torque arms coact with members 22 and 41 to form a support for the flooring.

While only one embodiment of the invention has been illustrated and described, it is to be expressly understood that the invention is not limited thereto, since various changes may be made in the form and arrangement of the parts without departing from the invention defined in the following claims.

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What is claimed is:

1. In a car underframe of the type embodying a rigid draft and buffing column extending substantially the length of the underframe and mounted for relative longitudinal movement, a

5 built-up body bolster comprising top and bottom cover plates, a center brace positioned centrally between said plates and secured thereto, a pair

10 of flanged members positioned between said plates and extending from the center brace outwardly on each side thereof to the end of said

15 plates, means for securing the flanged members to the center brace and said plates, said means being so constructed and arranged as to leave a

pair of openings between said flanged members and the center brace through which said column is freely slidable, and stiffening elements secured to each pair of said flanged members intermediate the ends of the latter.

20 2. In a car underframe, body bolsters, cross bearers intermediate said bolsters, side sills connected to the bolsters and cross bearers, a rigid center member extending through openings in

the bolsters and cross bearers and mounted for movement relative thereto, couplers movably connected to the opposite ends of the center member, and means for yieldingly resisting

80 movement of the center member relative to the bolsters including longitudinally extending members adapted for frictional engagement with the center member, and plates for securing said

85 longitudinal members to the upper surfaces of said cross bearers.

3. In a car underframe of the type embodying a rigid draft and buffing column extending substantially the length of the underframe, side

90 and end sills, a body bolster secured to the side sills, said column being adapted for movement relative to said bolster and sills, torque arms extending from the end sill to the inner face of the

95 body bolster, means for securing said arms to the bolster and end sill, and guiding members secured to the inner faces of the torque arms in the vertical plane of the end sill and having sliding engagement with said column.

OTHO C. DURYEA.

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