

June 19, 1934.

S. SIMONSON

1,963,215

CAR CONSTRUCTION

Filed June 4, 1932

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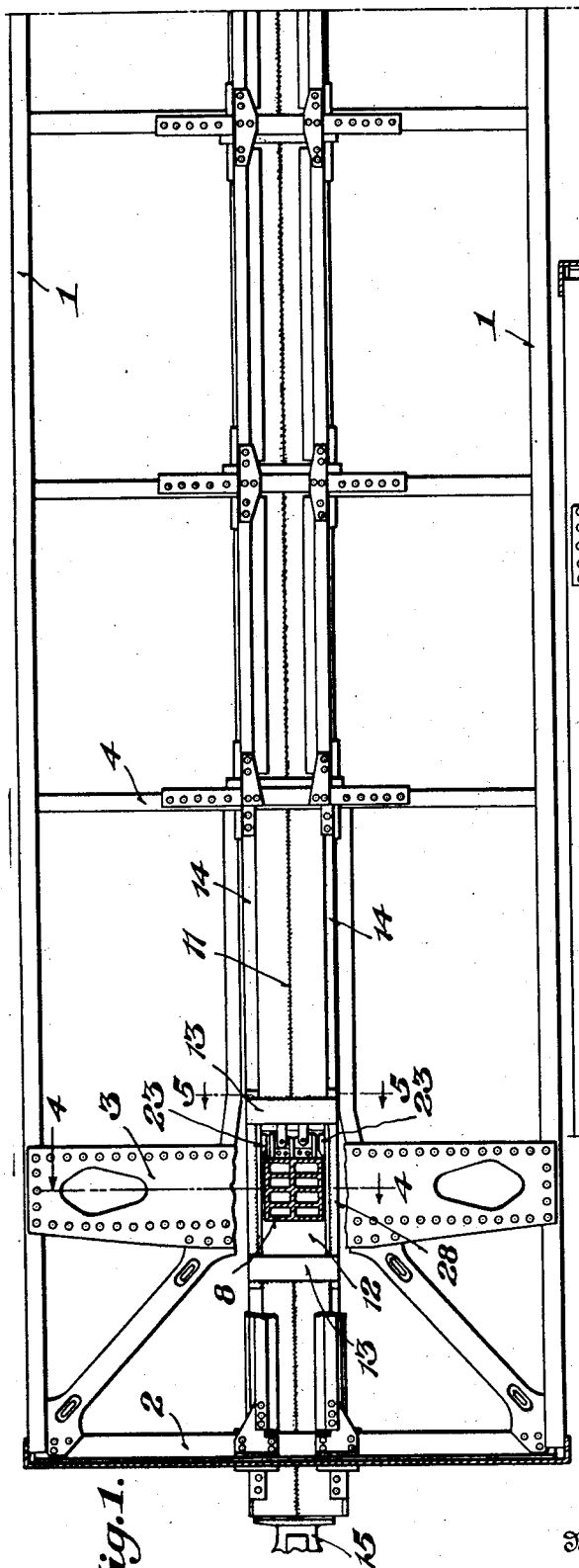


Fig. 1.

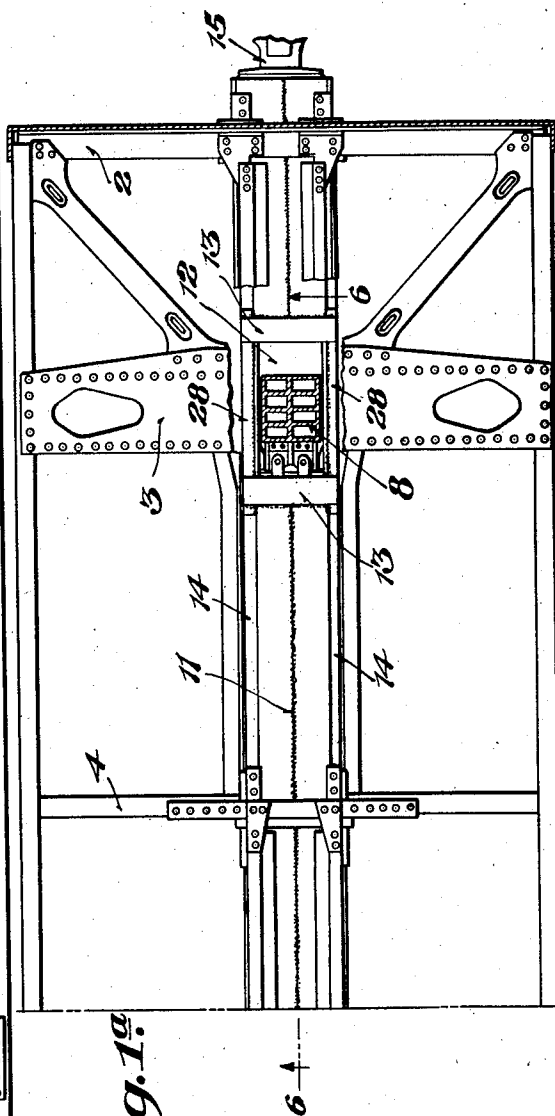


Fig. 1a.

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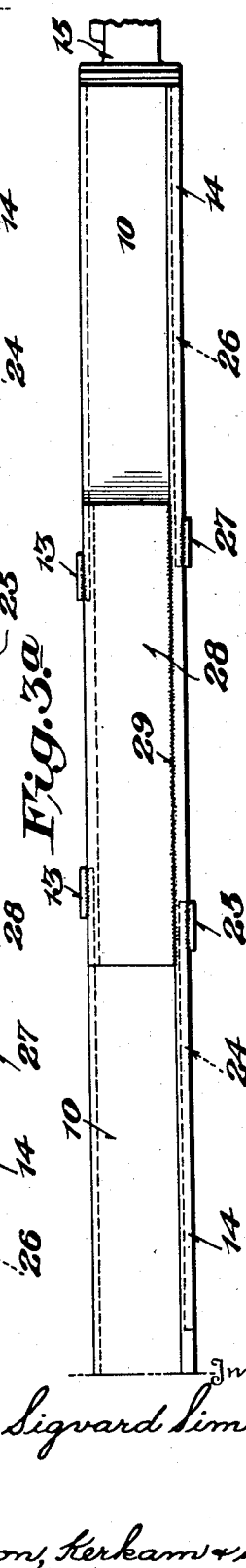
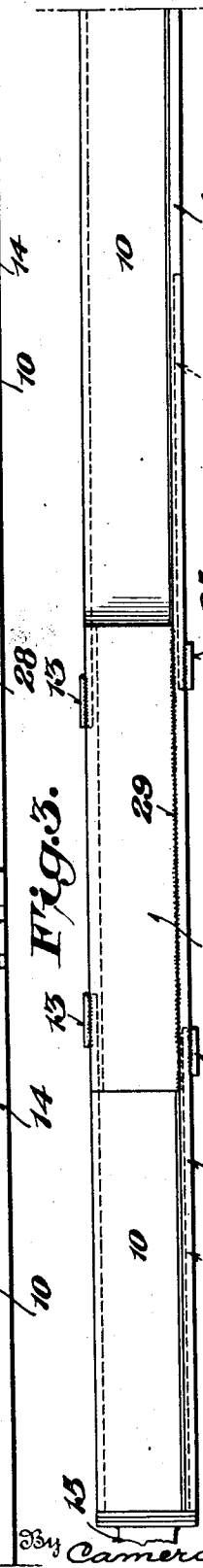
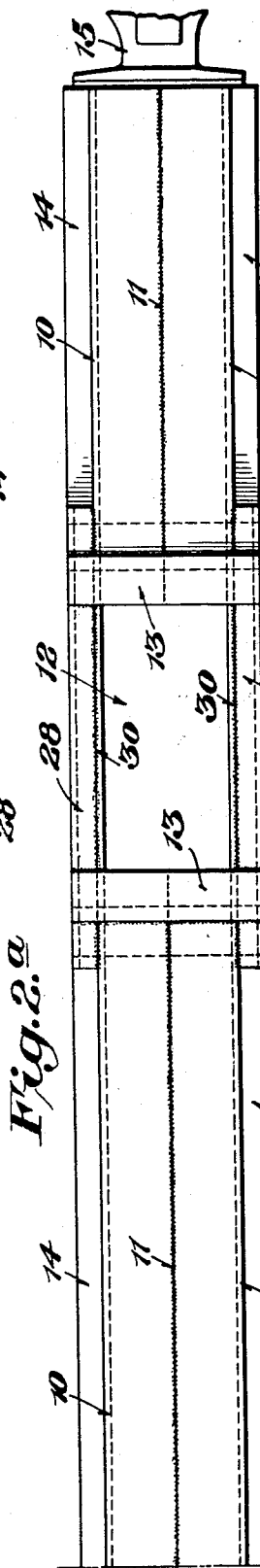
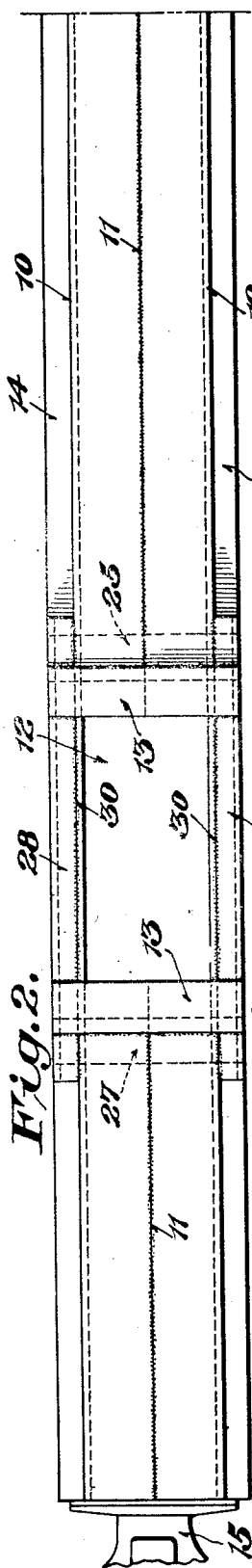
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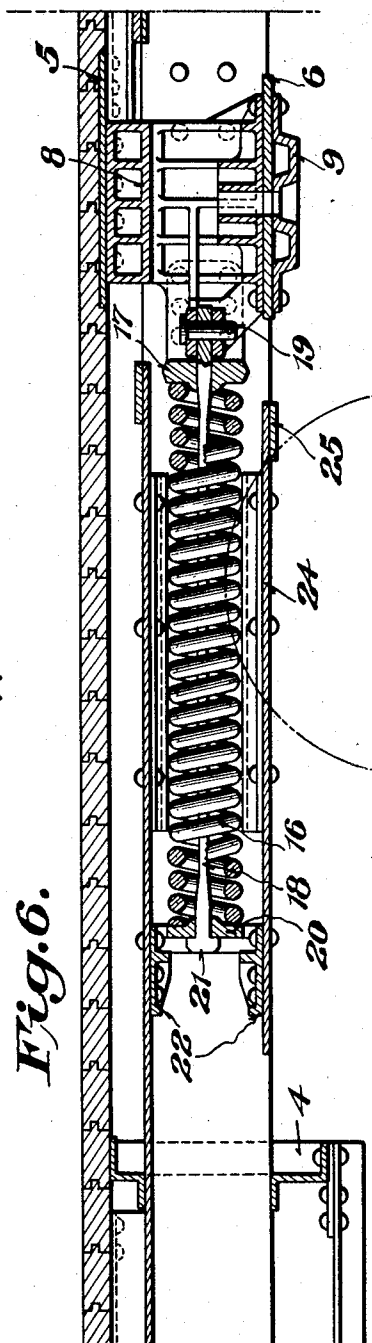
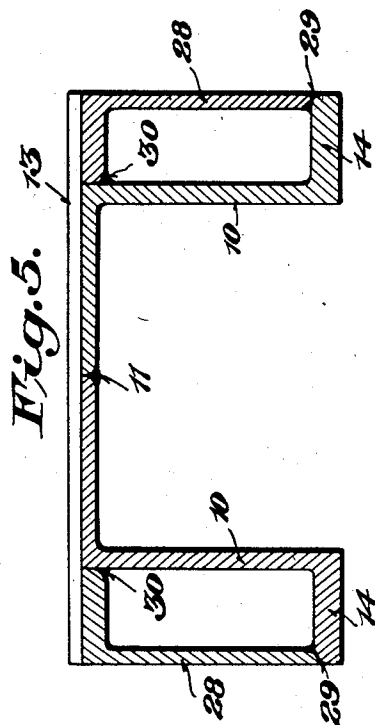
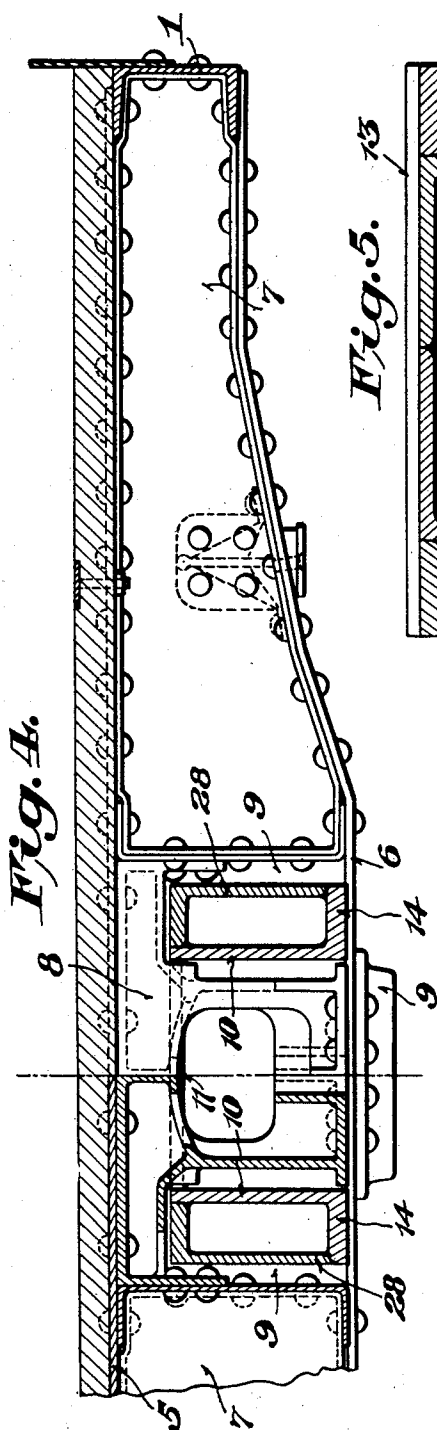
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4 Sheets-Sheet 3



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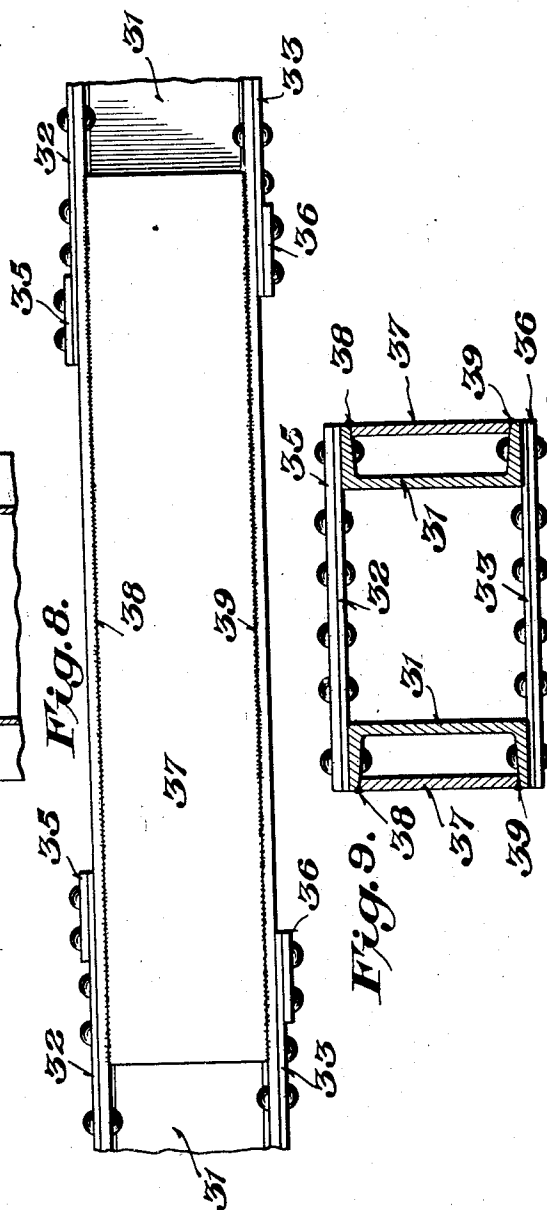
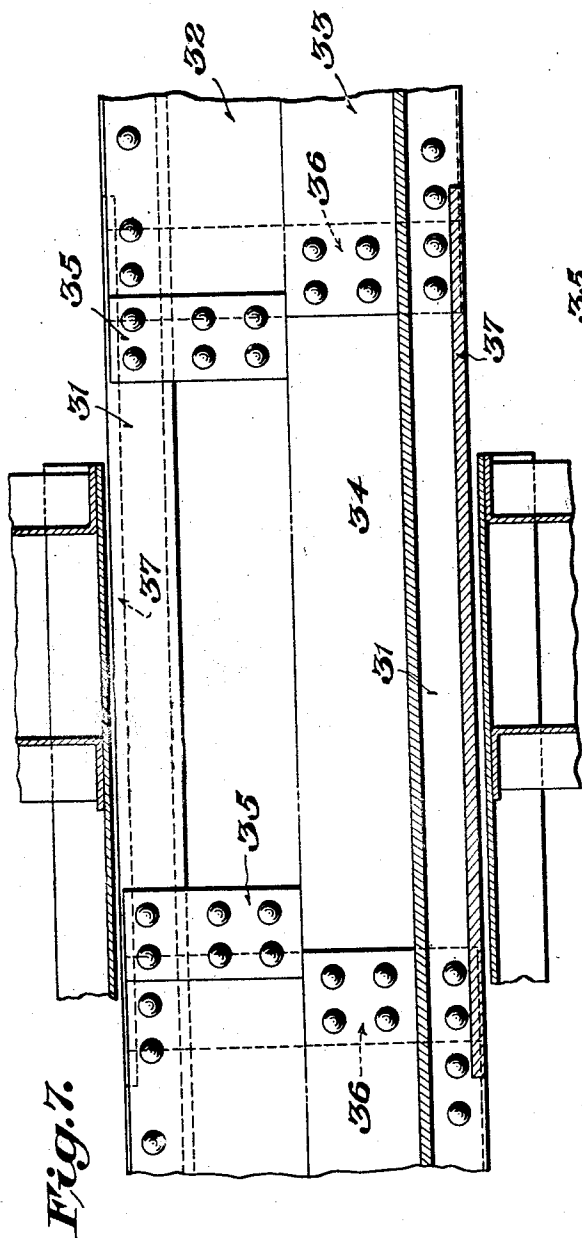
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CAR CONSTRUCTION

Filed June 4, 1932

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE

1,963,215

CAR CONSTRUCTION

Sigvard Simonson, Butler, Pa., assignor to O. C. Duryea Corporation, New York, N. Y., a corporation of Delaware

Application June 4, 1932, Serial No. 615,420

7 Claims. (Cl. 213—8)

This invention relates to car constructions of the type embodying a draft and buffing column or center member that extends substantially the length of the car structure and is mounted for longitudinal movement relative to the car structure and body bolsters.

In car constructions embodying the usual type of draft gear, energy which is transferred from one car to another as in train service or in coupling cars together is transmitted through a draft gear mounted at the end of the car structure and rigidly connected to the center sills and car body. It is desirable to increase the travel of such draft gears in order that energy absorbing capacity may be increased without excessively high forces, but at the same time there are rigid limitations on the permissible amount of train slack. With the usual draft gear, the travel of the gear limits both the train slack and the energy absorbing travel so that a compromise is necessary between the desired long travel for cushioning purposes and the desired short travel for train slack purposes.

It has been proposed heretofore, as for example in the United States patent to Otho C. Duryea, No. 1,693,194, to provide a car underframe wherein train slack and energy absorption capacity are controlled separately each to provide the most desirable operating conditions and without the necessity of compromise. The Duryea underframe embodies a center member movable relative to the car structure and body bolsters and adapted for long travel, that is, for travel materially greater than can be provided in the usual draft gear because of train slack limitations, and the car body is cushioned by suitable resilient or friction means interposed between the center member and the car structure. Train slack is controlled independently of cushioning by means including couplers mounted at the ends of the center member for limited movement of any desired extent with respect thereto whereby train slack can be reduced materially below that which can be provided by the usual draft gear wherein the travel must be kept as high as possible for energy absorption.

The usual center member of a Duryea underframe comprises a pair of spaced parallel channels which extend movably through spaced openings in the car bolsters and cross bearers and are connected together at a plurality of points by tie plates. It has been proposed heretofore, as for example in the application of Sigvard Simonson, Serial No. 549,473, filed July 8, 1931, to connect these parallel channels by a continuous cover plate extending substantially between the

car bolsters but spaced therefrom by predetermined distances which define the limits of movement of the center member. In this latter construction, the strength and rigidity of the center member between the bolsters are materially increased due to the cross-sectional form of the center member and also to the increased area of material in such cross-section. At the bolsters, however, cover plates cannot be employed because the spaced parallel channels embrace the bolster center brace casting and slide with respect thereto. Hence at the bolsters the center member has heretofore comprised only the spaced parallel channels which have been suitably guided by the center brace casting and by the bolster construction. It is an object of the present invention to improve and strengthen the center member at these points adjacent the bolsters without interfering with the usual operation of the underframe or with the bolster construction.

Moreover, the Duryea center member has heretofore been built up by riveting the cover and tie plates to the spaced channels. If a center member of this type is properly designed so as to provide plenty of rivets at the necessary points, and if careful work is done in placing the rivets, the riveted construction will operate very satisfactorily. However, surfaces of substantial area over which the members to be riveted together engage one another must be provided in order to provide room for the necessary rivets, and, furthermore, the placing of the rivets has required careful work by skilled workmen. Another object of the present invention is substantially to dispense with rivets in the construction of the center member and to provide a welded center member of novel construction having the advantages of the continuous cover plate construction referred to above.

A further object is to provide a novel center member formed by welding rolled sections together into one piece with the central portion thereof cut away at two points so that the sides embrace a portion of the bolster in the usual manner.

Another object is to provide a center member having its side portions slidably embracing a portion of the bolster, wherein the side portions adjacent the bolster are formed into hollow closed columns.

The drawings illustrate a typical Duryea underframe in which the invention has been embodied but it is to be expressly understood that said drawings are for purposes of illustration only and are not to be construed as a definition of the

limits of the invention, reference being had to the appended claims for this purpose.

In the drawings,

Figs. 1 and 1a constitute a top plan view of a complete underframe embodying the invention; Figs. 2 and 2a constitute a top plan view of the center member of this underframe;

Figs. 3 and 3a constitute a side elevation of said center member;

Fig. 4 is a section on the line 4—4 of Fig. 1; Fig. 5 is a section on the line 5—5 of Fig. 1;

Fig. 6 is a sectional view showing a portion of one bolster and a cushion gear associated therewith;

Fig. 7 is a plan view, partly in section, of another center member embodying certain features of the invention;

Fig. 8 is a side elevation of the center member shown in Fig. 7; and

Fig. 9 is a sectional view of the center member shown in Fig. 7.

Referring first to Figs. 1 and 1a, the underframe comprises interconnected side sills 1 and end sills 2. The side sills 1 are connected by bolsters at each end of the car which are indicated generally in Figs. 1 and 1a at 3, and also by one or more cross bearers indicated generally in Figs. 1 and 1a at 4. The bolsters and cross bearers may have any suitable construction, and for purposes of illustration, a suitable bolster construction is shown in detail in Figs. 4 and 6. Referring to these figures, the bolster comprises top and bottom cover plates 5 and 6 respectively which extend substantially between the side sills 1 and are connected by plates or webs 7 which extend from the side sills to points adjacent the center of the car. The cover plates, side sills and plates 7 are riveted together in any suitable manner and define at the center of the car a rectangular opening in which is a suitable center brace casting 8. The usual center plate 9 is secured to the bottom cover plate 6.

As shown in Fig. 4, the center brace casting 8 is designed to provide spaced openings between it and the inner ends of the plates 7, and the center member extends slidably through these openings, the sides of the center member embracing the central portion of the center brace casting. Preferably this center member or draft and buffing column is formed of two rolled sections of suitable form, the adjacent edges of which are welded together to form a one-piece column, and the cross-sectional form of these rolled sections is such as to provide a column having a cross-section like an inverted U and closed across the top so as to obtain the advantages of a continuous cover plate. In the form shown in Fig. 5, the rolled sections 10 have substantially Z-shaped cross-sections and their adjacent edges are brought together and welded at 11 as shown in Figs. 1 and 5 so as to form an inverted U-shaped column with a closed top. Adjacent the bolsters, the top portion of this column is cut out to provide openings 12 as shown in Figs. 1, 1a and 2, 2a through which the center brace casting extends, the sides of the column embracing the central portion of said casting and being capable of sliding relative thereto. The ends of these openings 12 are spaced from the center brace casting by predetermined amounts as shown in Figs. 1 and 1a, this spacing limiting the movement of the center member in either direction by engagement of the ends of the top portion of the center member with the center brace casting.

Preferably these ends which serve as top mem-

bers are reinforced by stop plates 13 that are welded to the ends of the top portion of the center member.

It will be seen that intermediate the bolsters the center member comprises a substantially U-shaped column having a closed top and flanges at the ends of the legs of the U. The cross-section of this column provides great strength and rigidity due to the increased area of the section and also to its form, and this is accomplished without the use of rivets. The center member is made from two rolled sections of standard form, and by the single operation of welding along the line 11. Drilling and riveting are avoided. The cross-sectional form of the column can be further improved by making the flanges 14 thicker than the other portions of the rolled sections.

Draft and buffing forces are transmitted to the column 10, 10 in any suitable manner as by the usual couplers 15 which may be connected to said column in any suitable manner. While the particular form of the coupler gears constitutes no part per se of the present invention, they may, for example, be of the type described in the copending application of Otho C. Duryea, Serial No. 460,505, filed June 11, 1930.

When a buffing blow is imparted to the center member at either end of the car body, the center member tends to move inwardly with respect to the car bolsters, and when a draft force is imparted to said center member at either end of the car body, the center member tends to be pulled outwardly relative to the car bolsters. This relative movement between the center member and the car bolsters is resisted and the car body is cushioned against draft and buffing forces by means of a suitable cushioning gear which may have, for example, the form shown in Fig. 6. Referring to this figure, a coiled spring or springs 16 are positioned in the center member adjacent the bolster, said springs bearing at one end against a follower plate 17 which normally abuts against the center brace casting 8. A link 18 that is pinned at 19 to the center brace casting extends movably through the follower plate 17 and spring 16 and also through a follower plate 20 at the inner end of the spring 16, said link being provided with an enlarged head 21. When a draft force is applied to the center member, it tends to move from left to right as seen in Fig. 6 whereupon suitable stops 22 that are secured to the center member in any suitable way engage the follower plate 20 and compress the spring or springs 16 against the follower plate 17 and center brace casting 8. When a buffing force is applied to the center member, it tends to move from right to left and suitable stops 23 (Figs. 1 and 1a) that are secured in any suitable way to the sides of the center member adjacent the bolsters engage the follower plate 17 and compress the spring or springs 16 against the follower plate 20 which is now held stationary by virtue of the link 18. Thus movement of the center member in either direction relative to the car body and bolsters is cushioned by the resilient cushioning gear. It will be understood that the same or a similar cushioning gear or suitable friction means may be employed at the opposite end of the car structure and that the particular form of these cushioning gears constitutes no part per se of the present invention.

Preferably the center member is closed at its bottom adjacent the cushioning gears in order to form a housing for the same, and to this end

plates 24 (Figs. 3 and 6) are secured to the members 10, 10 in any suitable manner as by welding. The ends of these plates 24 that are adjacent the bolsters may serve as additional stop means for limiting the movement of the center member and may be reinforced by stop plates 25 secured thereto in any suitable manner as by welding. Preferably the ends of the center member beyond the bolsters are also closed at their bottoms to form housings for the coupler gears, and to this end plates 26 (Figs. 3 and 3a) are secured to the members 10, 10 in any suitable manner as by welding, the ends of these plates adjacent the bolsters being reinforced by stop plates 27 preferably welded thereto.

Means are also provided for strengthening the center member adjacent the bolsters, since at these points the top portion of the center member is cut away to form the openings 12 as explained above. To this end angle members 28 (Figs. 2, 3 and 5) are secured to the outer sides of the members 10, 10, as by welding along the lines 29 and 30. As shown in Figs. 2 and 3, these members 28 extend on either side of the bolster openings 12 and overlap somewhat the ends of the top portion of the center member. Accordingly, adjacent the bolsters the center member is constituted by a pair of spaced hollow columns of closed substantially rectangular cross section. This construction is obtained without the use of rivets, and as clearly shown in Fig. 4, these spaced hollow columns pass slidably through the spaced openings in the bolster and embrace the center brace casting 8 without interfering in any way with the usual operation of the underframe or the usual construction of the bolster.

Figs. 7 to 9, inclusive, illustrate a center member of the type disclosed in the aforesaid Simonson application which comprises a pair of spaced parallel channels 31 provided with a riveted top cover plate 32 and, if desired, with a similar riveted bottom cover plate 33. These cover plates 32 and 33 also terminate at predetermined distances from each bolster, leaving openings 34, and the ends of the cover plates may be reinforced by stop plates 35 and 36 preferably riveted thereto. In accordance with the present invention, the center member is provided adjacent the bolster openings 34 with plates 37 that are interposed between the flanges of the channels 31 and are welded thereto along the lines 38 and 39. Hence this construction, like that described above, provides adjacent the bolsters two spaced hollow columns of closed substantially rectangular cross section which columns embrace the center brace casting and are capable of sliding with respect thereto. The plates 37 extend the length of the bolster openings 34 and overlap the ends of the cover plates 32 and 33 as clearly shown in Figs. 7 and 8. The operation of this center member with respect to the bolster is substantially the same as illustrated in Fig. 4, the spaced hollow columns passing slidably through the spaced bolster openings without interfering in any way with the bolster construction or with the usual operation of the underframe.

It will be understood that the invention is not restricted to the specific forms illustrated in the drawings and described above. For example, the spaced hollow column construction adjacent the bolsters may be used with other types of underframe, and either with the built-up riveted center member of Figs. 7 to 9 or with the welded center member of Figs. 1 to 6. Moreover, the welded construction of the center member as shown in

Figs. 1 to 6, may be employed without the use of the additional angles 28 adjacent the bolsters. The type and construction of the bolsters, center brace castings, cushioning gears, coupler gears, and other elements shown in the drawings may also be varied in particular cases without departing from the spirit of the invention. Reference is therefore to be had to the appended claims for a definition of the limits of the invention.

What is claimed is:

1. In a car structure, in combination with the car bolsters, a draft and buffing column extending substantially the length of the car structure and mounted for longitudinal movement relative to the bolsters, said column comprising a pair of parallel angle members having their adjacent edges welded together to form an inverted substantially U-shaped column, the top portion of the column being cut away at each bolster to provide an opening through which a portion of the bolster extends, and members secured to said parallel angle members and forming therewith closed hollow columns extending on either side of each of said bolsters.

2. In a car structure, in combination with the car bolsters, a draft and buffing column extending substantially the length of the car structure and mounted for longitudinal movement relative to the bolsters, said column comprising a pair of parallel angle members having their adjacent edges welded together to form an inverted substantially U-shaped column, the top portion of the column being cut away at each bolster to provide an opening through which a portion of the bolster extends, and other angle members welded to the outer sides of said first-named angle members and extending on either side of said bolsters, said angle members forming closed hollow columns slidably embracing said bolster portions.

3. In a car structure, in combination with the car bolsters, a draft and buffing column extending substantially the length of the car structure and mounted for longitudinal movement relative to the bolsters, said column comprising a pair of parallel Z-shaped members having their adjacent edges welded together to form an inverted substantially U-shaped column, the top portion of the column being cut away at each bolster to provide an opening through which a portion of the bolster extends, angles welded to the outer sides of said Z-shaped members and extending on either side of said bolsters, said angles and members forming closed hollow columns slidably embracing said bolster portions, and reinforcing plates welded to said top portion at the edges of said openings, said reinforced edges limiting the movement of the column by engagement with said bolsters.

4. In a car structure, in combination with the car bolsters, a draft and buffing column extending substantially the length of the car structure and mounted for longitudinal movement relative to the bolsters, said column comprising at each bolster a pair of spaced parallel members slidably embracing a portion of the bolster and members secured to said spaced parallel members adjacent one of the bolsters and forming therewith closed hollow columns extending on either side of said bolster.

5. In a car structure, in combination with the car bolsters, a draft and buffing column mounted for movement relative to the car bolsters, said column comprising at each bolster a pair of spaced parallel members slidably embracing a portion of the bolster and members welded to

each of said spaced parallel members and extending on either side of the bolsters, said members forming a pair of closed hollow columns of rectangular cross section slidably embracing said
5 bolsters.

6. In a car structure, in combination with the car bolsters, a draft and buffing column mounted for movement relative to the bolsters, said column comprising spaced parallel members slidably embracing portions of said bolsters and connected
10 by a closed top portion extending substantially continuously between the bolsters and beyond the bolsters, said top portion terminating on each side of the bolsters at a predetermined distance therefrom to limit positively the extent of
15 movement of said column, stop plates secured to the ends of said top portion adjacent the bolsters,

and members secured to said spaced parallel members and forming therewith closed hollow columns on each side of said bolsters, said closed hollow columns extending between and overlapping the ends of said top portion.

7. In a car structure, in combination with the car bolsters, a draft and buffing column mounted for movement relative to the car bolsters, said column including a pair of spaced channel members slidably embracing portions
85 of said bolsters and plates secured between the flanges of said channel members and forming therewith closed hollow columns on either side of said bolster portions, said plates each extending on either side of the adjacent bolster.

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35	110
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50	125
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60	135
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75	150