

June 3, 1941.

W. F. DIETRICHSON

2,244,518

BOLSTER CENTER FILLER AND DRAFT GEAR STOP

Filed May 1, 1940

2 Sheets-Sheet 1

Fig. 1.

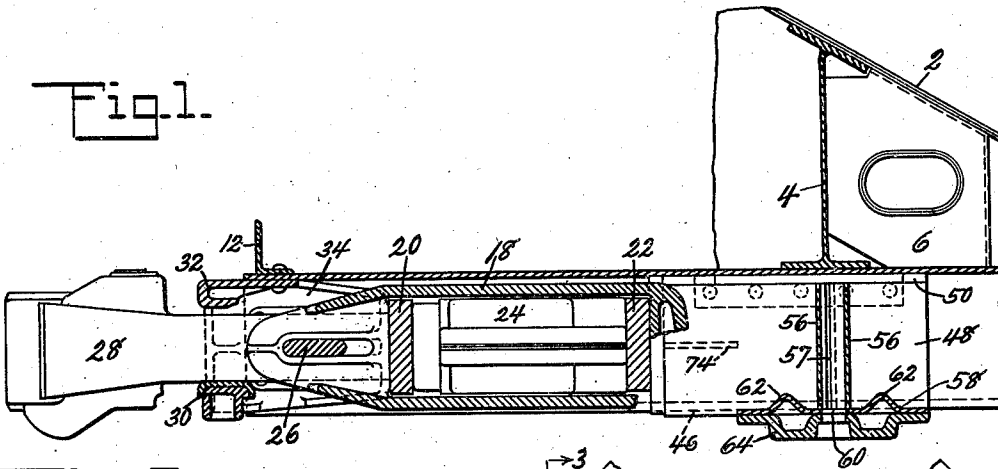


Fig. 2.

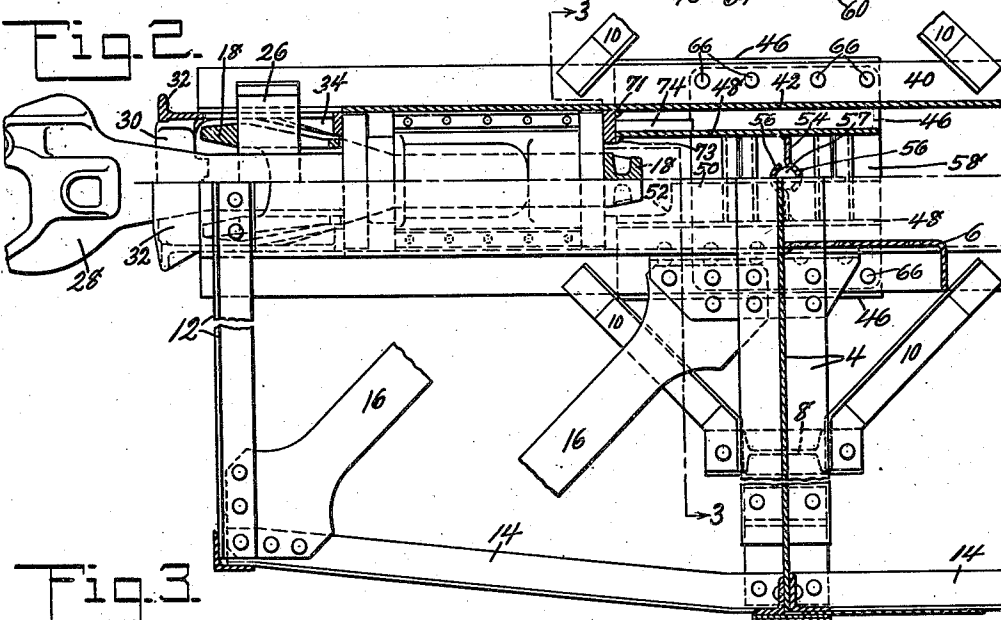
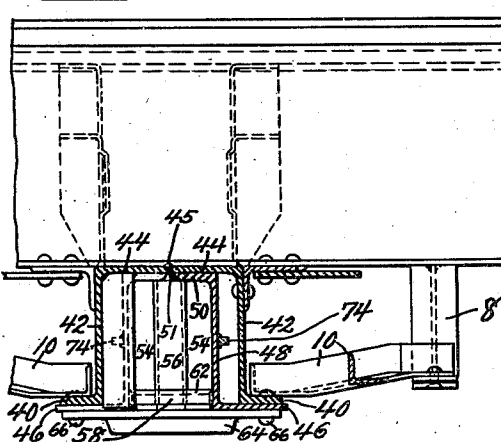


Fig. 3.



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Fig. 4.

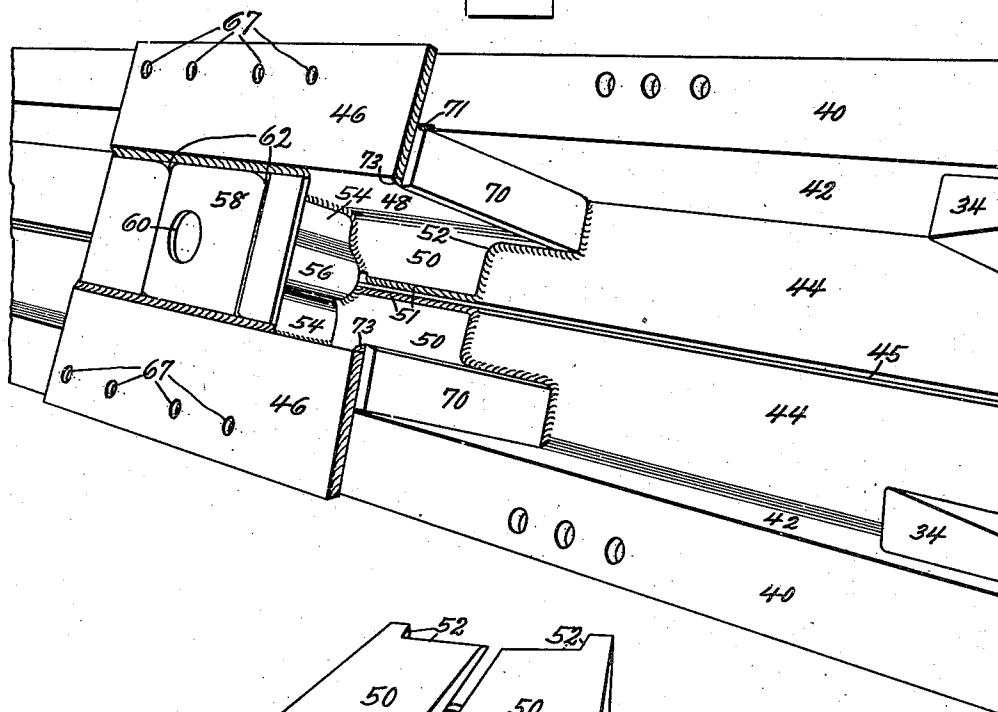
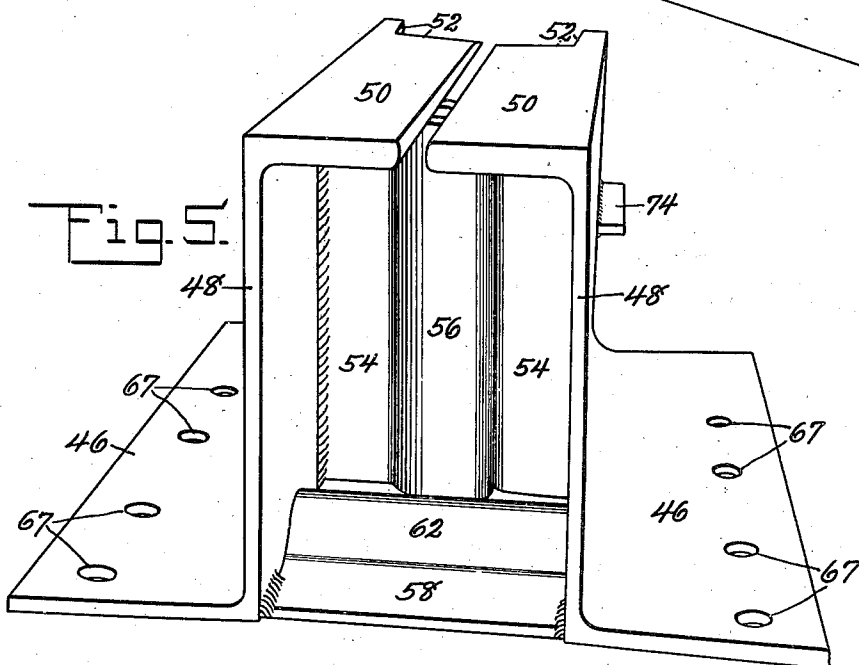


Fig. 5.



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BOLSTER CENTER FILLER AND DRAFT GEAR STOP

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Application May 1, 1940, Serial No. 332,669

22 Claims. (Cl. 105-420)

This invention relates to underframes for railway cars in general and in particular to that portion of the frame adjacent the truck center bearings and bolster.

Since the beginning of steel car construction bolster center fillers have been made practically without exception of castings and in order to simplify the construction and at the same time strengthen the framing, the bolster center filler and rear draft stops have been combined into a single casting. Such castings are of necessity extremely heavy and involve considerable expense in machining to remove the irregularities of the casting and obtain a perfect fit with the center sill and for the draft gear stops. Recently the trend has been toward welded assemblies in which the casting has been in effect broken down into a plurality of separate steel plates welded together to form an integral structure substantially identical with the casting. With such a welded construction the weight will be approximately half of the casting structure with the cost reduced not quite half. The strength presumably is retained the same although there can be no certainty since defects in welding and unequal distribution of stresses may cause failure even though the parts are made of metal having a higher unit strength. It has been discovered that by proper rearrangement of metal and by taking full advantage of commercial rolled sections, the cost may be materially reduced although the weight may be slightly increased over the all-welded construction, but will be materially reduced from the all-cast construction. For example, the AAR type of cast center filler and rear draft lug weighs approximately 650 pounds machined per car and at present costs roughly \$70.00; while the all-welded construction, dependent upon its design, will weigh approximately 400 pounds and cost in the neighborhood of \$40.00 per car. By proper use of rolled metal, as will later be disclosed, the weight may be reduced to the neighborhood of 525 pounds and at a total cost of \$32.00 per car. These prices necessarily include the cost of application to the center sill; in other words, to a structure ready for use in a car. It will be seen, therefore, that one of the objects of the invention is the provision of an improved bolster center filler and draft gear stop that may be easily fabricated from rolled sections with a minimum of welding.

A further object of the invention is the provision of a combined bolster center filler and draft gear stop which may be readily applied

to the center sill structure and produce an arrangement of increased strength;

A still further object of the invention is the provision of a bolster center filler and draft gear stop formed of the same metal as the center sills and fastened thereto with a minimum of welding, thereby minimizing the distortion and internal stresses.

These and other objects of the invention will be apparent to persons skilled in the art from a study of the following description and accompanying drawings, in which:

Figure 1 is a sectional view taken through one end of the underframe substantially at the longitudinal center line thereof;

Fig. 2 is a plan view of the construction shown in Fig. 1 with parts in section to better disclose the construction;

Fig. 3 is a transverse sectional view through the center sill and taken substantially on line 3-3 of Fig. 2;

Fig. 4 is a bottom perspective view of the center filler arrangement applied to the center sills; and

Fig. 5 is a rear upper perspective view of the center filler unit ready for application to the center sills.

Referring now to the drawings in detail, it will be seen that the improved bolster center filler and draft gear stop arrangement has been applied to a car of the hopper type having the new AAR welded Z center sill. It will, of course, be obvious that the center sill arrangement has been applied to such a sill and car merely for illustrative purposes for it is equally applicable to center sills of other types such as those shown in Figures 521 and 538 of pages 379 and 388 respectively of the Car Builders' Encyclopedia for 1937. It will be equally obvious that by slight modifications in the form of the center filler and back stop arrangement, it may be used for horizontal yoke draft gears of types similar to that shown in Figure 539, page 388, of the 1937 Car Builders' Encyclopedia.

As above stated, the improved bolster center filler and draft gear stop has been applied to a hopper type car having end slope sheets 2, supported upon bolster 4 resting upon and secured to the center sill structure. Customary gussets 6 are used to brace the center sill and assist in the support of the slope sheets. As clearly shown, the bolster is disposed entirely above the center sill structure with side bearings being provided by vertical I-beams 8 welded to the bolster and braced to the center sill by diverging angles 10.

The usual end sill 12 is provided connected at its ends to the ends of side sills 14 and braced by diagonal braces 16. The center sill structure has mounted therein between the bolster and the ends of the sill a draft gear of the vertical yoke type having yoke 18, front follower 20 and rear follower 22 separated by any suitable type of resilient unit 24. The vertically disposed yoke is connected by draft key 26 to the shank of any approved type of coupler 28. The coupler shank is supported upon the carry iron 30 which is formed as part of the striker casting 32, which is connected to the ends of the center sills. Front stops 34 of either cast or drop forged construction are attached to the center sill structure to limit outward movement of the front followers.

As clearly shown, the center sill structure is made up of two Z-bar members having short flanges 40, vertical webs 42 and a comparatively long flange 44. In forming the center sill these long upper flanges are placed in edge to edge relation and welded together as at 45, thus forming a downwardly opening flange channel center sill with the short flanges disposed at the lower edge and directed away from each other. The combined bolster center filler and draft gear stop is formed by using short center sill sections preferably cut from the center sills themselves in order that dimensional inaccuracies of rolling will not interfere with fabrication, although in practice it is found that such inaccuracies are very small and do not interfere with assembly or fabrication of the units. In forming the bolster center filler and rear draft gear stop, the short center sill elements are positioned with the long flange 46 downwardly and positioned beneath the short flange 40 of the center sill. The webs 48 of the short sections will thus be disposed vertically in spaced relation and parallel to the webs of the center sills, while the short flanges 50 will underlie and be in contact with the top of the center sill formed by the long flanges 44. The spacing between short flanges 50 of the bolster center filler elements is so regulated as to permit the edges to be welded to the top portion of the center sill as at 51, while at the same time causing the long flange 46 to project slightly beyond the edge of the short flange 40, as clearly shown in Fig. 3, in order to provide a ledge to more readily permit welding together of the flanges 46 and 40. As clearly shown in Figs. 2 and 4, a short portion of each flange 50 is cut away as at 52 in order to accommodate the vertically disposed yoke of the draft gear and the edges of this cut away portion are securely welded to the top of the center sill. It is, of course, obvious that if a horizontal yoke draft gear is to be used, this cutting away of the flanges will not be necessary. In order to provide space for reception of the truck center pin, short plates 54 are provided having the inner ends pressed with a semi-circular corrugation 56 adapted to be disposed in overlapping relation with the similar corrugation of the adjoining plate to provide a vertically extending hole 57, as clearly shown in Figs. 1 and 2. The top and side edges of these plates are welded or otherwise secured to the webs and short flanges 50 of the center filler element. The lower edges of these center pin receiving plates bear upon the upper surface of a tie and bearing plate 58 extending between and securely welded to the lower edges of the vertically extending webs 48. This combined tie and bearing plate is formed with a central opening 60 adapted to receive

the center pin and with transversely extending corrugations 62 which serve to stiffen the plate and to give increased bracing effect between the webs 48, previously referred to. As clearly shown in Figs. 1 and 3, the center bearing bowl 64 receives the load from the flanges 48 as well as from the combined tie and bearing plate 58 and is securely fastened to the bolster center filler and center sills by means of rivets 66 extending through the bowl center sill flanges and flange 46 of the bolster center filler. For this purpose a plurality of holes 67 are punched or otherwise formed in the edges of the flanges 46. In order to provide increased bearing area for the back followers, back stop plates 70 are provided having one edge welded directly to the web of the center sill as indicated at 71 in Fig. 2, while the other edge is welded as at 73 to the ends of the webs 48 of the bolster center filler elements. To relieve the weld 71 of some of the strain and to brace the webs 48, short ribs 74 are welded to the webs 48 centrally thereof and as near as possible in a position centrally behind the rear followers. These ribs have their front edge in direct bracing engagement with the back stops 70 and will, as previously stated, relieve the weld 71 of some strain and prevent distortion of the web 48 or of the back stops 70. It will further be apparent that the plates 54 constitute additional bracing means for the back stops 70 and the webs 48; said bracing means 54 and 74 being so arranged in the structure as to absorb, to a large amount, the buffing shock transmitted to the back stops 70, thus correspondingly reducing the direct transmission of said shock from the back stop 70 to the center sill webs 42.

In assembling the center filler and draft gear stop, the parts will be preferably welded together to form a unit as shown in Fig. 5, while the back stop 70 will be welded in proper position on the center sill, after which the unit as shown in Fig. 5 will be brought into position and welded to the back stops and to the center sill structure as shown in Fig. 4. With the parts in this condition, the center bowl may be applied by driving the rivets connecting the flanges of the center sill and bolster center filler together. It is, of course, obvious that if a different type of bolster is used, it may be necessary to use a bottom cover plate, but in any case this would not affect the construction or arrangement of the bolster center filler just described. In case the draft gear of the horizontal yoke type is to be used, then the back stops 70 will either be joined together to form a solid wall or a single solid plate will be inserted taking the place of the two plates 70.

From the preceding description it will be seen that the combined bolster center filler and draft gear stop is formed entirely of commercial rolled sections and plates connected together with a minimum of welding and the unit joined to the center sill with a minimum of welding disposed so as to take full advantage of the strength of the weld. In other words, all of the welds joining the unit to the sills will act in shear. It would be impossible to distort the back stops 70 since they are backed up by the full depth and length of the flanges 48 as well as by ribs 74. It will be apparent that there is no machine work at all and that the number of pieces has been reduced to a minimum, thus materially reducing the cost of the unit while producing a unit which may be readily applied.

While the construction has been described more or less in detail, it is obvious that various modifications, other than those shown and described, will suggest themselves to persons skilled in the art, but all such modifications and rearrangements of parts are contemplated as will fall within the scope of the appended claims defining my invention.

What is claimed is:

1. In a car underframe including a continuous channel shaped center sill having spaced apart webs and bolster members secured to the center sill inwardly of its end, draft gear back stops secured to the sill webs, and bracing means secured to said back stops and the head portion of said center sill but arranged in spaced relation to the center sill webs whereby to reduce transmission of local strains directly from said back stops to said center sill webs.
2. In a car underframe including a continuous center sill having a top portion connecting together spaced apart webs which merge into lower flanges, bolster members secured to the sill inwardly of the ends thereof, draft gear back stops secured to the sill webs between the bolster and adjacent sill ends, and back stop bracing means secured only to the back stops and to the sill top portion and lower flanges, said bracing means being so formed and arranged as to absorb a portion of the buffing shocks to which the back stops are subjected to reduce the direct transmission of buffing shock to the webs of the center sill.
3. In a car underframe including a continuous center sill having a top portion connecting together spaced apart webs which merge into lower flanges, bolster members secured to the sill inwardly of the ends thereof, draft gear back stops secured to the sill webs between the bolster and adjacent sill ends, and back stop bracing means secured to the back stops and to the sill top portion and lower flanges, said bracing means being located in spaced relation to said center sill webs and free of attachment thereto excepting through said back stops.
4. In a car underframe including a flanged channel center sill formed by Z bars each having long and short flanges, with the long flanges secured together to form the sill top portion and with the short flanges directed outwardly to provide the sill flanges at the lower edges of the sill webs, draft gear back stops secured to the sill webs inwardly of the sill ends, and back stop bracing means of flanged channel form secured to the back stops and to the flanges of the sill forming Z bars, said bracing means being formed of Z bars each having long and short flanges, with the short flanges directed toward each other and secured to the sill top portion and with the long flanges directed outwardly and secured to the short lower flanges of the center sill.
5. In a car underframe including a flanged channel center sill formed by Z bars each having long and short flanges, with the long flanges secured together to form the sill top portion and with the short flanges directed outwardly to provide the sill flanges at the lower edges of the sill webs, draft gear back stops secured to the sill webs inwardly of the sill ends, and back stop bracing means of flanged channel form secured to the back stops and to the flanges of the sill forming Z bars, said bracing means being formed of Z bars substantially identical to the sill forming Z bars but with the short flanges directed toward each other and secured to the sill top portion thereby placing the webs of the bracing means in spaced relation to the sill webs.
6. In a car underframe including an inverted flanged channel center sill having spaced apart substantially vertical webs, an inverted flanged channel back stop bracing means having substantially vertical webs spaced apart a distance substantially less than the spacing of said center sill webs to provide spaces between the adjacent webs, said bracing means being secured to the center sill with the outer ends spaced inwardly of the sill ends, and draft gear back stops secured to said sill and bracing means and closing the space between the adjacent webs.
7. In a car underframe including an inverted flanged channel center sill having spaced apart substantially vertical webs, an inverted flanged channel back stop bracing means having substantially vertical webs spaced apart a distance substantially less than the spacing of said center sill webs to provide spaces between the adjacent webs, said bracing means being secured to the center sill with the outer ends spaced inwardly of the sill ends, and draft gear back stops secured to said sill and bracing means and closing the space between the adjacent webs, said back stops being additionally braced intermediate their ends by buttressing members secured to the outer surfaces of the webs of said back stop bracing means.
8. In a car underframe including an inverted flanged channel center sill having spaced apart substantially vertical webs, an inverted flanged channel back stop bracing means having substantially vertical webs spaced apart a distance substantially less than the spacing of said center sill webs to provide spaces between the adjacent webs, said bracing means being secured to the center sill with the outer ends spaced inwardly of the sill ends, and draft gear back stops secured to said sill and bracing means and closing the space between the adjacent webs, said back stops being additionally braced by buttressing members secured to one of said adjacent webs and located in the space therebetween.
9. In a car underframe adapted to be supported on trucks and including a center sill having a top portion connecting together spaced apart webs, center bearings for supporting the sill, combined center filler and back stop bracing means secured to the sill and having spaced webs spaced inwardly of said sill webs to provide rectangular cavities between the adjacent webs, back stops secured to said bracing means and sill webs and closing one end of said cavities, and plate means connected to the webs of said bracing means above said center bearings and providing an opening in alignment with the axis of the adjacent center bearing.
10. In a car underframe adapted to be supported on trucks and including a center sill having a top portion connecting together spaced apart webs, center bearings for supporting the sill, combined center filler and back stop bracing means secured to the sill and having spaced webs spaced inwardly of said sill webs to provide rectangular cavities between the adjacent webs, back stops secured to said bracing means and sill webs and closing one end of said cavities, and plate means connected to the webs of said bracing means above said center bearings, said plate means each having the inner ends formed with opposed semi-cylindrical depressions and together forming a cylindrical opening with the

axis thereof substantially in alignment with the axis of the adjacent center bearing.

11. In a car underframe adapted to be supported on trucks and including a center sill having a top portion connecting together spaced apart webs, center bearings for supporting the sill, combined center filler and back stop bracing means secured to the sill and having spaced webs spaced inwardly of said sill webs to provide rectangular cavities between the adjacent webs, back stops secured to said bracing means and sill webs and closing one end of said cavities, plate means connected to the webs of said bracing means above said center bearings and providing an opening in alignment with the axis of the adjacent center bearing, and additional plate means connecting said first named plate means and the lower edge of the webs of said bracing means, said additional plate means overlapping and bracing said center bearing intermediate the webs of said back stop bracing means.

12. As an article of manufacture a combined center filler and draft gear back stop for car center sills having spaced apart webs and comprising short unsymmetrical Z bars secured together to form an inverted flanged channel having webs spaced apart a distance substantially less than the spacing between the center sill webs, and draft gear back stops overlapping an end of the Z bar webs and being secured thereto and extending laterally of the webs a sufficient distance to contact the center sill webs.

13. As an article of manufacture a combined center filler and draft gear back stop for car center sills having spaced apart webs and comprising short unsymmetrical Z bars secured together to form an inverted flanged channel having webs spaced apart a distance substantially less than the spacing between the center sill webs, draft gear back stops overlapping an end of the Z bar webs and being secured thereto and extending laterally of the webs a sufficient distance to contact the center sill webs, and buttress means secured to the webs of said Z bars and supporting the central portions of the lateral extensions of said back stops.

14. As an article of manufacture a combined center filler and draft gear back stop for car center sills having spaced apart webs and comprising short unsymmetrical Z bars having vertical webs and short flanges directed toward each other, plate means securing said Z bars together to form an inverted flanged channel having the webs thereof spaced apart a distance substantially less than the spacing between the center sill webs, and draft gear back stops overlapping an end of the webs and being secured thereto and at least one of the flanges of the Z bars and extending laterally outward of the webs a sufficient distance to contact the center sill webs.

15. As an article of manufacture a combined center filler and draft gear back stop comprising short unsymmetrical Z bars secured together to form an inverted channel having spaced apart webs, and draft gear back stops overlapping an end of the Z bar webs and being secured thereto and extending laterally outward of the webs.

16. As an article of manufacture a combined center filler and draft gear back stop comprising short unsymmetrical Z bars secured together to form an inverted flanged channel having spaced apart webs, draft gear back stops overlapping

an end of the Z bar webs and being secured thereto and extending laterally outward of the webs, and buttress means secured to the webs of said Z bars and supporting the central portions of the lateral extensions.

17. As an article of manufacture a combined center filler and draft gear back stop comprising short unsymmetrical Z bars having vertical webs and short upper flanges directed toward each other, plate means securing said Z bars together to form an inverted flanged channel having spaced apart webs, and draft gear back stops overlapping an end of the webs and being secured thereto and to at least one of the flanges of the Z bars, said back stops extending laterally outward of the webs of the Z bars.

18. As an article of manufacture a combined center filler and draft gear back stop support comprising short unsymmetrical Z bars secured together to substantially form an inverted flanged channel having spaced apart webs and having the long flanges of the Z bars directed laterally outwardly away from each other, and a rigid member secured to the web of each Z bar and arranged substantially parallel to the Z bar flanges and constituting bracing elements for the Z bar webs.

19. In a car underframe, interfitted inner and outer channel sections secured together at the head portions thereof with the webs thereof arranged in spaced relation, and spaced means extending between and connecting the adjacently arranged channel webs and constituting back stops.

20. In a car underframe, an outer channel section including spaced web portions, an inner channel section arranged within said outer channel section and secured thereto and having spaced webs spaced respectively from the adjacent webs of the outer channel section, back stops connecting the webs of the outer channel section with the adjacent webs of the inner channel section, and means for reducing the amount of shock transmitted from the back stops directly to the webs of the outer channel section comprising rigid members extending between and connecting the webs of the inner channel section, and rigid bracing means secured to the webs of the inner channel section and located between said inner channel section and said outer channel section.

21. In a car underframe including an inverted channel center sill having spaced apart webs, back stops secured to said webs, and bracing means for said back stops comprising an inverted channel member having the webs and top portion thereof arranged within the center sill and its flanges and top portion directly connected to the center sill and the web portions thereof spaced from the center sill webs but connected to said back stops.

22. As an article of manufacture, a combined center filler and draft gear back stop support comprising spaced Z bars, spaced plate members extending between and connecting the webs of said Z bars to form a flanged channel section having parallel spaced apart webs, said plate members having adjacently arranged arcuate portions formed therein to define a king pin opening, and draft gear back stops overlapping the ends of the Z bar webs and secured thereto and extending laterally outward of the webs.

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