April 30, 1935. A. CAMPBELL 1,999,652

UNDERFRAME CONSTRUCTION FOR RAILWAY CARS

Filed March 25, 1932 3 Sheets-Sheet 1

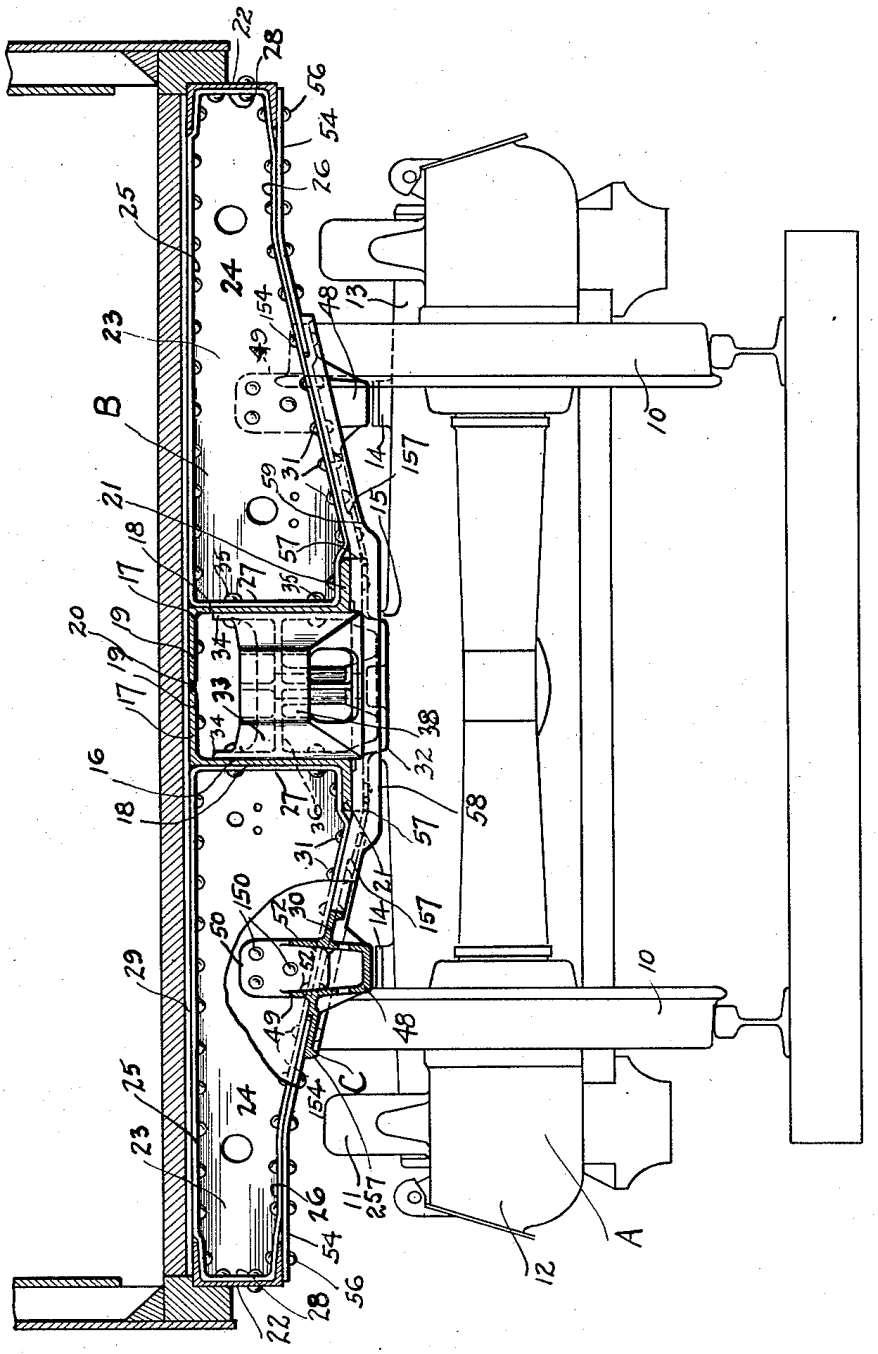

Fig-1

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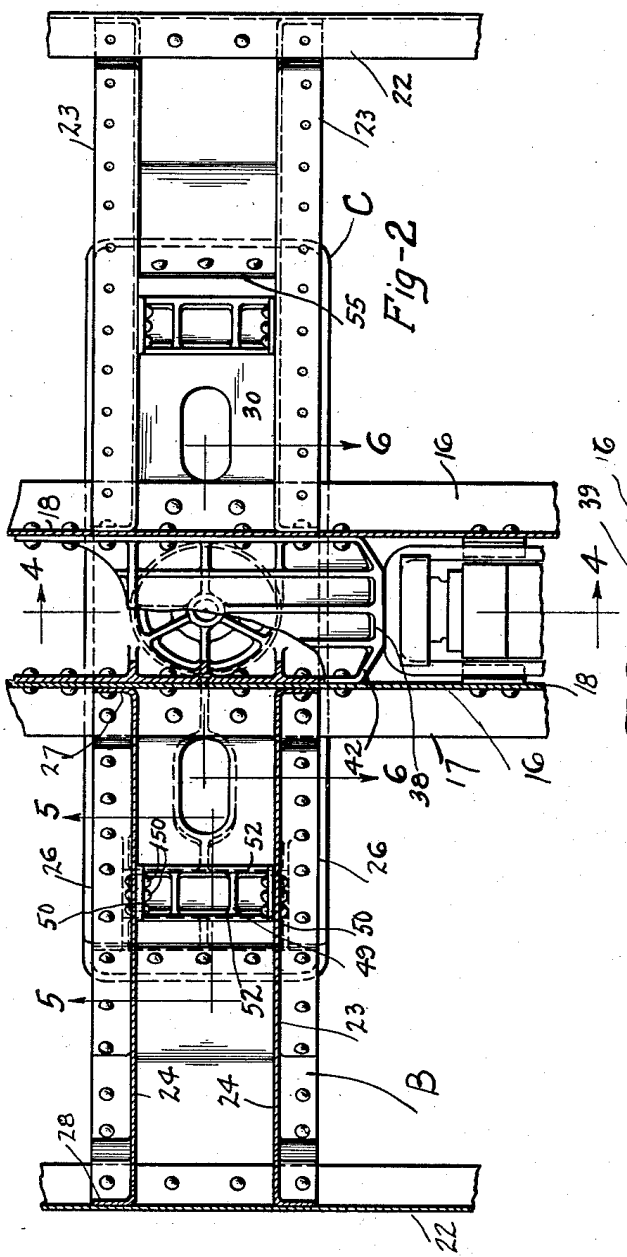

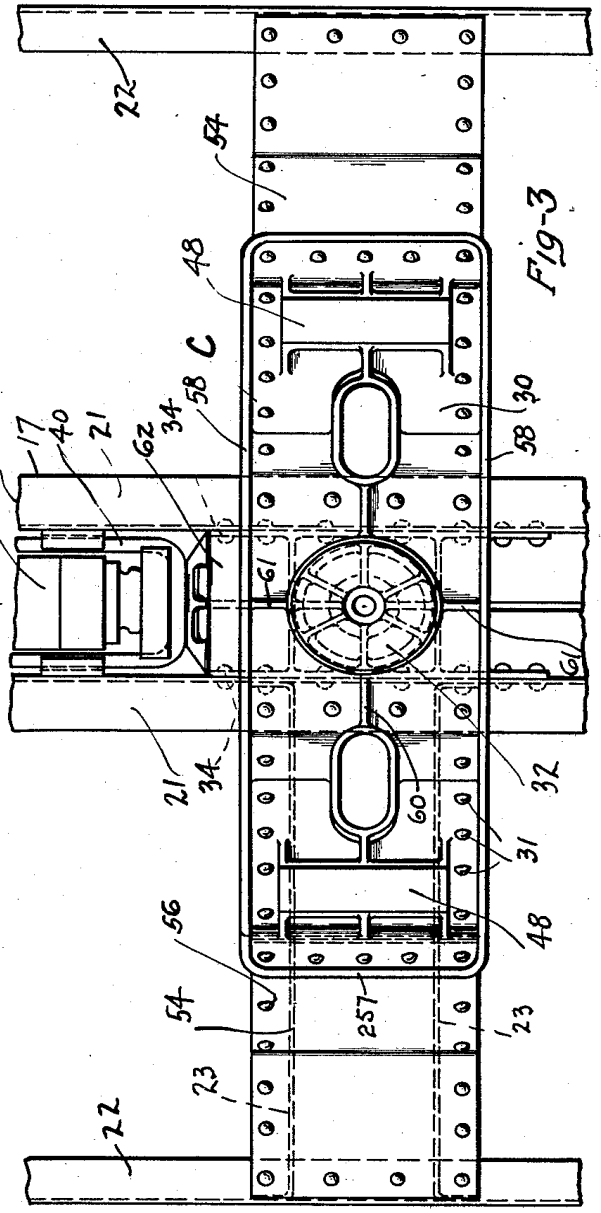

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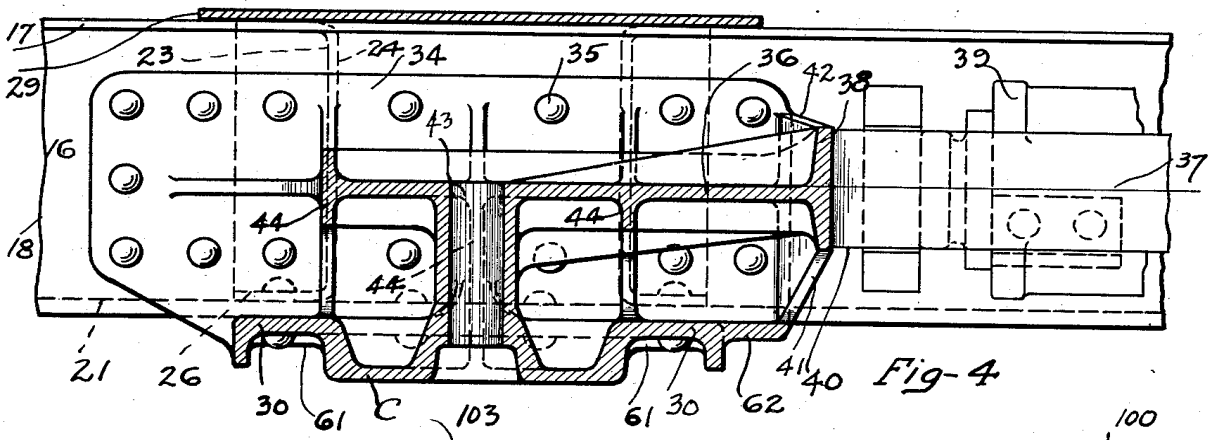

Fig-4

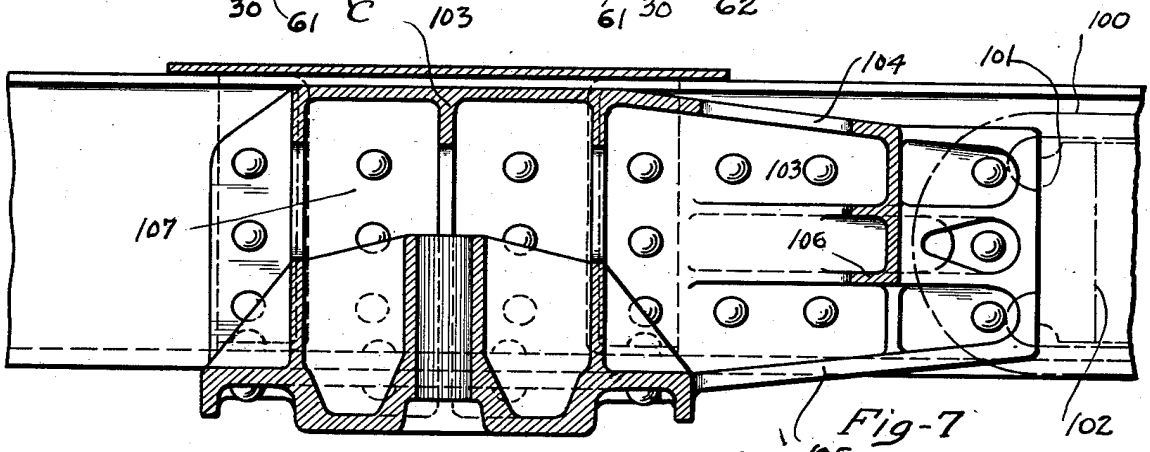

Fig-7

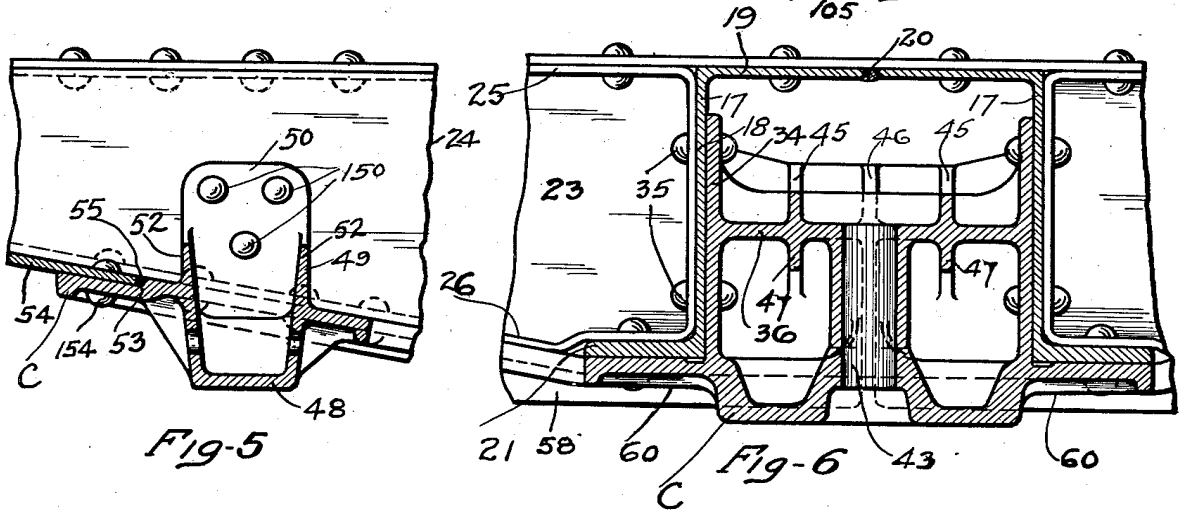

Fig-5 Fig-6

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1,999,652

UNITED STATES PATENT OFFICE

1,999,652

UNDERFRAME CONSTRUCTION FOR RAILWAY CARS

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Application March 25, 1932, Serial No. 601,123

3 Claims. (Cl. 105—228)

My invention relates to improvements in underframe construction for railway cars.

This invention relates to the construction of railway car underframes and has for one of its objects the provision of an improved foundation bolster member which will act as a rigid connection between the bolster parts and the centersills and provide a solid foundation on which the longitudinal members of the centersill structure and the transverse member of the bolster are mounted.

Another object of my invention is to provide an improved bolster bottom tie member formed to extend beneath the centersills and act as a bottom tie for the bolster diaphragms, on the opposite sides of the centersill, and which will incorporate integral portions adapted to extend upwardly between the centersills and between the bolster diaphragms respectively and provide spacing means for the centersills and bolster diaphragms respectively.

Another object of my invention is to provide a combined center plate and bolster bottom tie member having integral spacing means adapted to extend between the bolster diaphragms and operate to space the same and provide improved bracing means for the bolster above the side bearings.

Still another object of my invention is to provide a bolster bottom tie member adapted to extend flatwise beneath the centersills and bolster diaphragms and which is provided with an integral portion extending upwardly between and lengthwise of the centersills and constitute a draft gear abutment whereby buffing strains are transmitted through a member having connection with both the centersills and body bolster.

Still another and more specific object of my invention is to provide a bolster bottom tie member extending beneath the centersills and having upwardly and outwardly extending portions adapted to be secured to the bolster diaphragms, and to so form this member that it may be precast to shape thereby obviating the necessity of bending and stretching the fibers of this member, it being understood that the bolster bottom tie member normally operates as a compression member and when formed of a commercial plate it is usual to heat this member and distort said member by bending in a die which results in stretching the outermost fibers and thereby reducing the value of this member as a compression member.

A still more specific object of my invention is to provide a composite bolster bottom tie member having the central part, or that part of the member subject to the greatest strain, formed of cast metal and having the end portions formed of ordinary commercial rolled metal plate, the latter being welded to the cast metal portion.

My invention further resides in certain detail of parts and improvements such as will be more fully pointed out hereinafter.

For further comprehension of my invention reference may be had to the accompanying drawings wherein:

Fig. 1 is a vertical transverse sectional view taken through the lower portion of a railway car adjacent the truck and bolster parts and incorporating my improved construction, certain parts of the bolster diaphragms being broken away to better illustrate the construction;

Fig. 2 is a top plan view of that part of the car illustrated in Fig. 1, said view illustrating the bolster top cover plate removed and certain parts broken away to better illustrate the construction;

Fig. 3 is a bottom plan view of that part of the car illustrated in Fig. 1;

Fig. 4 is an enlarged fractional longitudinal sectional view on an enlarged scale taken on a line corresponding substantially to a line 4—4 of Fig. 2;

Fig. 5 is an enlarged fractional vertical elevational view of a part of the body bolster taken on a line corresponding substantially to a line 5—5 of Fig. 2;

Fig. 6 is an enlarged fractional vertical transverse sectional view on an enlarged scale taken on a line corresponding substantially to a line 6—6 of Fig. 2; and

Fig. 7 is a view similar to Fig. 4 showing a modified construction of center spacer and draft gear abutment to accommodate a vertically disposed draft yoke.

In said drawings the truck parts are generally indicated by the reference character A and the body portion of the car at B. The truck parts A are shown as including the wheels 10, side truck frames 11 and journal boxes 12. The truck bolster is indicated at 13, said bolster having side bearings at 14—14 and center plate bearing portion at 15.

The car body construction B includes a longitudinally extending centersill structure 16 formed of a pair of Z-shaped beam members 17 arranged with their webs 18 vertically disposed. The top flanges 19—19 of the respective sections face inwardly towards each other and are preferably united at their edges along the longitudinal center of the car by welding as indicated at 20. The

lower flange 21 of each Z-beam member 17 faces outwardly of the centersill structure and is preferably formed of increased thickness as compared with the remaining portions of the beam.

Spaced outwardly from said centersill structure are the side sills 22—22 preferably of channel shape section with the upper and lower flanges turned inwardly towards the centersill structure. Extending transversely of the car on each side of the centersill between the center and side walls are the bolster diaphragms 23—23. These bolster diaphragms 23 are arranged in pairs (Fig. 2) on each side of the centersill and are spaced from each other lengthwise of the car a limited distance.

Each said diaphragm 23 is preferably formed of conventional design including an upstanding web section 24 and a continuous outstanding marginal flange presenting upper and lower flanges as indicated at 25 and 26 respectively, also inner and outer vertical flanges indicated at 27 and 28, said inner and outer flanges being adapted to respectively overlie and connect with the centersills and side sills. Said diaphragms at their inner ends lie in the angle defined by the upstanding web 18 and the outstanding lower marginal flange 21 of the adjacent Z-shaped centersill beam member. Extending transversely of the car from side to side thereof is the bolster top cover plate member 29 which is riveted to the upper flanges of the centersill and to the upper horizontal flanges 25—25 of the respective diaphragms 23 thereby providing a tension member for the bolster construction.

The compression element of the bolster includes a foundation member C which is preferably formed of cast metal and includes a flat body portion 30 which extends continuously across the centersill and beneath the bolster sections on the respective sides of the centersills and is united therewith by a series of rivets 31. The member C has formed integral therewith a center plate section 32 which cooperates with the center plate section 15 of the truck bolster.

Extending up above said center plate section 32 the foundation member is formed with an integral spacing portion 33 having two substantially parallel vertical walls 34—34 (Fig. 6) which overlie and are riveted to the respective webs 18—18 of the centersill structure by rivets 35. Said walls 34—34 are extended lengthwise of the car for an appreciable distance beyond the flat body portion 30 and are united by an integral wall portion 36 which extends horizontally between the respective walls 34—34, said horizontal wall being disposed in substantial alignment with the center line of draft, said last named being indicated at 37 (Fig. 4). The respective walls 34—34 and the horizontal wall 36 are further united by a transversely disposed wall section 38 which constitutes an abutment for the draft gear parts, the draft gear being indicated at 39 and the draft yoke at 40. The abutment wall 38 throughout its central portion corresponds substantially in depth to the depth of the draft gear yoke, and adjacent the ends thereof progressively increases in thickness as indicated at 41 and 42 in order to provide increased strength at the junction with the side walls 34—34.

Above the center plate, the portion 33 is provided with a hollow tubular-like central portion 43 of substantial height, said portion being for the purpose of receiving the usual center pin (not shown). A number of vertically disposed walls or webs 44 extend between the walls 34—34 and cooperate to maintain the respective walls 34—34 in proper spaced relation. The abutment wall 38 is further braced lengthwise of the car by a plurality of ribs as indicated at 45, 46 and 47, respectively. The walls 44—44 in combination with the walls 34—34 provide a rectangular shaped open box section, the walls of which extend upwardly and form substantially a continuation of the outermost portion of the circular portion of the vertically extending wall of the center plate thereby providing a substantial backing for the center plate and preventing said center plate from bending. The said transverse walls 44—44 in combination with the longitudinal walls 34—34 and the horizontal walls 36—36 together with the flat body portion 30 provide a rectangular six-sided box shape which effectively spaces the centersills, the said horizontal walls 30 and 36, being disposed substantially in parallelism, form an effective medium for resisting the crushing effect of the bolster section due to the vertical strains on the body bolster, it being appreciated that in a shallow bolster of the construction shown, the bolster sections would act as cantilever members pivoting about a center located at the upper portion of the centersills and the lower portion of the top cover plate. This action causes a compressive action to be exerted against the centersills which in turn is transmitted to the upstanding portion of the bolster center casting.

The flat body portion 30 is provided with integral side bearing portions 48—48 on each side of the centersills, and above said side bearings there are provided upwardly extending integral portions 49 each provided with walls 50—50 which overlie and are riveted to the upstanding webs 24 of the pair of bolster sections 23 by rivets 150. The portions 49 also include walls 52 which extend lengthwise of the car and connect at each end with the walls 50 and cooperate therewith to form a strong box-like spacing member. This box-like spacing member operates to brace the side bearing portions and further provides the necessary strength to enable said extensions 49 to function as spacing means for the bolster diaphragms.

The ends of the body portions 30 outwardly of the side bearings are depressed as indicated at 53, and sandwiched between said depressed portions and the diaphragm bottom flanges of the diaphragms at each end of the bolster is a plate member 54 which is riveted as indicated at 154 and welded to the member C as indicated at 55. Each plate 54 extends outwardly to the side sill of the car and is united therewith and with the bolster bottom flanges by a series of rivets 56. In this manner a composite construction is obtained by utilizing a cast member for the central portion of the body bolster and a commercially rolled plate section for the outer portions of the body bolster, thereby economizing in weight and concentrating metal where most required and effecting a saving in weight at the locations of least strain.

The thickness of the body plate 30 is graduated, providing for a substantial thickness for that portion of the body which underlies the centersills and also for an appreciable distance beyond each centersill flange and beyond the bend indicated at 57, said increased thickness terminating at 157, the thickness thereafter gradually decreasing to a minimum adjacent the outer ends of the member C where said body portion merges into a beading or flange 257.

Said member C is reinforced transversely of the car by depending flanges 58—58, the depth of said flanges being graduated to provide maximum depth beneath and slightly beyond the centersills, the portion of reduced depth commencing beyond the bend 57 as indicated at 59. The body portion 30 adjacent the center plate structure is also braced transversely and longitudinally of the car by shallow horizontal ribs 60 and 61 respectively. Outwardly of one of the transversely extending flanges 58 on the side of the draft gear, the body portion 30 is extended lengthwise of the car as at 62 and connection effected with the flaring portions 41 of the vertical abutment.

In the modification shown in Fig. 7, the construction of the center portion of the foundation casting is modified to accommodate a vertical draft gear yoke as indicated at 100. In this construction the arrangement of center plate and side bearings corresponds to that formerly described, the modification being effected in the center brace portion which is provided with an abutment portion as indicated at 101 for the purpose of receiving the draft gear follower 102. In this construction the center brace portion 103 is preferably extended for the full depth of the centersill and the abutment portions 101 are braced by means of upper and lower ribs as indicated at 104 and 105, and intermediate ribs 106 whereby abutment strains are directed towards the vertical wall portions 107.

My improved construction, by combining in a one-piece integral member the center plate, bottom tie plate, side bearings, bolster spacers, centersill filler and draft gear abutment greatly simplifies the construction of the car and eliminates a number of rivets, as it will be appreciated that the rivets securing the horizontal body portion of the foundation member to the bolster diaphragms and centersill flanges are also available to resist buffing and draft shocks and in like manner the combining of the center plate with the draft gear abutment with the bolster bottom tie plate greatly strengthens the car construction and counteracts twisting tendency of the bolster. The twisting tendency of the body bolster is further counteracted in my improved construction by extending the upstanding portion of the foundation bolster casting lengthwise of the car beyond the flatwise body portion and attaching the said extended portions of the foundation bolster to the centersills beyond the bolster diaphragms and independently of said diaphragms.

The formation of a member in one piece having a base portion on which the longitudinal centersills and transverse members of the bolsters rest and being also provided with integral spacing means for the centersills and bolster diaphragms greatly facilitates the manufacture of a car inasmuch as the location of the centersills and the bolster diaphragms are accurately determined.

I claim:

1. In a railway car underframe, the combination with centersills and diaphragms on the opposite sides of said centersills, said diaphragms being arranged in pairs spaced from each other lengthwise of the car, each said diaphragm having a vertical, web section and a lower outstanding marginal flange portion; a bolster bottom member having a body portion extending flatwise beneath the centersills and extending outwardly beneath the bolster diaphragms and united with the outstanding flange portions of the diaphragms, said bolster bottom member having upstanding integral portions extending upwardly above the lower portion of, and between, the said spaced diaphragms, said upstanding integral portions being secured to the respective diaphragms and constituting spacers for said diaphragms, and including transverse vertical walls extending between the centersill webs and disposed substantially in alignment with the vertical webs of the bolster diaphragm.

2. In an underframe for railway cars, a centersill having vertical web plates spaced apart; bolster sections disposed on the opposite sides of the centersills and extending transversely of the car, said bolster sections being arranged in pairs on each side of the centersills and each including a vertical web; a foundation bolster casting having an integral tie plate portion adapted to extend beneath the centersills and bolster sections, said casting having an upwardly extending integral portion positioned between the centersills, said upwardly extending portion having longitudinally extending walls bearing against the centersill webs and transversely extending walls disposed substantially in alignment with the webs of the bolster sections, said upwardly extending portion also having a horizontal wall disposed at an appreciable distance above the integral tie plate portion and extending transversely of the car and connecting the longitudinal and transverse walls and forming in combination therewith and the integral tie plate portion a box shaped integral section adapted to serve as a spacer for the vertical webs of the centersills.

3. As an article of manufacture, a casting having an upstanding integral portion adapted to be positioned between the centersill webs of a railway car, said casting having a laterally extending flat portion extending on each side of the upstanding portion for attachment to bolster sections lying outwardly of the centersills on each side thereof, said flat portion having formed integral therewith a center plate portion defined in part by substantially vertical walls formed of circular contour, said upstanding portion lying between the centersills having longitudinally and transversely extending vertical walls together defining a rectangular box shaped four walled section adapted to be positioned above and substantially forming an upward extension of the outermost portion of the walls of the circular contour of the center plate and constituting a bracing means above the said center plate.

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