J. McE. AMES.

UNDERFRAME.

APPLICATION FILED MAR. 18, 1910.

1,066,568.

Patented July 8, 1913.

2 SHEETS—SHEET 1.

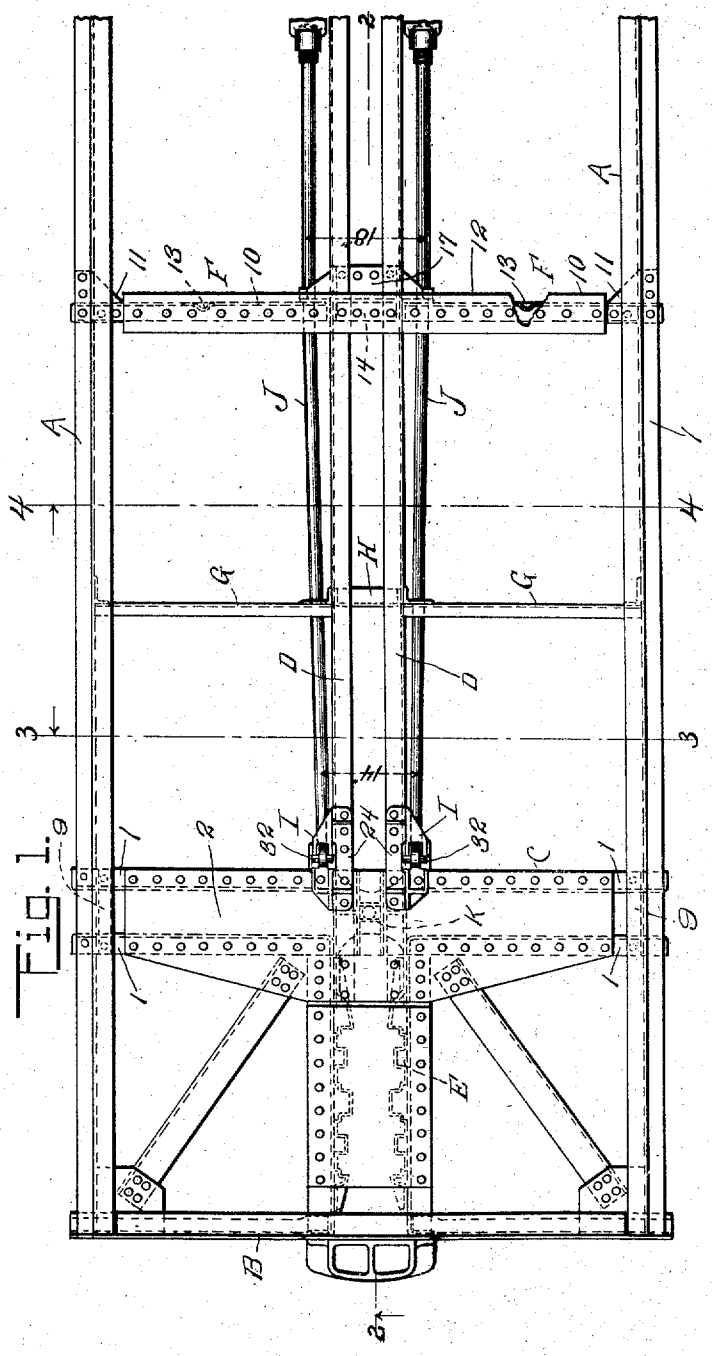


Fig. 1.

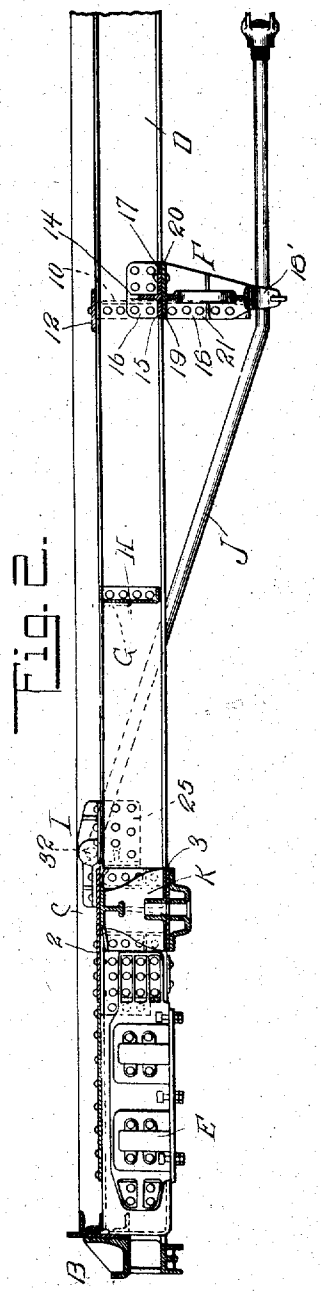


Fig. 2.

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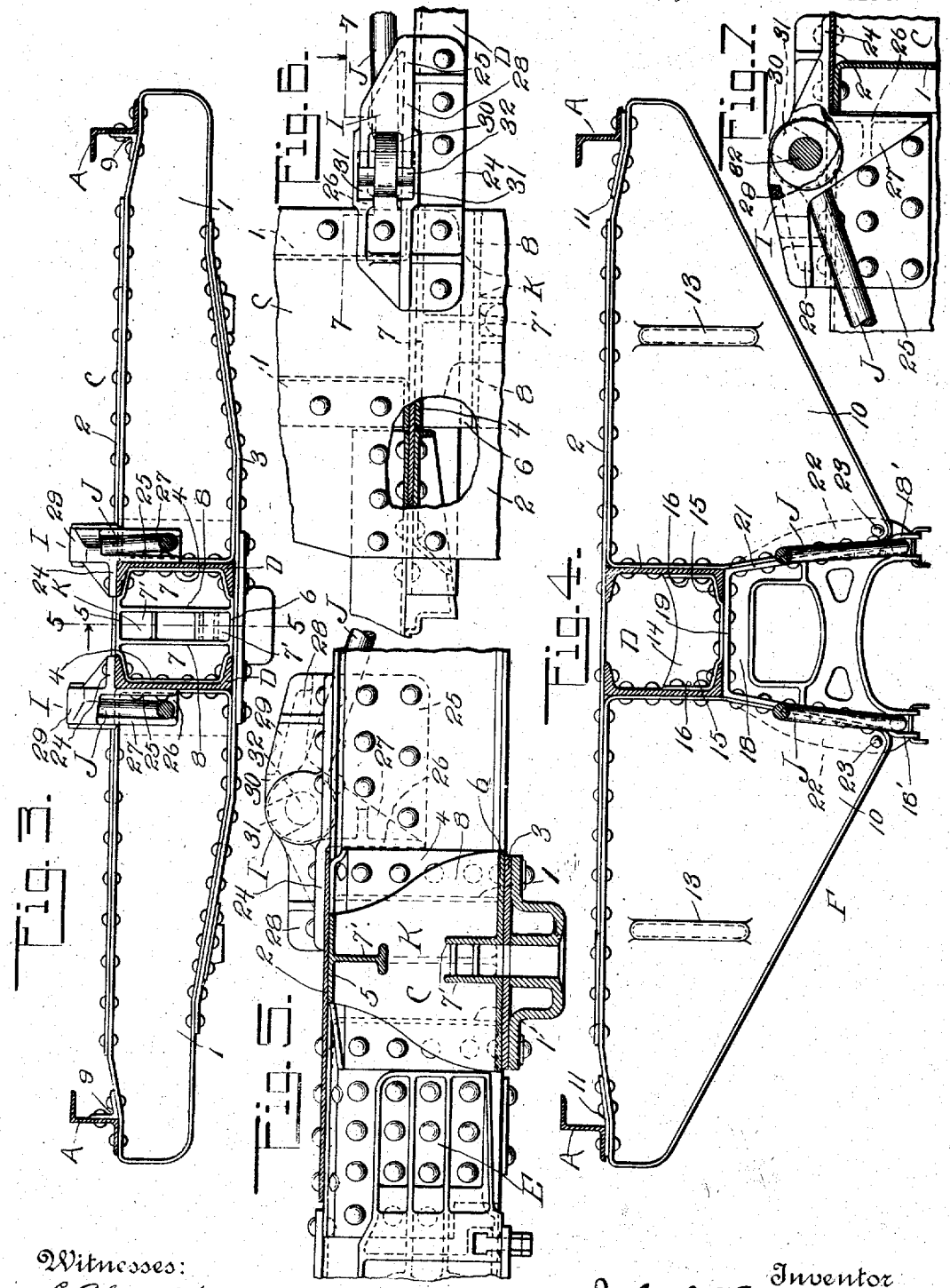


Fig. 3.

Fig. 5.

Fig. 6.

Fig. 4.

Fig. 7.

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UNITED STATES PATENT OFFICE.

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UNDERFRAME.

1,065,568. Specification of Letters Patent. Patented July 8, 1913.

Application filed March 18, 1910. Serial No. 550,243.

To all whom it may concern:

Be it known that I, JOHN McE. AMES, residing at New York city, New York, and being a citizen of the United States, have invented certain new and useful Improvements in Underframes, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and to use the same, reference being had to the accompanying drawings, which illustrate the preferred form of the invention, though it is to be understood that the invention is not limited to the exact details of construction shown and described, as it is obvious that various modifications thereof will occur to persons skilled in the art.

In said drawings:—Figure 1 is a top plan view of an underframe embodying the features of the present invention, one half of the frame being broken away. Fig. 2, is a longitudinal, vertical, central section therethrough taken on the plane indicated by line 2—2 of Fig. 1. Figs. 3 and 4 are transverse vertical sections taken respectively on the planes indicated by lines 3—3 and 4—4, of Fig. 1, and looking in the direction indicated by arrows. Fig. 5 is an enlarged detailed fragmentary vertical section taken on the plane indicated by line 5—5 of Fig. 3 and looking in the direction indicated by the arrow. Fig. 6 is a top plan view thereof, parts being broken out for disclosing interior construction. Fig. 7 is an enlarged detailed fragmentary elevation of one of the truss rod anchor blocks and contiguous parts, parts being broken away and seen in section.

Referring to the details, A A are side sills or connectors, each comprising a beam Z-shaped in cross section, the sills being connected at the ends by end sills B. Spaced inwardly from each end sill is a body bolster C, which extends beneath and slightly beyond the side sills.

Extending through, and framed into the bolster C, are the center sills D D, their ends terminating in connections with the usual draft rigging members E. Sills D are spaced apart and are formed by channels facing inwardly, that is, opening toward each other. Spaced from the middle of the underframe, at either side of the transverse median line thereof, are cross-bearers F which extend beneath and slightly outside of and connect the side sills A. Center sills D extend through the cross-bearers F and are framed therein. Spaced in the length of the frame between each cross-bearer F and the respective contiguous bolster C are cross tie bars G connecting sills A with sills D, the tie being completed by a filler H, disposed between and fixed to the sills D.

To each bolster C is connected, at each of the two corners formed by the meeting of the outer faces of sills D with the inner face of the bolster, a truss rod anchor casting I, each of said castings being engaged by the end of the truss rod J, one of said rods being disposed just outside of and extending along each sill D. Said rods engage saddles, hereinafter described, at the lower edges of cross-bearers F, which saddles are spaced at greater distance apart than the spacing of the ends of rods J, for spreading the intermediate portions of said rods, and thus causing the rods, in sustaining their usual tension stresses, to exert an inward or centering stress on the parts. The relative spreading of the rods is indicated in Fig. 1 of the drawing, by the dimension marks 14″ near the ends, and 18″ contiguous cross-bearers F, these measurements indicating the distance from center to center of the rods at the points designated in the particular structure illustrated.

Each bolster C is made up of two pairs of flanged plates or diaphragms 1—1, fixed to and extending outwardly from the sills D and connected by top and bottom cover plates 2 and 3, the bolster being completed by the filler block K, disposed between the sills D on a line with the diaphragms, and having a contour snugly fitting and filling the space between the sills. Filler K is fixed to sills D preferably by the same rivets which connect the diaphragms 1 thereto, said rivets being passed through the webs of the sills and the flanges of the diaphragms and filler, and the filler is also connected to the center sills by the rivets which extend through the flanges of the sills and secure the top and bottom cover plates. Filler K consists of a substantially rectangular boxing comprising side plates 4—4 and top and bottom plates 5 and 6, the latter being shaped to conform to the curvature of the

inner faces of the flanges of sills D. A central cross-web 7 extends from the top and bottom and side plates and is interrupted by longitudinal webs 8—8, lying parallel to the side plates 4 and connecting the top and bottom plates, suitably flanged complemental cross webs 7′, 7′ connecting webs 8. Top plate 5, as clearly seen in Fig. 5, tapers from its ends toward its middle portion, and webs 8 correspondingly taper upwardly, being the same width at their base as plate 6, and the same width at their top as plate 5.

The upper edge of the outer end of each diaphragm 1 is depressed from a point inside the respective side sill, so that the lower flange of the side sill lies below the plane of the major portion of the upper edge of the bolster, each sill A having its lower flange riveted to the upper flange of the respective bolster diaphragm, and the sill being further secured to the bolster by an angle plate 9 connecting the diaphragms and disposed in the inner angle between the sill and the respective diaphragms, and riveted to the flange of the sill and to the upper flanges of the diaphragms.

Each anchor casting I comprises a horizontal web 24, overlying and fixed to the upper flange of the respective contiguous sill D, and similarly overlying and fixed to the cover plate 2 and the respective contiguous diaphragm 1, said web being strengthened by suitable transverse and longitudinal upstanding flanges, and also being provided with a depending flange 25, contacting with the outer face of and fixed to the web of the contiguous sill D. A flange 26 also depends from web 24 at right angles to web 25, and faces bolster C. The outer edge of flange 26 terminates in a flange 27, which extends at right angles to flange 26, and parallel to flange 25, and spaced therefrom, the inner edge of flange 27 tapering from the upper end of the flange to the lower end thereof. The upper edges of each of flanges 25 and 27 terminate and merge in upstanding parallel walls 28, which rise above web 24 and are connected by a cross web 29, the web 29 terminating at a distance above web 24 for leaving an open space 30, affording access to the space between walls 28 and the webs 25 and 27. Each of the walls 28 is formed with an upwardly opening recess or pocket 31, and a pin 32 rests in the lower ends of said pockets and extends from one wall 28 to the other through an eye 33, formed at the respective end of one of the truss rods J. The opening 30 is of sufficient size for allowing the end of the rod J to be thrust through the space between wall 28 and through the opening 30 for facilitating the introduction or removal of the pin 32 and the rod, the inability of the respective truss rod J to have any appreciable longitudinal movement in service, assuring against loss of the pin 32 by riding out of the recesses 31, the pin being held against lateral play in said recesses by contact of the ends of the pin with walls 28.

Each cross-bearer F comprises a pair of flanged plates or diaphragms 10, fixed to and extending outwardly from the sills D, the upper edge of each of the diaphragms at the outer end thereof, being depressed and extending beneath and beyond the respective side sill A, so that the lower flange of sill A lies below the horizontal plane of the major portion of the upper edge of the diaphragm, and said sill is connected to the respective diaphragm by a gusset plate 11, disposed beneath the sill and mounted on the upper edge of the depressed portion of the diaphragm, said gusset being riveted to the flange of the diaphragm and to the flange of the sill, one of the connecting rivets extending through the lower flange of the sill, the web plate and the upper flange of the diaphragm. The diaphragms 10 are connected by a top cover plate 12, secured to the upper flanges of the diaphragms and to the upper flanges of the sills D. Each diaphragm 10 is formed approximately midway of its length between the respective sills D and A with a stiffening bead 13, formed by a lateral stamping of a portion of the material of the plate comprising the diaphragm, the bead terminating within and spaced from the edges of the diaphragm.

Disposed between the sills D in alinement with the diaphragms 10 and forming part of the cross-bearer is a filler casting 14, having outwardly extending horizontal and vertical flanges 15 and 16, the former flange being shaped to conform to the contour of the upper face of the lower flanges of sills D, and being secured thereto, and the flanges 16 being secured to the webs of sills D. Extending inwardly from the opposite side of the web of filler 14 is a flange 17. Contacting with the lower edges of the sills D and depending therefrom is a filler casting 18, disposed between and fixed to the inner edge flanges of the diaphragms 10 which extend below sills D. Filler 18 flares downwardly and outwardly conforming to the contour of the inner portion of the diaphragms, and has its lower corners spaced apart a distance greater than the distance between the upper corners, and, at each lower corner, said filler block is formed with a saddle 18′ in which is seated the respective truss rods J. The upper portion of the filler 18 is formed with an outwardly extending flange 19, fixed to flange 15 and to the lower flanges of the sills D, and at the opposite side of the filler 18, the same is provided with an inwardly extending flange 20, fixed to flange 17. Along the inclined edges of filler 18, the same is formed with the outstanding flanges 21—21, secured to the adjacent flanges of the

diaphragms 10 and, at the opposite side of the filler the same is formed with laterally projecting flanges 22, 22 lapping the flat faces of the diaphragms and preferably fixed thereto as by rivets 23.

In trussed underframes it has heretofore been the general practice to rivet the ends of the truss rods in position. The result is that when, for any reason, the rods must be removed and new rods substituted, the rivets must be destroyed and more or less of the car floor removed to permit access to the location of the fastening rivets used to secure the new truss rods in position. If the car is loaded, the lading must be removed for this purpose. By the method of construction herein used, it is possible to remove the truss rods in the event of breakage and substitute new rods therefor without the inconvenience commonly incident to the old method of removal and replacement.

Owing to the increase in size and weight of railway rolling stock, it is now considered advisable to provide an extremely strong center sill construction to receive buffing stresses. To that end I have produced the underframe illustrated and described herein, which is of such design that a very strong central longitudinal truss is produced capable of withstanding the enormous buffing stresses of service, and at the same time so proportioned with respect to the other parts of the underframe that the major portion of the lading is carried by the center sill truss.

What I claim is—

1. In a car underframe, a bolster comprising spaced flanged diaphragms, center sills and a filler casting between said diaphragms, truss rod anchors having pockets therein, connected with the webs of said center sills and with said diaphragms and truss rods having enlarged ends removably seated in said pockets.

2. In a car underframe, a bolster comprising spaced flanged diaphragms and a filler casting, in combination with a trussed center sill construction in which there are truss tension members connected with said filler castings.

3. In a car underframe, a combination comprising bolsters with spaced diaphragms, center sills extending through between said diaphragms, flanged anchoring means connected by through rivets with the flanges of said diaphragms and the webs of said sills and sill truss tension members resting between flanges in said anchoring means.

4. In a car underframe, a combination comprising bolsters with spaced diaphragms, center sills extending through between said diaphragms, flanged anchoring means connected by through rivets with the flanges of said diaphragms and the webs of said sills and sill truss tension members resting in pockets formed therefor in said anchoring means.

5. In an underframe, the combination with side and center sills and bolsters, of truss rods connecting said bolsters, and means, intermediate the length of the sills, for spacing the intermediate portions of the truss rods a distance greater than the spacing of their ends.

6. In an underframe, the combination of the side and center sills and bolsters, of anchor plates connected with said bolsters, truss rods having their ends anchored in said plates, and means, intermediate the length of the sills for spacing the rods apart a distance greater than the spacing of their ends.

7. In an underframe, the combination with side and center sills and a body bolster connecting the same, of anchor plates disposed in angles between the center sills and bolster, means connecting said plates to the center sills and bolster, each of the said plates having a truss rod receiving opening, truss rods extending into each opening, means for securing said truss rods therein, and means spacing said truss rods apart intermediating their length a distance greater than the spacing of their ends.

8. In an underframe, the combination with side and center sills and cross bearers connecting the same, of truss rods extending beneath the cross bearers and connected at their ends to the center sills, and means carried by the cross bearers engaging the truss rods spacing the same apart a distance greater than the spacing of their ends.

9. In an underframe, the combination with side and center sills, of a cross bearer connecting the same and comprising diaphragms fixed to and outstanding from the center sills, and a filler block disposed between and fixed to the diaphragms, saddles depending from the filler block and spaced apart, and truss rods connected at their ends to the center sills and engaging the saddles, intermediate their length, the ends of the truss rods being spaced apart a distance less than the distance between the saddles.

10. In an underframe, the combination, with side and center sills, of a cross bearer comprising oppositely disposed diaphragms fixed to and extending outwardly from the center sills and projecting below the same, a filler between the sills in the transverse planes of the frame occupied by the diaphragms, and a filler below the center sills disposed betwen and fixed to the inner edges of the diaphragms.

11. In an underframe, the combination, with center sills, and truss rods fixed at their ends to the sills, of a casting fixed to the sills and depending therefrom and flaring downwardly to a width greater than the space between the ends of the truss rods, and sad-

dles at the lower corners of the casting for receiving intermediate portions of the truss rods.

12. In an underframe, the combination, with center sills, of a cross-bearer comprising diaphragms fixed to and outstanding from the sills, a filler casting fixed to and depending from the sills between the diaphragm, and truss rods engaging said filler casting and disposed for exerting a centering strain thereon.

13. In an underframe, the combination, of center sills, diaphragms fixed to and outstanding therefrom and each having a portion depending from the center sills, and tapering outwardly and downwardly, a filler block fixed to and depending from the center sills and flared to correspond with the taper of the depending portions of the diaphragms and snugly fitting between said diaphragms, saddles at the lower corners of the filler, and truss rods connected to the center sills and spaced by engagement with the saddles.

14. In an underframe, the combination of center sills and diaphragms fixed to and outstanding from said sill, and having portions depending below the same, a flanged filler between the sills connected through the webs of the sills to the diaphragms, a flanged filler depending from the sills between and fixed to the depending portions of the diaphragms, and means connecting the lower flange of the first filler to the upper flange of the second filler.

15. In an underframe, the combination, with center sills, of diaphragms extending therefrom and having portions depending below the center sills, a filler disposed between the depending portions of the diaphragms, the diaphragms and filler having edge flanges secured together, and lateral flanges on the filler lapping the diaphragms and fixed thereto.

16. In an underframe, the combination, with center sills, of diaphragms fixed thereto and extending therefrom, and having portions depending below the sills, a filler block between and fixed to the edges of the depending portion of the diaphragms, said filler block having lateral flanges lapping portions of the diaphragms.

17. In an underframe, the combination, with center sills, of a bolster comprising diaphragms extending outwardly from the sills, and a filler between the sills in alinement with the diaphragms, said filler comprising top, bottom, and side plates having a contour fitting the inner surfaces of the sills, a cross web extending from said top, bottom, and side plates, longitudinal webs interrupting the cross webs and connecting the top and bottom plates, and a cross web connecting the longitudinal webs.

18. In a car underframe adapted to support the major portion of its lading by a central longitudinal truss, a pair of center sills serving as compression members of said truss, end sills, side sills and body bolsters, a pair of longitudinally extending truss rods connected with said center sills and terminating near the bolsters, said truss rods being held in position by tension thereon, and being removable without destructive effort, said truss rods serving as tension members of said truss.

19. In a car underframe, a combination comprising spaced center sills and side sills spaced from the center sills, bolsters, an intermediate cross bearer, truss rod anchor castings connected directly to the webs of some of said sills and the flange of adjacent bolsters and truss rods between a plurality of said sills anchored at their ends in said anchor castings and seated intermediate their ends in pockets in said cross-bearer.

20. In an underframe for cars, the combination comprising longitudinal sills, an intermediate strut below said sills, bolsters, and truss rod anchor castings directly connecting said sills and bolsters and provided with flanges secured to vertical faces of said sills and having open pockets for truss rods, which truss rods pass under the strut below the center sills and terminate short of said bolsters.

21. In an underframe, the combination with center sills of a bolster comprising diaphragms extending outwardly from the sills, and a filler between the sills in alinement with the diaphragms, said filler comprising top, bottom, and side plates having a contour fitting the inner surfaces of the sills, a cross web extending from said top, bottom, and side plates, longitudinal webs interrupting the cross webs and connecting the top and bottom plates, and a cross web connecting the longitudinal webs, said top plate tapering from its ends inwardly and each of the longitudinal webs being tapered upwardly to conform in width to the width of the plates which it engages.

22. As an article of manufacture, a diaphragm chair adapted to serve as a filler between cross bearing diaphragms and adapted to be supported by car sills and of greater width at its middle portion than at its upper portion, and adapted to serve as a support for said cross bearing diaphragms.

23. In a car underframe, a sill, including a plurality of tension members, a diaphragm chair resting on said tension members and diaphragms resting on said chair, portions of said chair spacing said diaphragms and other portions spacing said members.

24. In a car underframe, a sill having a tension portion and means carried by said portion adapted to fit between and support cross-bearing members.

25. In a car underframe, a sill comprising a tension member and a vertical web, a dia-

phragm chair resting on said tension member and a diaphragm resting on said chair and engaging the outer face of said web.

26. In a car underframe, spaced sills, each sill comprising a tension member and a vertical web, filling means disposed between and supported by said tension members and adapted to support cross-bearing members on the outside of said vertical webs.

27. As an article of manufacture, a chair having a portion adapted to serve as a seat for a tension member below spaced center sills and having another portion forming seats above the said seat for the tension member adapted to support spaced diaphragms.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

JOHN McE. AMES.

Witnesses:
F. H. GIBBS,
P. A. KOLLS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."