

H. W. WOLFF.
CAR UNDEBFAME.

APPLICATION FILED MAY 25, 1909.

Patented Mar. 26, 1912.

1,021,124.

3 SHEETS-SHEET 1.

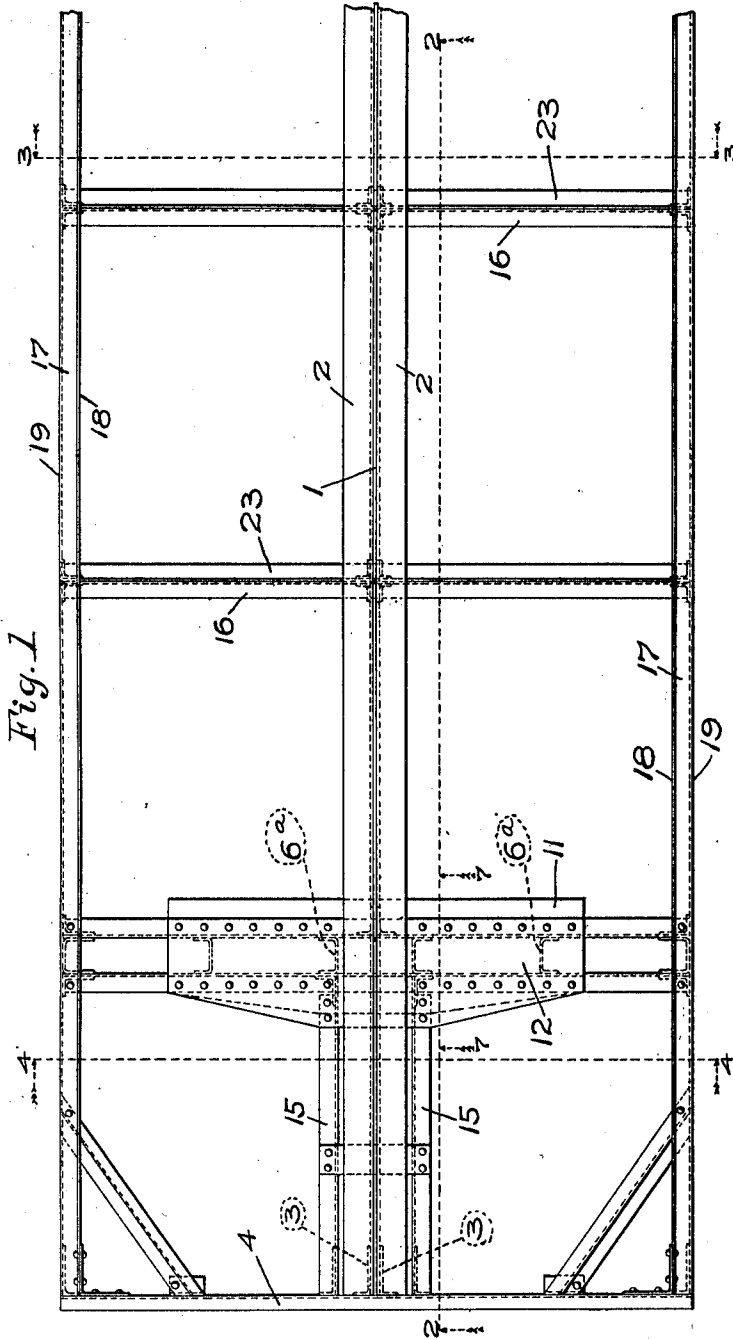


Fig. 1

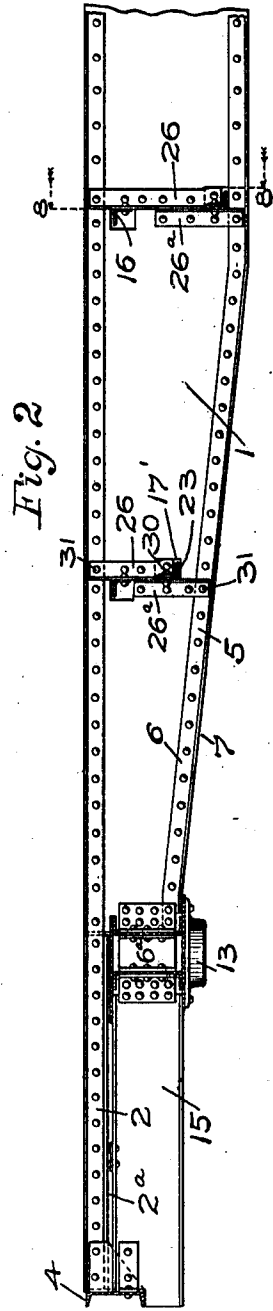


Fig. 2

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3 SHEETS—SHEET 2.

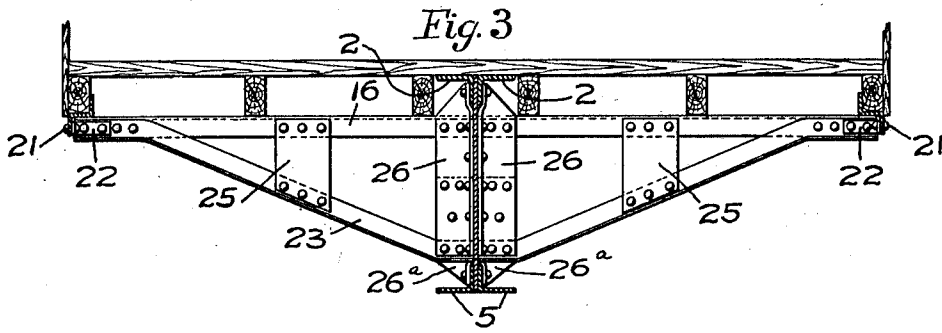


Fig. 4

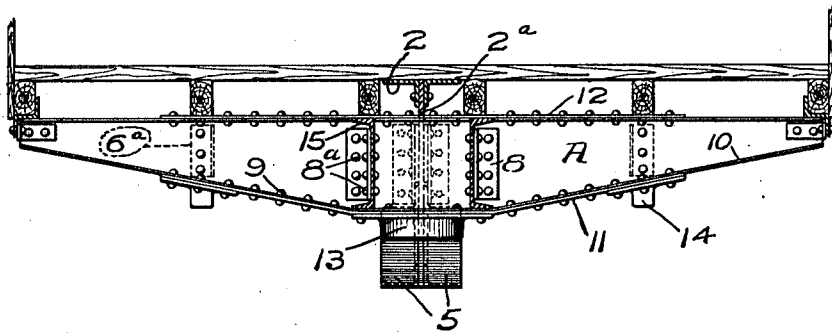
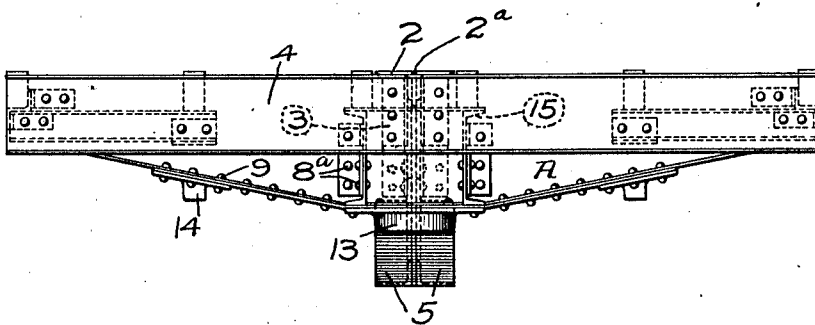


Fig. 5



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3 SHEETS—SHEET 3.

Fig. 6

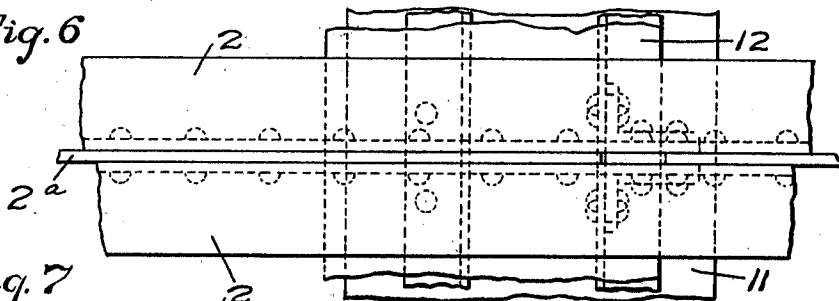


Fig. 7

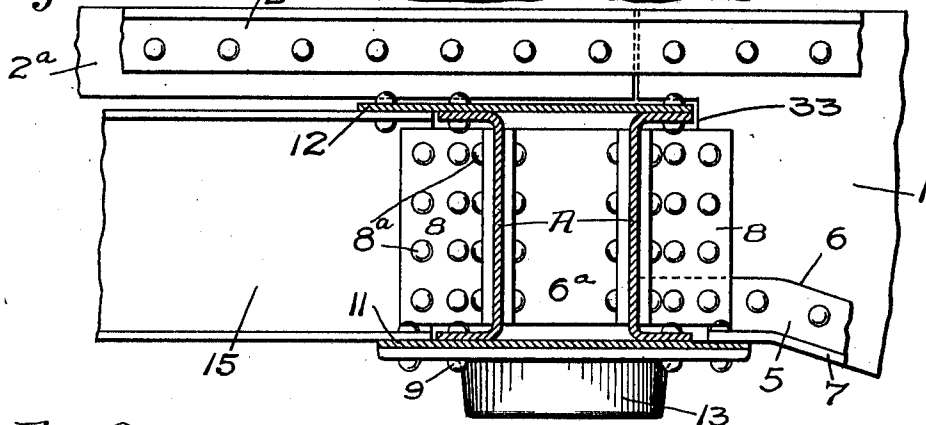


Fig. 9

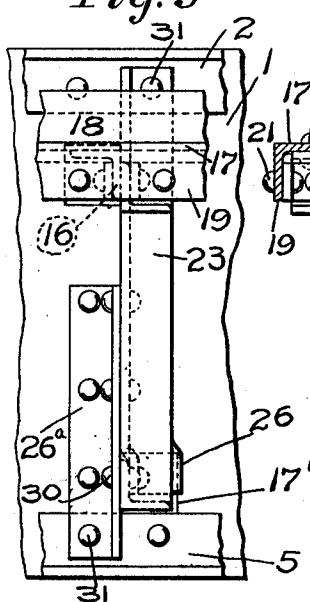
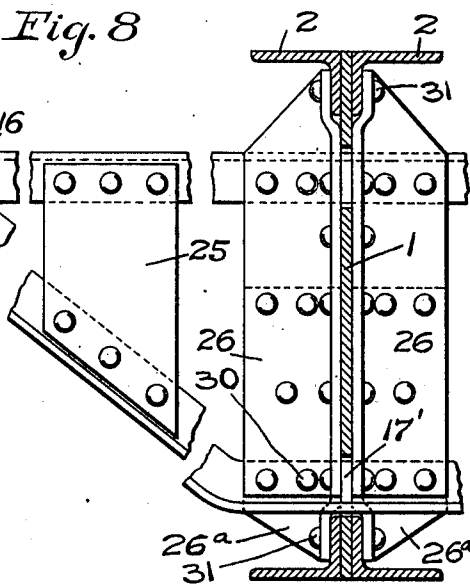


Fig. 8



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UNITED STATES PATENT OFFICE.

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CAR-UNDERFRAME.

1,021,124.

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Application filed May 25, 1909. Serial No. 498,318.

To all whom it may concern:

Be it known that I, HERBERT W. WOLFF, residing at St. Louis, Missouri, and being a citizen of the United States, have invented certain new and useful Improvements in Car-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 plan view of approximately one-half of an underframe equipped with the invention, the opposite end of the underframe being a duplicate of that shown. Fig. 2 is a longitudinal sectional view taken on line 2—2 of Fig. 1 slightly to one side of the center sill so as to show the draft sill in elevation. Fig. 3 is a transverse sectional view, the section being taken on line 3—3 of Fig. 1. Fig. 4 is a transverse sectional view taken between the bolster and end sill on line 4—4 of Fig. 1. Fig. 5 is an end elevational view of the underframe. Fig. 6 is an enlarged fragmentary plan view of a portion of the underframe contiguous to the bolster, including part of the bolster. Fig. 7 is an enlarged fragmentary sectional view taken approximately on line 7—7 of Fig. 1, which is a part of the section line 2—2 before referred to. Fig. 8 is an enlarged fragmentary sectional view the section being taken on line 8—8 of Fig. 2. Fig. 9 is an enlarged fragmentary side elevational view of the parts shown in Fig. 8.

The underframe is provided with a single built up I-beam sill, the advantages of which are obvious when the capacity of a car is 40 tons or over, as a rolled member of sufficient strength to carry the load is so heavy that the expense of it is prohibitive. With modern facilities for punching and riveting the cost of the built up sill is considerably less than the cost of a rolled I-beam of the same strength, in addition to which the built up sill is considerably lighter and is better adapted for general service conditions. In the type of underframe shown in

the drawings the web of the center sill terminates at the bolster members and this web is slit inwardly from its ends to permit the flange of the inside bolster member and a portion of its cover plate to pass through a slit in the end of the web. The top angles of the center sill extend continuously from end sill to end sill while the bottom angles are coextensive with the center sill and terminate at the bolster. The center sill web terminating at the bolster while the top angles extending through to the end sill necessitates the use of a filler between the two angles beyond the center sill web to take the place of this web. This feature is clearly indicated in Figs. 6 and 7. The draft sills are preferably of rolled channels but these sills may be formed of pressed steel members of any desired shape and may be of U shape or may be formed of rolled channels or Z bars. In the body bolster pressed steel channels are shown but these may be replaced by rolled sills of Z bar shape or other convenient form, if desired, as indicated within the scope of the claims.

The object of the invention is to provide an underframe formed with a single centrally disposed sill carrying member designed to carry the major portion of the load, the sill comprising a general plate girder construction with oppositely disposed angles along the top and bottom edges of the web, the web being perforated at convenient intervals throughout its length for the passage transversely therethrough of top and bottom flanged members which are united at their outer ends and connected with a side connecting member which is in the position ordinarily occupied by a side sill.

One of the advantages of the present construction is the continuity of the center sill by reason of the top angles and interposed filler, hereinafter more particularly described, whereby, to a greater or less extent, buffing stresses are transmitted through the sill independently of the buffing stresses transmitted through the draft sills and bolsters.

Referring to the parts, 1 is the web of the center sill which is provided with oppositely disposed angles 2 secured along its upper edge portion and extending beyond the web 1, as shown in the drawings, and being connected by suitable angle plates 3 with the

end sills 4, while oppositely disposed angle members 5 are provided along the lower edge portion of the center sill which latter terminate at the bolsters. The vertical legs 6 of the angle members 5 continue substantially in contact with the bolster diaphragms while the horizontal legs 7 of the angles 5 are cut off, as shown in Figs. 2 and 7, and terminate just far enough inside the bottom bolster cover plate to permit of suitable rivet connection therewith. Owing to the limited vertical height of the bolsters it is preferred that the sill shall be deeper at its middle portion than near the bolster. This permits the use of cross bearers or needle beams of greater depth near the middle of the car than between the middle portion and the bolster. The bolsters comprise continuous preferably channel shaped or pressed diaphragms A which are connected with the draft sills and the center sill by means of angle plates 8, which are connected with the said sills and diaphragms by rivets 8^a, while lines of rivets 9 connect the outstanding lower diaphragm flanges 10 with a bottom bolster cover plate 11, and a corresponding line of rivets connects a top bolster cover plate 12 with the upper flanges of the bolster diaphragms. The top and bottom cover plates of the bolster are of different widths, the bottom plate being wide enough to extend equal distances forwardly and rearwardly of the center line of the bolster so as to permit riveting thereto the center bearing plate 13, while the top bolster cover plate extends nearer the end sills and both top and bottom cover plates are of greater width relatively in line with the draft sills than at their ends and taper inwardly toward the side sills. Thus the bolster cover plates extend forwardly far enough to permit of suitable rivet connection of the draft sills 15 to said bolster cover plates, said draft sills being also connected by suitable angle plates with the end sills 4. The bolsters are continuous from side to side of the car and are connected with the side bearing members 17 at their ends thus forming continuous supporting members possessing greater utility than where they are divided at and dependent upon rivet connection with center sills interposed between separated or discontinuous bolster diaphragms.

The cross bearers comprise top and bottom angles which extend through slots in the center sill web, the top angle 16 being continuous from side to side and riveted to the horizontal web portion 17 of a Z shaped side connecting member which is provided with a vertical inward flange 18 and a vertical outward flange 19 and is connected by rivets 20 with the horizontal leg of the top angle 16 of the cross bearer, while rivets 21 extend through suitable angle plates 22 both longitudinally and

transversely of the car and thereby serve to connect the outer ends of the cross bearers with the Z shaped member and also serve to connect the top and bottom members of the cross bearers or needle beams near the outer ends thereof. The bottom member 23 of the cross bearer extends from the Z shaped side connecting member inwardly and downwardly, as best shown in Fig. 8 and passes through a slot 17' punched in the web of the vertical sill plate, as shown in Figs. 8 and 9 of the drawings. The top and bottom angles of the cross bearers are connected intermediate the sill and the Z shaped side connecting members by plates 25 riveted to the vertical legs of the top and bottom angles 16 and 23 and by angle plates 26 and 26^a. The angle plate 26 extend from above the horizontal legs of the angles 23 upwardly, as best shown in Fig. 8, at each side of the web 1 of the center sill and at each side of the vertical legs of the angles 2 secured near the upper edge of said web and are connected by suitable rivets with the top and bottom angles of the cross bearers and with the web of the center sill. The angle plates 26^a extend from above the horizontal flanges of the angles 5 upwardly at each side of the sill web a sufficient distance to afford a firm connection with the angle plates 26. The angle plates 26 and 26^a are connected together and to the vertical flange of the angle 23 by means of rivets 30. The upper and lower portions of the angle plates 26 and 26^a respectively are bent outwardly to receive between them the vertical legs of the top and bottom angles 2 and 5 and are riveted thereto and together by suitable rivets 31.

As will be noted in Figs. 6 and 7, the web 1 of the center sill is provided with a slit 33 which extends from its end inwardly far enough into said web to permit of the outstanding upper flange of the inner bolster diaphragm to pass therein while a portion of the top bolster cover plate 12 also rests in the said slit. Between the ends of the web 1 and the end sills 4 the angles 2 are provided with an interposed filler plate 2^a, which preferably extends downwardly in contact with or nearly in contact with the top bolster cover plate 12, as shown in Figs. 2 and 7 of the drawings, thus providing better rivet connection and adding stiffness to these parts.

To impart stiffness to the bolster vertically disposed channel shapes 6^a are provided at convenient intervals and a pair of these channel shaped members are located in alinement with the side bearings 14 to impart additional stiffness to the bolsters above the side bearings, while another pair are in alinement with the draft sills and between the inner ends of said draft sills and the inner bolster diaphragms.

What I claim is:

1. In a car underframe, the combination comprising continuous bolsters, a single plate girder center sill, the web of which terminates in the vicinity of said bolsters, and the compression flange of which extends beyond said bolsters. 70
2. In a car underframe, the combination comprising continuous body bolsters, a single plate girder center sill the web and tension flange of which terminate in the vicinity of said bolsters and are connected therewith, the compression flange of said sill extending over and beyond said bolsters. 75
3. In a car underframe, end sills, a single center sill part of which extends from end sill to end sill, a continuous body bolster comprising channel shaped diaphragm members, and interposed channel members connecting said diaphragm members. 80
4. In a car underframe, the combination comprising a single plate girder center sill, inner bolster diaphragms connected therewith, separated draft sills out of alinement with said center sill, outer bolster diaphragms connected with said draft sills, said bolster diaphragms extending continuously substantially the width of the car, means connecting said inner and outer diaphragms in alinement with said draft sills and cover plates connecting said diaphragms and said draft sills, the web of the center sill terminating in the vicinity of the bolster and having a recess into which a portion of the bolster extends. 85
5. In a car underframe, the combination comprising a longitudinally disposed plate girder center sill and draft sill members placed in different positions with relation to the longitudinal axis of said underframe, a body bolster comprising inner and outer relatively vertical members of channel form extending continuously between said center sill and draft sills, and means for connecting said vertical bolster members together and to said sills, the web of the center sill terminating in the vicinity of the bolster and having a recess into which a portion of the bolster extends. 90
6. In a car underframe, the combination comprising non-alined plate girder center sill and draft sills, a body bolster provided with substantially vertically disposed channel shaped supporting members, top and bottom bolster cover plates of unequal widths extending forwardly of said channel shaped members with said draft sills connected to said top and bottom cover plates, the web of the center sill terminating in the vicinity of the bolster and having a recess into which a portion of the bolster extends. 95
7. In a car underframe, the combination comprising non-alined plate girder center and draft sills, an end sill connected with the outer ends of said draft sills and a body bolster provided with continuous diaphragms of channel shape in cross section and bottom cover plates connected with said center and draft sill members, the web of the center sill terminating in the vicinity of the bolster and having a recess into which a portion of the bolster extends. 100
8. In a car underframe, the combination comprising non-alined center and draft sills, a body bolster having diaphragms of channel shape in cross section connected respectively with said center sill and said draft sills, said bolster extending continuously between said center sill and draft sills and a bolster cover plate connected with said diaphragms and said draft sills and extending into the web of said center sill. 105
9. In a car underframe, the combination comprising a bolster provided with flanged diaphragms of channel shape, draft sills connected with the outer diaphragms and a single plate girder center sill connected with the inner diaphragms and terminating in the vicinity of the bolster and having a recess into which a portion of the bolster extends. 110
10. In a car underframe, the combination comprising built up bolsters provided with top and bottom cover plates and with diaphragms of channel shape, spaced draft sills connected with the outer diaphragms and a single plate girder center sill connecting the inner diaphragms of bolsters near opposite ends of the underframe, the web of the center sill girder having a recess into which a portion of the bolster extends. 115
11. In a car underframe, the combination comprising end sills, non-alined center and draft sills connected with said end sills, built up bolsters of less depth than said center sill and having portions extending into the web of the center sill, each bolster comprising parallel channel shaped diaphragms extending entirely across the car, cover plates connected with said bolster diaphragms and said draft sills and stiffening members between said diaphragms near the inner ends of and in line with said draft sills. 120
12. In a car underframe, the combination comprising end sills, non-alined plate girder center sill and channel shaped draft sills connected with said end sills, body bolsters of less depth than said center sill, said bolsters comprising diaphragms connected with said center sill and with said draft sills, stiffening means between said diaphragms and a cover plate extending into a slit in said center sill. 125
13. In a car underframe, the combination comprising end sills, a relatively continuous buffing sill with continuous top flange and discontinuous web portion extending in part from end sill to end sill, separate draft sills out of alinement with said buffing sill, and 130

continuous bolsters interposed between said draft sills and the lower portion of said buffing sill.

14. In a car underframe, the combination comprising end sills, a relatively continuous buffing sill extending in part from end sill to end sill, separate draft sills out of alignment with said buffing sill, and bolsters extending transversely of the lower part of said buffing sill and having portions extending into the web of the buffing sill, said draft sills being connected with said bolsters.

15. In a car underframe, the combination comprising a relatively continuous buffing sill, spaced draft sills near the end portions of said buffing sill, and means for connecting the adjacent ends of said draft and buffing sills comprising continuous body bolsters extending transversely of said sills.

16. In a car underframe, the combination comprising a relatively continuous buffing sill, spaced draft sills near the end portions of said buffing sill, means for connecting the outer ends of said draft and buffing sills, and body bolsters extending transversely of said sills below parts of said buffing sill.

17. In a car underframe, the combination comprising a relatively continuous buffing sill, spaced draft sills near the end portions of said buffing sill, continuous body bolsters connecting the adjacent ends of said draft and buffing sills, said body bolsters extending transversely of said sills in position to transmit buffing stresses from the draft sills through the lower portion of the buffing sill.

18. In a car underframe, the combination comprising end sills, bolsters, a center sill of plate girder form, the web and lower flange of which extend substantially from bolster to bolster, an upper flange extending beyond said bolsters, spaced draft sills between said bolsters and end sills and cross bearers extending through the web of said center sill.

19. In a car underframe, the combination comprising end sills, bolsters, a center sill of plate girder form, the web and lower flange of which extend substantially from bolster to bolster, an upper flange extending beyond said bolsters and connected with said end sills, spaced draft sills between said bolsters and end sills and cross bearers extending through the web of said center sill.

20. In a car underframe, the combination comprising end sills, bolsters, a center sill of plate girder form, the web and lower flange of which extend substantially from bolster to bolster, an upper flange extending beyond said bolsters, draft sills extending substantially parallel with said upper flange and cross bearers extending through and outwardly from said center sill.

21. In a car underframe, the combination comprising end sills, a plate girder center sill extending in part from end sill to end

sill, continuous diaphragm bolsters extending across the ends of part of said center sill and connected therewith, top and bottom bolster cover plates extending beyond said bolster, and draft sills between said bolster cover plates and connected with said plates.

22. In a car underframe, the combination comprising end sills, a plate girder center sill extending in part from end sill to end sill, continuous diaphragm bolsters extending across the ends of part of said center sill and connected therewith, top and bottom bolster cover plates extending beyond said bolster, draft sills between said bolster cover plates and connected with said plates, cross bearers intermediate said bolsters extending in part through said center sill.

23. In a car underframe, the combination comprising end sills, a plate girder center sill extending in part from end sill to end sill, continuous diaphragm bolsters extending across the ends of part of said center sill and connected therewith, top and bottom bolster cover plates extending beyond said bolster, draft sills between said bolster cover plates and connected with said plates, cross bearers extending in part through said center sill, and connection plates substantially the height of said center sill connecting said cross bearers with said center sill.

24. In a car underframe, the combination comprising end sills, a plate girder center sill extending in part from end sill to end sill, continuous diaphragm bolsters extending across the ends of part of said center sill and connected therewith, top and bottom bolster cover plates extending beyond said bolsters, draft sills between said bolster cover plates and connected with said plates, top and bottom flanged members extending through said center sill and vertically disposed connection plates connecting said flanged members with the center sill.

25. In a car underframe, a center sill with relatively deep web portion, an end sill of less depth than the ends of the center sill web, draft sills connected with the lower portion of said end sill, a bolster between the web of said center and draft sills, and a center sill projection extending over the bolster to the end sill, the bolster having a portion extending into the web of the center sill.

26. In a car underframe, a center sill with relatively deep web portion, an end sill of less depth than the ends of the center sill web, draft sills connected with the lower portion of said end sill, a bolster between the web of said center and draft sills and a center sill flange extending over the bolster to the end sill.

27. In a car underframe, the combination comprising bolsters and end sills, a single plate girder center sill having a main web

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portion and tension chord terminating at a point adjacent the bolster, and a compression chord comprising a filler portion extending over and beyond said bolsters and connected with the end sills.

28. A car underframe comprising a main longitudinal carrying member, draft sills out of alinement with said carrying member, continuous bolster elements interposed between said draft sill and the lower portions of said carrying member, said carrying member comprising a main web member extending substantially from bolster to bolster and having a tension chord co-extensive therewith, and a compression chord along the upper margin of said main web member, said compression chord extending over and beyond the bolster and comprising an attached filler plate independent of main web portion.

29. In a car underframe, the combination comprising continuous bolster elements, a single longitudinal carrying member having a compression chord continuous from end to end of the underframe above the bolsters, and having a main web portion extending from bolster to bolster, transversely arranged trussed members intermediate the bolsters, openings in said main web portion registering with top and bottom chords of said trussed members, the chords of said transverse members extending through said openings.

30. In a car underframe, the combination comprising continuous bolsters, and a single plate girder center sill, the web of the center sill terminating in the vicinity of the bolsters and the compression flange of the center sill extending across the bolsters.

31. In a car underframe, the combination comprising continuous bolsters, and a single plate girder center sill, the web of the center sill terminating in the vicinity of the bolsters and the compression flange of the center sill extending above the bolsters.

32. In a car underframe, a continuous bolster and a single plate girder center sill, the web of the center sill terminating in the vicinity of the bolster, a flange of said center sill lapping the bolster.

33. In a car underframe, a bolster, end sill, and a single plate girder center sill, the web of the center sill terminating in the vicinity of the bolster, and a flange of the center sill extending to the end sill.

34. In a car underframe, a single plate girder center sill, a continuous bolster comprising spaced members and reinforcing members connecting the spaced members.

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

HERBERT W. WOLFF.

Witnesses:

FRED G. WOLFF,
ROBERT E. FRAME.