W. VOSS.

PASSENGER CAR UNDERFRAME.

APPLICATION FILED AUG. 27, 1910.

1,014,791.

Patented Jan. 16, 1912.

4 SHEETS—SHEET 1.

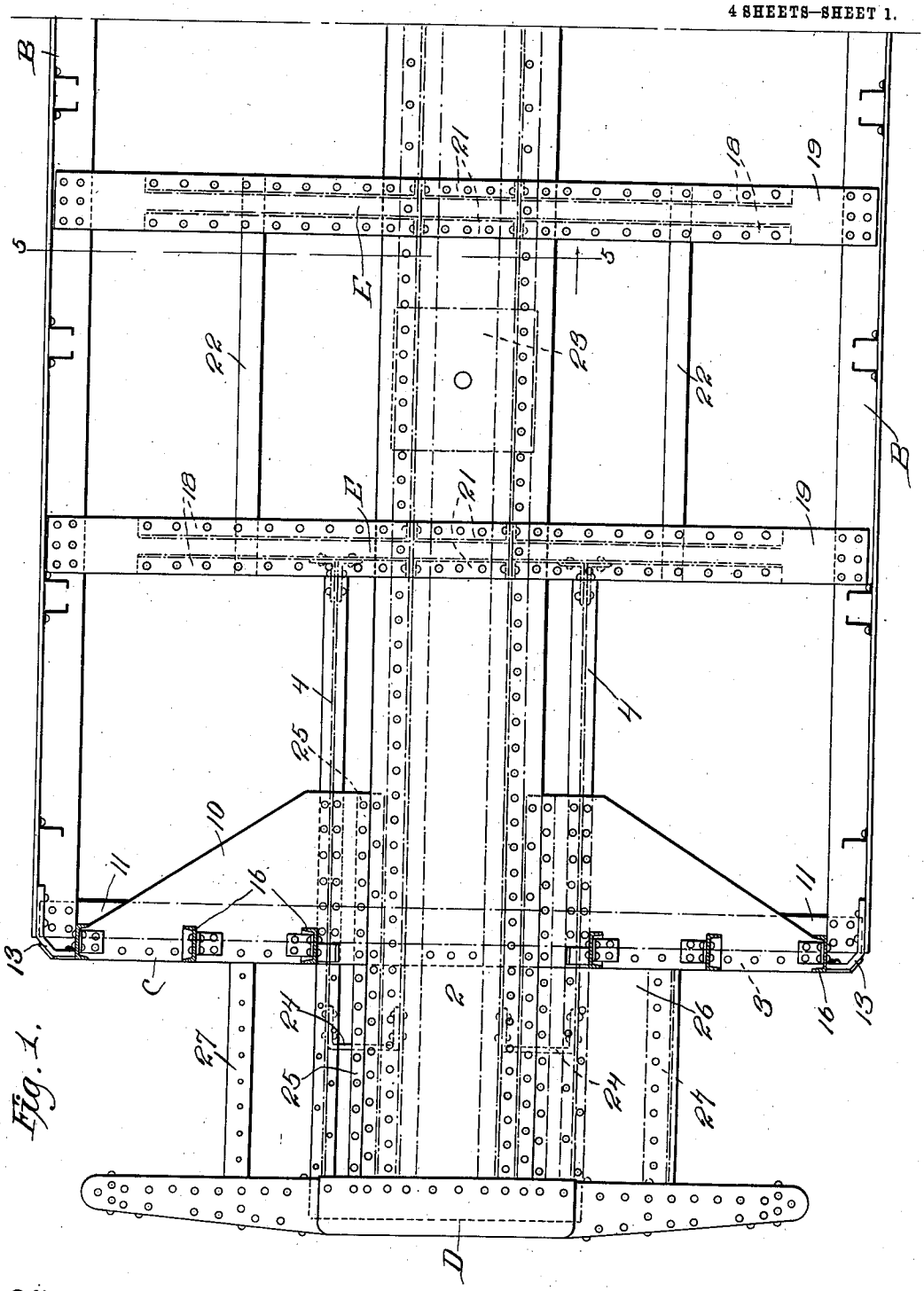

Fig. 1.

Witnesses:
L. Bond Hardie
C. A. Humphreys.

William Voss Inventor
By his Attorney F. H. Gibbs

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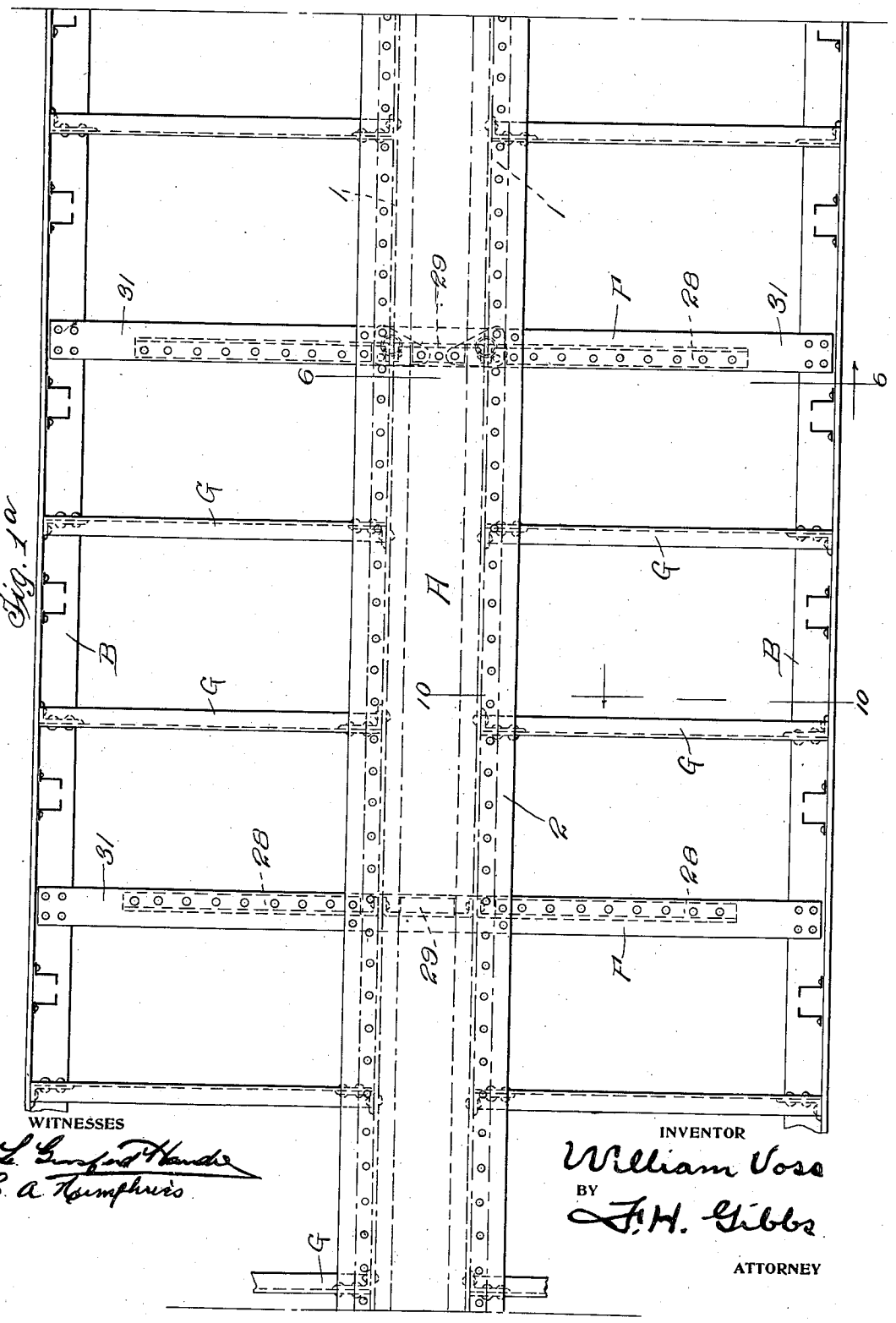

WITNESSES

L. Linford Hendricks

C. A. Humphreis

INVENTOR

William Voss

BY

F. H. Gibbs

ATTORNEY

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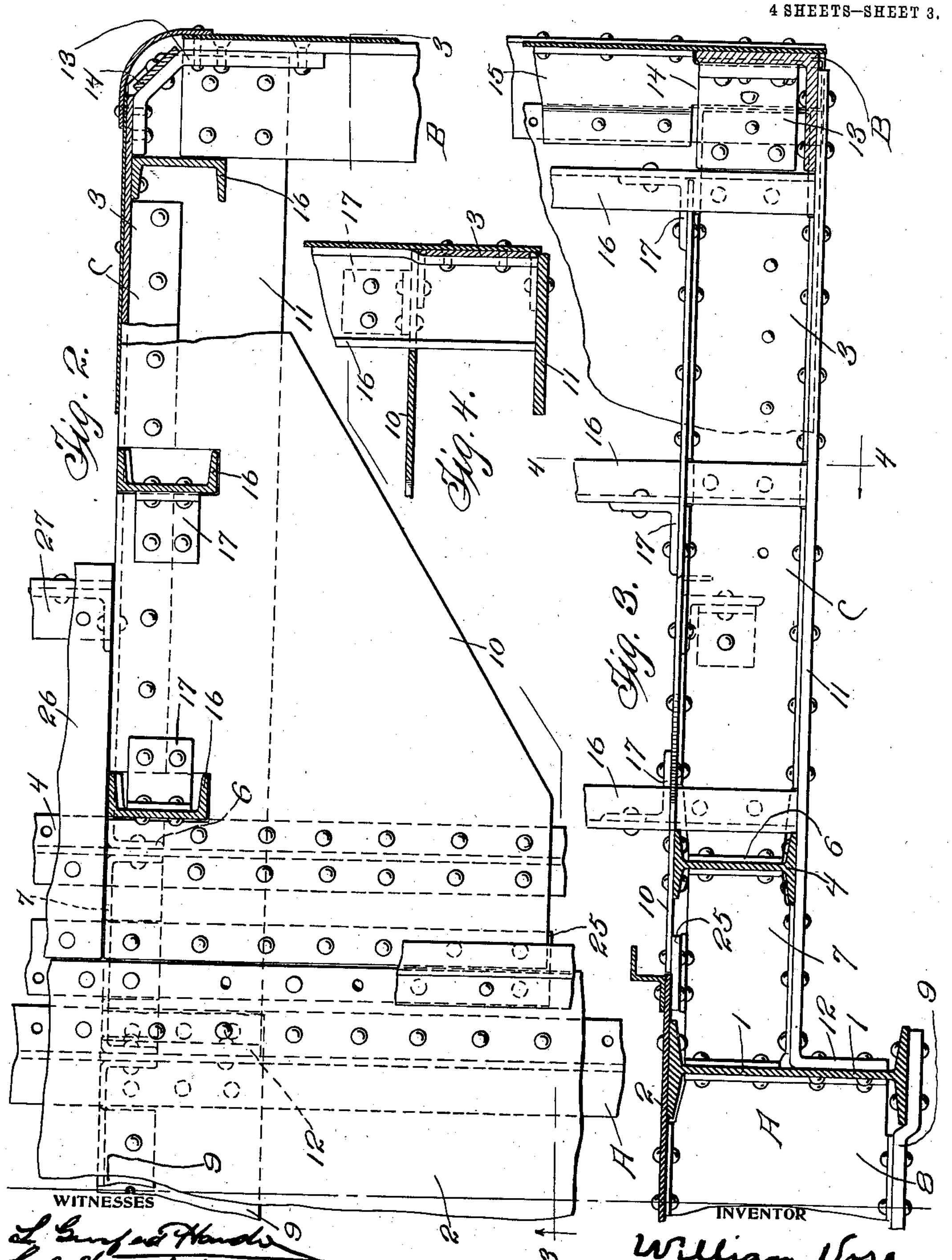

WITNESSES

L. Gunford Handy

C. A. Humphries.

INVENTOR

William Voss

BY

F. H. Gibbs

ATTORNEY

W. VOSS.

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4 SHEETS—SHEET 4.

Fig. 5.

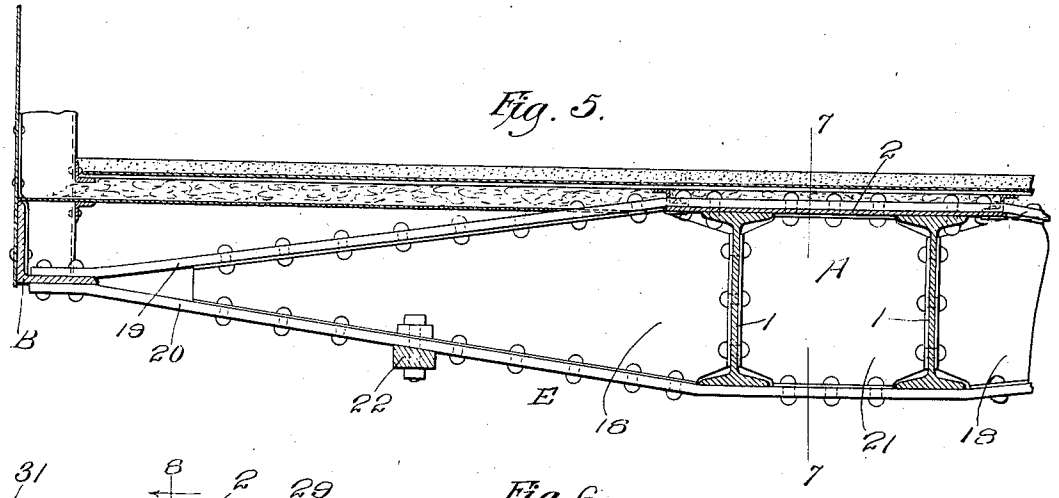


Fig. 6.

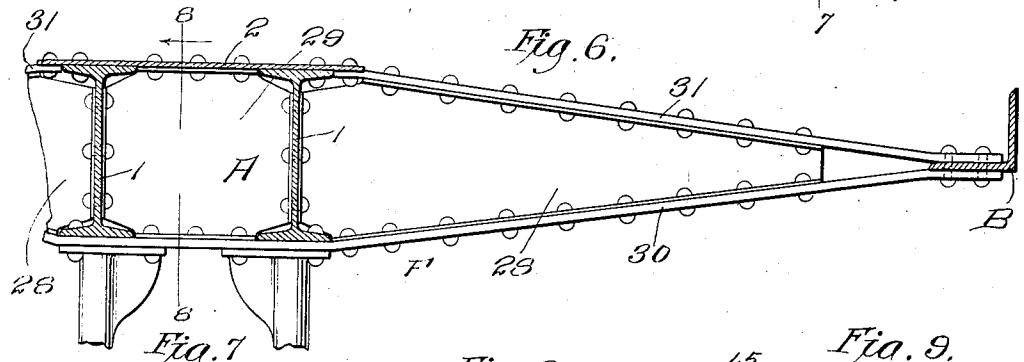


Fig. 7

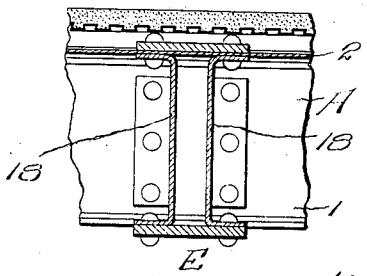


Fig. 8

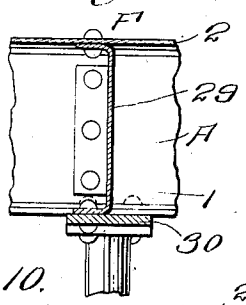


Fig. 9.

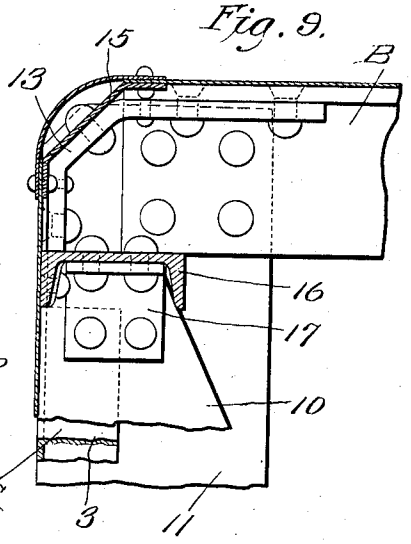
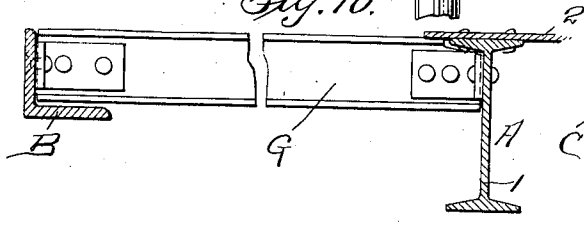


Fig. 10.



Witnesses:

L. Emmet Handa

C. A. Humphries

William Voss Inventor

By his Attorney F. H. Gibbs

UNITED STATES PATENT OFFICE.

WILLIAM VOSS, OF WILMINGTON, DELAWARE, ASSIGNOR TO AMERICAN CAR AND FOUNDRY COMPANY, OF ST. LOUIS, MISSOURI, A CORPORATION OF NEW JERSEY.

PASSENGER-CAR UNDERFRAME.

1,014,791. Specification of Letters Patent. Patented Jan. 16, 1912.

Application filed August 27, 1910. Serial No. 579,322.

To all whom it may concern:

Be it known that I, WILLIAM VOSS, residing at Wilmington, Newcastle county, Delaware, and being a citizen of the United States, have invented certain new and useful Improvements in Passenger-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, through 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 a portion of a car underframe embodying the features of the invention. Fig. 1ª is a view complemental to Fig. 1, which, with Fig. 1, discloses approximately one half of the underframe. Fig. 2 is an enlarged, detail, fragmentary plan of the end portion of the underframe. Fig. 3 is a vertical transverse section taken on the plane indicated by line 3—3 of Fig. 2. Fig. 4 is an enlarged, detail section taken on the plane indicated by line 4—4 of Fig. 3. Fig. 5 is a transverse section taken on the plane indicated by line 5—5 of Fig. 1, illustrating the body bolster in elevation. Fig. 6 is a similar view, taken on the plane indicated by line 6—6 of Fig. 1ª, illustrating one of the cross bearers in elevation. Fig. 7 is a vertical section taken on the plane indicated by line 7—7 of Fig. 5, illustrating one member of the double body bolster. Fig. 8 is a similar section taken on the plane indicated by line 8—8 of Fig. 6. Fig. 9 is an enlarged, detail plan view of one of the corners of the underframe, parts being seen in section. Fig. 10 is a transverse, vertical section taken on the plane indicated by line 10—10 of Fig. 1ª.

Referring to the drawings, A indicates the center sill, B, B the side connecting members or chords, C the end sills, D the platform end sills, and E the double body bolster. The center sill comprises spaced I-beams 1, 1 connected throughout their length by a top cover plate 2, the center sill extending from platform end sill to platform end sill. Each of the side connecting members B is preferably an angle extending from end sill to end sill and having its horizontal leg or flange extending inwardly and its vertical flange extending upwardly.

The end sill C, of which only one is illustrated, but of course it is understood that all parts at one end of the underframe are duplicated at the other, comprises a channel section 3 having its web disposed vertically and its flanges directed inwardly, one such section being disposed at each side of the center sill and extending from the respective member B to an I-section platform extension sill 4 spaced away from and at the side of each center sill. The inner end of the web of each channel section 3 is turned to form a flange 6, the flanges of the channel being cut away and the web tapered to allow the flange 6 to engage the outer surface of the web of the platform sill 4. A channel filler 7, constituting a part of the end sill C, is disposed between each platform sill 4 and the adjacent I-beam 1, the flanges of each filler 7 being cut away adjacent the ends and the ends of the web being turned to form flanges, one engaging the inner surface of the web of sill 4, and the other the outer surface of the web of beam 1. A filler 8, similar in construction to filler 7, but of greater depth, is disposed between the beams 1, and has its lower and upper flanges fixed respectively to a bottom cover plate 9, which connects the lower web of the beams 1, and to the cover plate 2. The vertical flanges of filler 8 are riveted to the webs of the center sills, some of the rivets engaging the corresponding adjacent flange of the next adjacent filler 7, the corresponding flange at the opposite end of the filler 7 being riveted to the web of the sill 4 by rivets engaging the flange 6 of channel section 3. A gusset plate 10 is arranged at each side of the center sill A and extends from each side of the center sill substantially throughout the length of each section 3. The upper horizontal flange of each section 3 is riveted to the superposed gusset plate 10, and the corresponding flange of each filler 7 is riveted to the same plate and to the cover plate 2. A bottom cover plate 11 is disposed beneath each section 3 and extends throughout the length thereof, and at its inner end is bent downwardly at 12 where said downwardly bent portion or flange is riveted to the web of the adjacent center sill member 1.

The outer end of each plate 11 is riveted

to the horizontal flange of the side connecting member B, the plate extending beneath said flange. The lower horizontal flange of each section 3 and of each filler 7 is riveted to the corresponding plate 11.

It will be noted that the gusset plates 10, at opposite sides of the center sill, and alined portions of the cover plate 2, constitute a discontinuous or sectional top cover plate for the end sill, and that the cover plates 11, at opposite sides of the center sill, with the alined plates 9, beneath the center sill, constitute a discontinuous or sectional bottom cover plate connecting the several sections of the end sill together and to the side connecting members B.

A corner bracket 13 is riveted to each end of the vertical web of each member B and extends, and is riveted to, the adjacent end of the contiguous section 3, as shown in Fig. 2. Each bracket plate 13 is preferably formed with an intermediate diagonally disposed flattened portion to which is riveted the depending end 14 of a corner plate 15 which upstands from said bracket and forms a part of the superstructure.

End posts 16, 16 have their lower end resting upon each plate 11 and extend upwardly therefrom through the flanges of the channel sections 3 and through the gusset plates 10, said plates and flanges being recessed for accommodating the posts. Each of said posts comprises a channel, and each is fixed by an angle bracket 17 to the adjacent plate 10 and upper flange of the adjacent channel end sill section 3, the bracket engaging the web of the channel of the post. In some instances the bracket is disposed between the flanges of the channel, and in others the bracket engages the opposite side of the post.

The double body bolster E comprises a pair of cross members, each made up of a pair of spaced channel diaphragms 18 fixed to and outstanding from the center sill members 1 and having their flanges riveted to top and bottom cover plates 19 and 20. Each diaphragm 18 has its web flanged at its inner end and riveted to the center sill members, a pair of fillers 21 being disposed between the I-beams 1 for each set of alined diaphragms transversely of the underframe, each filler comprising a plate flanged vertically and horizontally, and the vertical flanges being fixed to the webs of the beams 1. The horizontal flanges are fixed to the bottom plate 20 and to the cover plate 2 and top bolster cover plate 19, both said top and bottom bolster plates 19 and 20 being continuous, the former extending over and the latter under the center sills. Each diaphragm 18 tapers outwardly, and each cover plate 19 and 20 covers a pair of diaphragms at each side of the center sill and inclines correspondingly to the taper of the diaphragms, the taper being such as to bring the ends of the cover plates 19 and 20 adjacent each other, the end portions being straightened for a short distance for snugly receiving therebetween the horizontal leg of the side connecting angle B. The two cross members of each double body bolster E are connected at each side of the center sill, intermediate the center sill and side connecting member, by tie bar 22. Intermediate the transverse members of the double body bolster, the center sill is provided with a center bearing plate 23 for the center pin, the said center sill thus serving as the connector for the cross members of the bolster.

Each platform sill 4 is fixed at its inner end to the outermost diaphragm 18 and extends outwardly through the end sills C to the platform end sill D, and intermediate the end sill C and platform end sill D each sill 4 is connected with the adjacent beam 1 by a filler 24 having flanges riveted to said center sill members 1 and to the platform sills 4. Each gusset plate 10 is fixed along its inner edge by a splice plate 25 to the cover plate 2, the said splice plate extending outwardly, in each instance, to the sill D and connecting the platform cover plate 26 to cover plate 2. Supplemental sills 27 extend from each end sill 3 to the sill D for sustaining the outer edge of said plates 26.

At various points, spaced along the length of the car, the center sill is connected to the side connecting members by cross bearers F, F, and also connected by tie bars G, G. Each cross bearer F comprises transversely alined outstanding diaphragms 28, 28 fixed to the sill beams 1 and having an interposed filler 29, similar in construction and arrangement to diaphragms 18 and fillers 21. A bottom plate 30 is fixed to the lower flanges of the diaphragms 28 and to filler 29, and extends from side to side of the car beneath the center sill. A top plate 31 is provided but formed in two sections, one at each side of the center sill, and each extending from the adjacent sill beam 1 to the corresponding side connecting member B, the coöperating sections of cover plate 31 being riveted to cover plate 2 and to the upper flanges of the diaphragms 28. Diaphragms 28 taper similarly to the diaphragms 18, and the ends of the bolster plates 30 and 31 are thus brought substantially together with the horizontal flange or leg of member B interposed and riveted to said cover plates.

What I claim is:—

1. In a car underframe, the combination with a center sill and platform extension sills at opposite sides thereof, of an end sill comprising sections between the center sill and platform extension sills and between the platform extension sills and the sides of the

car, and platform sills fixed to outer faces of some of said sections.

2. In a car underframe, the combination with side connecting members, of an end sill comprising channel sections, and a bottom cover plate connecting said sections and fixed to the lower flanges thereof and to said side connecting members.

3. In a car underframe, a center sill and an end sill comprising separate sections at each side of the center sill, a cover plate at each side of the center sill extending longitudinally of the sections and fixed thereto, said cover plates having their inner edges spaced from said center sill, and means connecting said cover plates to said center sill.

4. In a car underframe, the combination with a center sill and side connecting members, of an end sill comprising a plurality of sections at each side of the center sill, a bottom cover plate fixed to the center sill and extending longitudinally of and fixed to the several sections of the end sill and being fixed to the side connecting members, and a discontinuous top cover plate connecting said sections.

5. In a car underframe, the combination with side connecting members, a center sill comprising spaced beams, and a center sill cover plate, of an end sill comprising a plurality of sections at each side of the center sill, a bottom cover plate fixed to the center sill and extending longitudinally beneath and fixed to the end sill sections and to said side connecting members, and a separately formed gusset plate fixed to the end sill sections and to the center sill cover plate for connecting said sections together and to said center sill.

6. In a car underframe, the combination with a center sill extending from platform end sill to platform end sill, of an end sill comprising sections outstanding from the center sill and a gusset plate connected to each section and having its inner edge lying along the center sill, a center sill cover plate having its edge adjacent the inner edge of the respective gusset plate, and a splice plate connecting said gusset plate and center sill cover plate.

7. In a car underframe, the combination with a center sill extending from platform end sill to platform end sill, of an end sill comprising sections outstanding from the center sill and a gusset plate connected to each section and having its inner edge lying along the center sill, a center sill cover plate having its edge adjacent the inner edge of the respective gusset plate, a splice plate connecting said gusset plate and center sill cover plate, and a platform plate-connected by the same splice plate to the center sill cover plate.

8. In a car underframe, a cross member comprising diaphragms, and cover plates therefor, and side connecting members each having a flange snugly fitting between and fixed to said cover plates.

9. In a car underframe, the combination with flanged side connecting members, of a cross member comprising diaphragms, and cover plates therefor having converging end portions, said side connecting members each having a flange snugly fitting between and fixed to said cover plates.

10. In a car underframe, the combination with a side connecting member and a center sill, said side connecting member having a horizontal flange projecting toward said center sill, of diaphragms outstanding from the center sill and tapering toward said flange, and cover plates fixed to said diaphragms and having their end portions converging into engagement with opposite sides of said flange being fixed thereto by through rivets.

11. In a car underframe, the combination with flanged side connecting members, and a center sill having a cover plate, outwardly tapering diaphragms outstanding from the center sill, a bottom cover plate fixed to the under surface of the flanges of the respective side connecting members and extending longitudinally of the diaphragms beneath the center sill, and a sectional top cover plate for the diaphragms fixed to the center sill cover plate and to the diaphragms and engaging the upper surfaces of the flanges of the respective side connecting members.

12. In a car underframe, a center sill, a pair of cross members spaced longitudinally of the car and fixed to the center sill and comprising members of a double body bolster, each of said members comprising a pair of diaphragms and a top and bottom cover plate, the intermediate portions of the center sill between said cross members completing said bolster, and a bolster center bearing plate fixed to the center sill intermediate said cross members.

13. In a car underframe, the combination with a side connecting member and an end sill, of a corner bracket connecting said end sill and side connecting member, said corner bracket being formed with a diagonally disposed portion, and a corner plate fixed to said diagonally disposed portion and upstanding therefrom.

14. In a car underframe, the combination with a side connecting member and an end sill, of a corner bracket connecting said end sill and side connecting member, said corner bracket being formed with a diagonally disposed portion, a corner plate fixed to said diagonally disposed portion and upstanding therefrom, and a corner cover plate inclosing said corner plate.

15. In a car underframe, the combination with a side connecting member and an end sill, of a corner bracket connecting said end

sill and side connecting member, said corner bracket being formed with a diagonally disposed portion, a corner plate fixed to said diagonally disposed portion and upstanding therefrom, and a corner cover plate inclosing said corner plate, being fixed to said corner bracket.

16. In a car underframe, the combination with a flanged end sill and a flanged side connecting member, of a corner bracket fixed to the web of said end sill and to a flange of said side connecting member, a corner plate fixed to said corner bracket and upstanding therefrom, and a corner cover plate inclosing said corner plate.

17. In a car underframe, the combination with a side connecting member and an end sill, of a corner bracket connecting said side connecting member and end sill, a corner plate fixed to said corner bracket and upstanding therefrom and a corner cover plate inclosing said corner plate.

18. In a car underframe, the combination with a channel section end sill having its web disposed vertically and a bottom cover plate fixed to the lower flange of the channel, of an end post extending through the flanges of the channel having its lower end resting upon said bottom cover plate, said post projecting upwardly from the end sill.

19. In a car underframe, the combination with a channel section end sill having its web disposed vertically and a bottom cover plate fixed to the lower flange of the channel, of an end post extending through the flanges of the channel and having its lower end resting upon said bottom cover plate, said post projecting upwardly from the end sill, and a plate fixed to the upper flange of the channel being penetrated by said post and fixed thereto.

20. In a car underframe, the combination with a channel section end sill having its web disposed vertically and a bottom cover plate fixed to the lower flange of the channel, of an end post extending through the flanges of the channel having its lower end resting upon said bottom cover plate, said post projecting upwardly from the end sill and comprising a channel.

21. In a car underframe, the combination with a flanged end sill and a flanged side connecting member, of a corner bracket fixed to the web of said end sill and to a flange of said side connecting member, said corner bracket being formed with a diagonally disposed portion, and a corner plate fixed to said diagonally disposed portion and upstanding therefrom.

22. In a car underframe, the combination with a center sill and a side connecting member, of a plate fixed to said side connecting member by one of its ends and to said center sill by its other end, an end sill comprising a plurality of sections fixed to said plate, and a corner bracket connecting one of said end sections to said side connecting member.

23. In a car underframe, the combination with a center sill and a side connecting member, of a plate fixed to said side connecting member by one of its ends and to said center sill by its other end, an end sill comprising a plurality of sections fixed to said plate, and end posts resting upon said plate and being fixed to said end sill.

24. In a car underframe, the combination with a center sill and a side connecting member, of a plate fixed to said side connecting member by one of its ends and to said center sill by its other end, an end sill comprising a plurality of sections fixed to said plate, a corner bracket connecting one of said end sill sections to said side connecting member, and end posts resting upon said plate and being fixed to said last mentioned end sill section.

25. In a car underframe, the combination with a center sill and a side connecting member, of a plate fixed to said side connecting member by one of its ends and to said center sill by its other end, an end sill comprising a plurality of flanged sections fixed to said plate, and end posts resting upon said plate extending through the flange of one of said end sill members being fixed to the web thereof.

26. In a car underframe, the combination with a center sill and a side connecting member, of a plate fixed to said side connecting member by one of its ends and to said center sill by its other end, an end sill comprising a plurality of flanged sections fixed to said plate, end posts resting upon said plate, and a plate connecting said end sill sections being penetrated by said posts.

27. In a car underframe, the combination with a side connecting member and an end sill, of a corner bracket connecting said end sill and side connecting member, said corner bracket being formed with a diagonally disposed portion, a corner plate fixed to said diagonally disposed portion and upstanding therefrom, and a corner cover plate inclosing said corner bracket and connecting said end sill and side connecting member.

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

WILLIAM VOSS.

Witnesses:
P. E. WILSON,
JAMES H. SCOTT.