

No. 750,049.

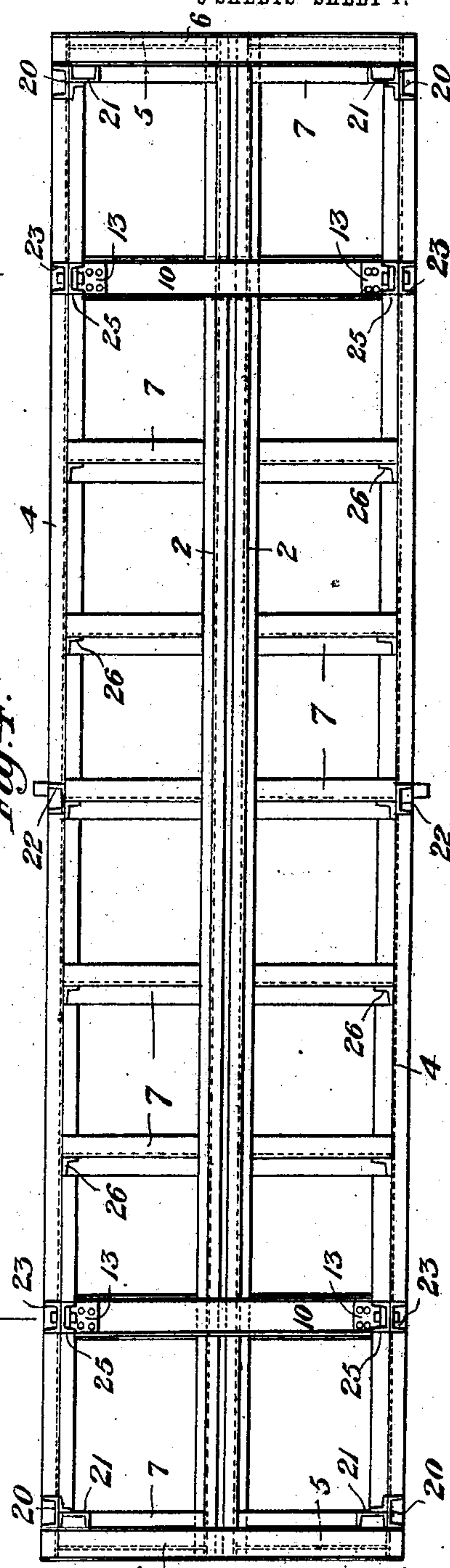
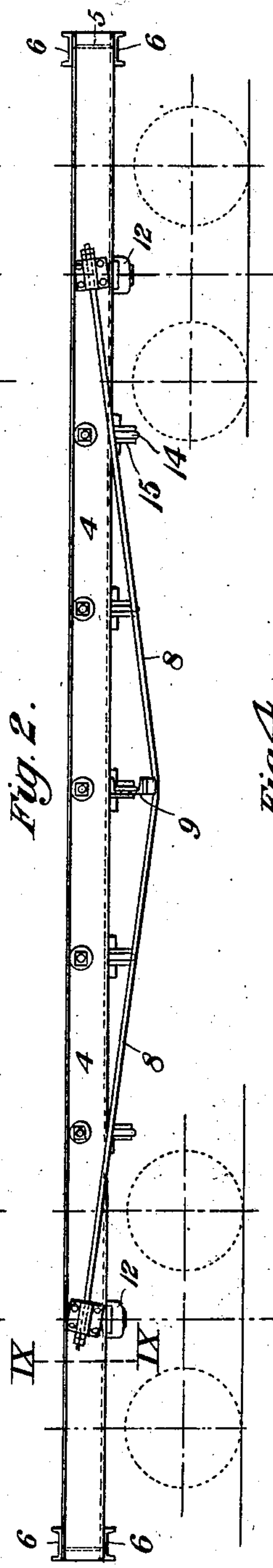
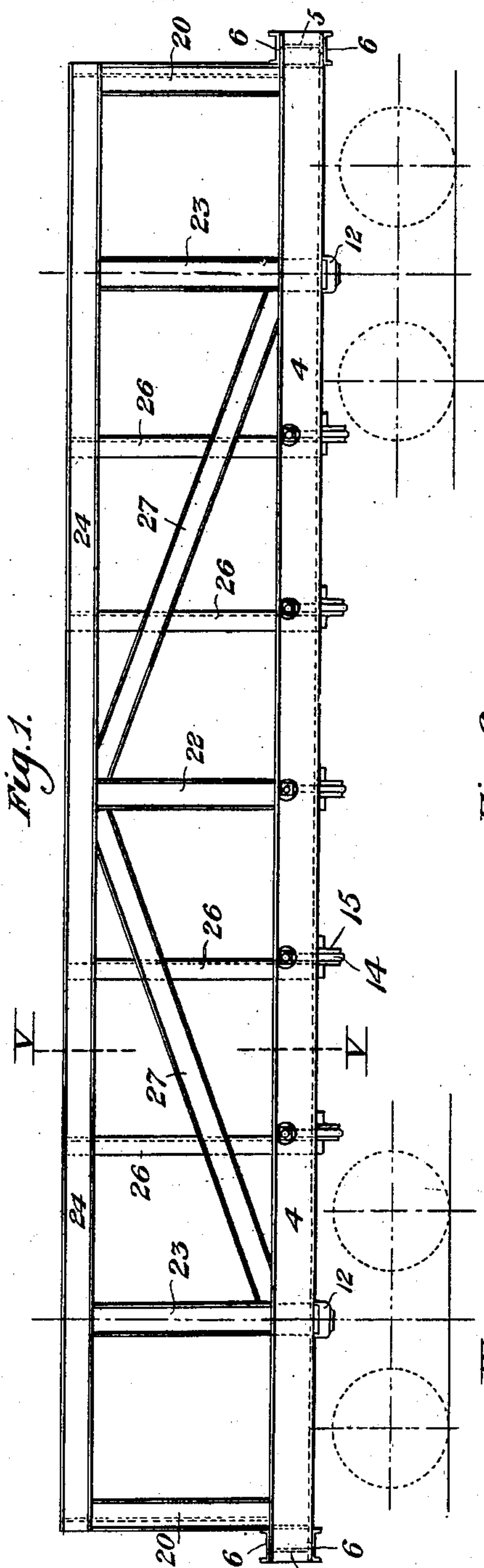
PATENTED JAN. 19, 1904.

C. M. CARNAHAN.
METALLIC CAR CONSTRUCTION.

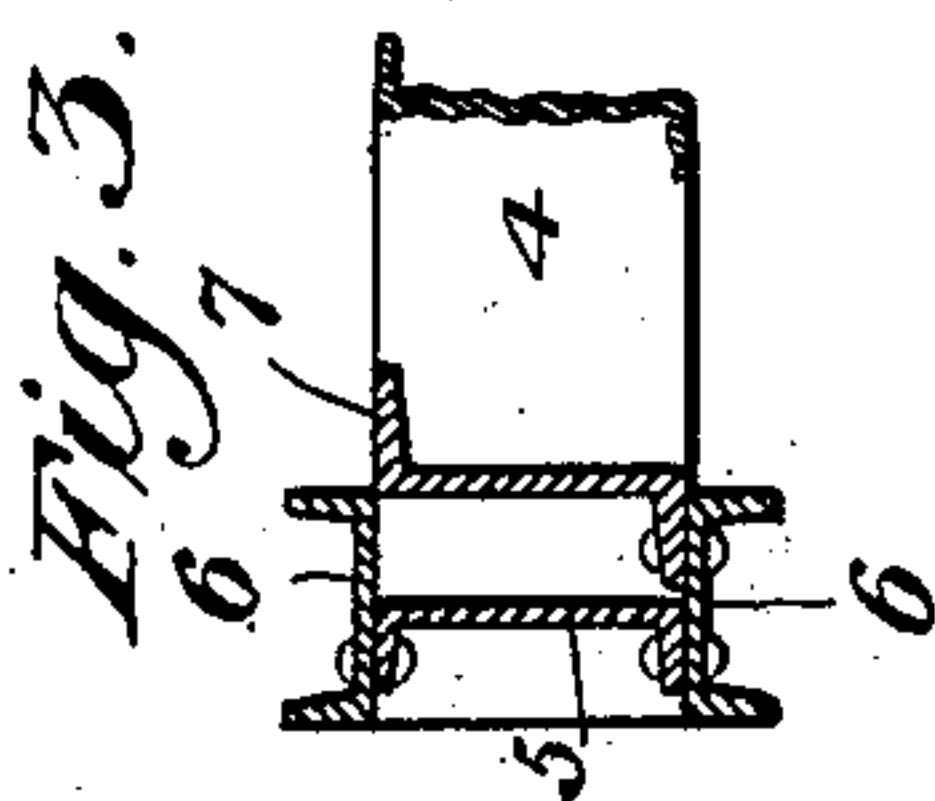
APPLICATION FILED APR. 17, 1902.

NO MODEL.

3 SHEETS—SHEET 1.



Witnesses:
E. V. Mackenzie
Chas. S. Lopley.



Inventor:
Cyrus M. Carnahan
by C. M. Clarke.
his Attorney.

PATENTED JAN. 19, 1904.

NO MODEL.

3 SHEETS—SHEET 2.

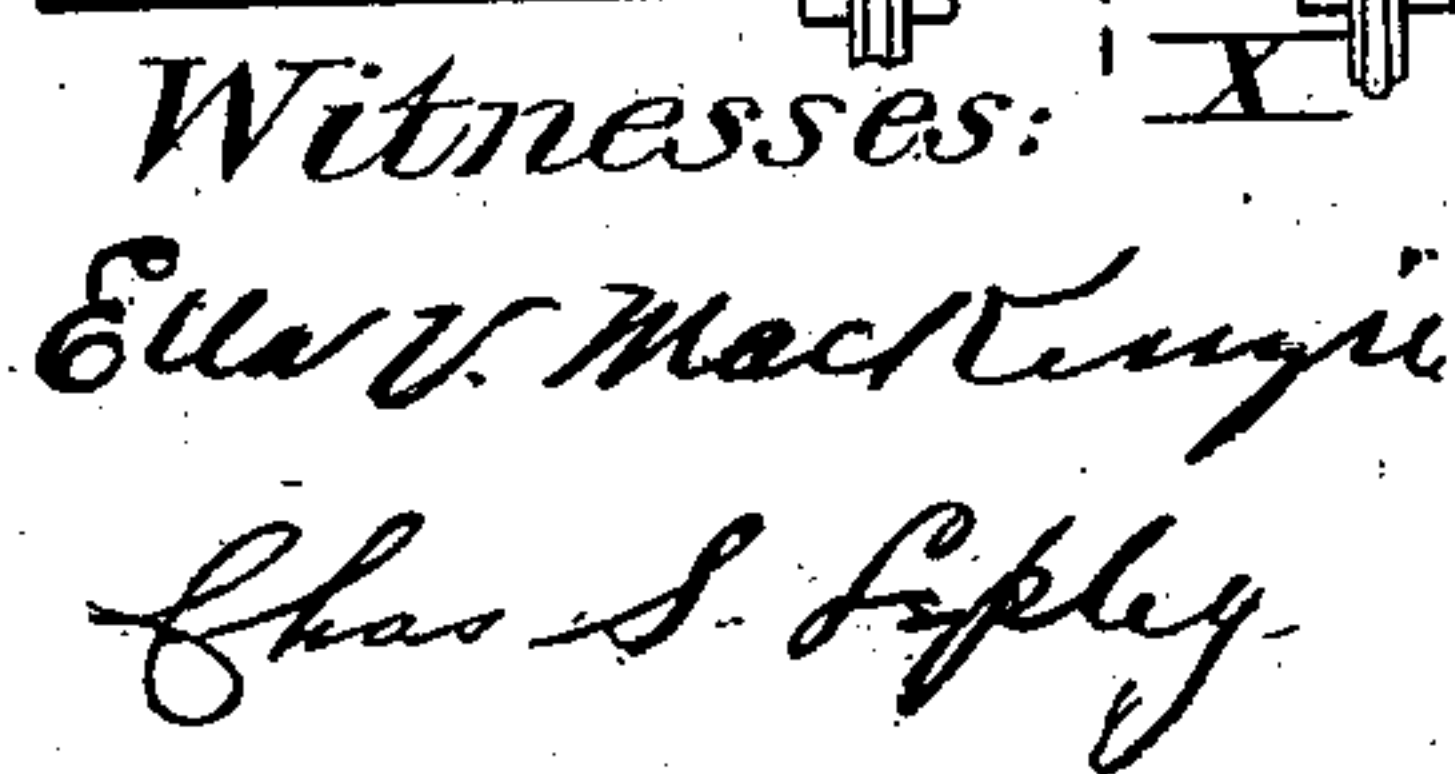


Fig. 8.

Inventor:

Cyrus M. Larnahan
by O. M. Charles
his Attorney

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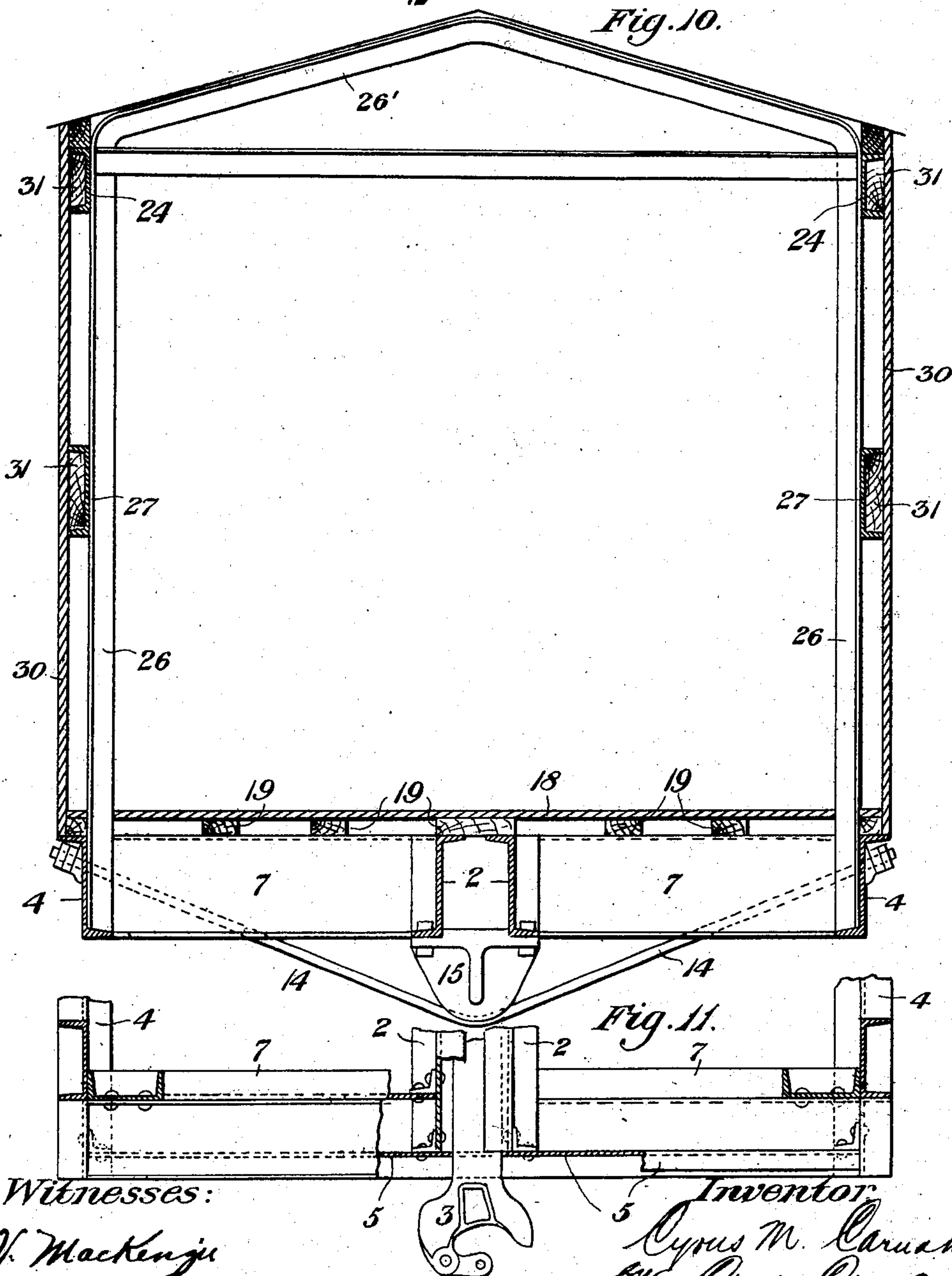
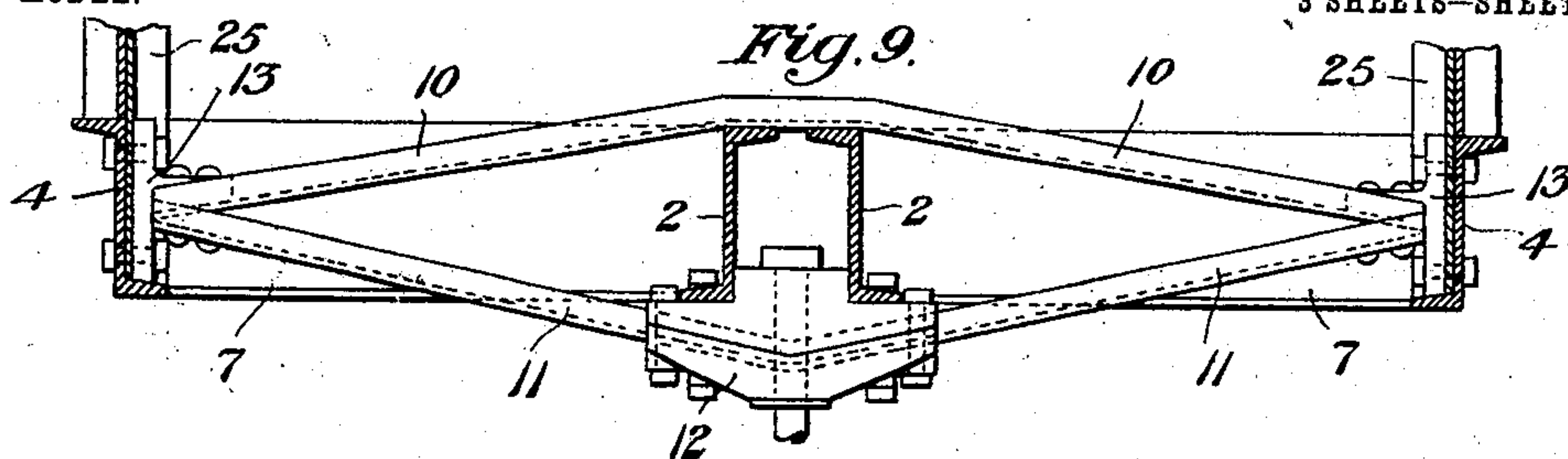
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METALLIC CAR CONSTRUCTION.

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NO MODEL.

3 SHEETS—SHEET 3.



Witnesses:

E. V. Mackenzie
Chas. S. Ledy.

Inventory

Cyrus M. Caruahan
by C. M. Clarke
his Attorney.

UNITED STATES PATENT OFFICE.

CYRUS M. CARNAHAN, OF ALLEGHENY, PENNSYLVANIA, ASSIGNOR TO
NATIONAL ROLLED STEEL CAR COMPANY, OF PITTSBURG, PENNSYLVANIA,
A CORPORATION OF NEW JERSEY.

METALLIC-CAR CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 750,049, dated January 19, 1904.

Application filed April 17, 1902. Serial No. 103,262. (No model.)

To all whom it may concern:

Be it known that I, CYRUS M. CARNAHAN, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Metallic-Car Construction, of which the following is a specification, reference being had therein to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a view in side elevation of my improved car-frame. Fig. 2 is a similar view showing the underframe alone without any superstructure. Fig. 3 is a detail sectional view of the end framing. Fig. 4 is a plan view of Fig. 1. Fig. 5 is a cross-sectional view, on an enlarged scale, indicated by the line V V of Fig. 1. Fig. 6 is a detail sectional view showing a metal side plate. Fig. 7 is a fragmentary plan view of a portion of the underframing, showing the arrangement of the side and center sills and connecting cross-sills. Fig. 8 is a partial side elevation similar to Fig. 1, showing the superstructure framing of a box-car. Fig. 9 is a cross-sectional view through the underframe, showing the construction of body-bolster indicated by the line IX IX of Fig. 2. Fig. 10 is a cross-sectional view illustrating the superstructure framework of a box-car indicated by the line X X of Fig. 8. Fig. 11 is a plan view, partially in section, of one end of the car, illustrating the arrangement of the draft-rigging.

My invention refers to an improved construction in metallic cars, and refers more particularly to the construction of the underframing or bottom structure and to the superstructure framework incorporated therewith.

The invention has in view the cheapening, strengthening, and simplifying in construction of what are known as "steel" cars, more particularly flat-bottom, platform, gondola, or box cars, by the use of standard rolled sections of structural steel—such as channels, Z-bars, angles, &c.—with members comprising the elements of the framing structure incorporated together for the purpose and in the manner hereinafter described.

The invention is designed to provide an underframe metallic structure with which may be incorporated a floor of either metal, as plates, or of wood or other suitable material laid over the underframe and secured thereto in any suitable manner, while it is also well adapted to provide an underframe with which may be incorporated metallic upper framework with which may be combined sides and ends of wood or other suitable material. The roof structure also may be supported thereon, if desired, and with all such varying types of car the foundation framework is adapted to be employed.

Referring to the drawings, 2 2 are the center sills, made of structural flanged members, as channels or Z-bars, adapted to provide top bearing-surfaces for the floor-framing, while the webs provide good attaching-faces for the cross framing members midway of the main framework running longitudinally for the full length of the car and assembled in close relation to each other and with sufficient intervening space to receive the draw-heads 3, with their accompanying draft-gear, at each end. On each side on corresponding levels with the center sills are the side sills 4 of suitable structural shape, as channels or Z-bars, the flanges and webs of which provide good bearing and attaching faces for the superstructure floor and cross framing members, and with the center and side sills are incorporated the end sills 5, likewise of similar structural members, incorporated with the side and center sills by suitable angle-brackets riveted to each other, so as to secure the parts together in the manner customary in structural work. Across the ends of the foundation structure from side to side above and below and secured to the center and side sills are the reinforcing end sill members 6 6 of suitable form, as channels, which serve to bind these parts securely together, giving a finished appearance, the upper one of such members providing an end platform for the car. Extending across the underframing structure at suitable intervals between the side and center sills to provide good bearing-supports for the floor structure

are the floor-beams 7 of structural shape, as channels, beams, or Z-bars, likewise incorporated with the side and center sills by suitable angle-brackets or other means, the upper
 5 flanges of which floor-beams are preferably flush with the upper surfaces of the side and center sills. This construction provides a foundation structure, and for the purpose of
 10 further supporting it and the superimposed load I have provided longitudinal truss-rods 8, connected at each end to the side sills in any suitable manner, depressed at their middle
 15 portion, and passed under the ends of a cross supporting-bolster 9, extending midway of the framing structure underneath from side to side, as shown in Fig. 2. The body-bolsters
 20 are located underneath the framing structure at each end in proper position to provide truck-bearings in the usual manner, and while various forms of bolsters may be utilized with the
 25 car-body I have employed upper and lower structural members, as channels 10 11, arranged in diamond form, passing over and under the center sills, incorporated with truck-
 30 bearings 12 and brought together at the ends and connected by rivets or bolts and brackets 13 to the side sills 4, as shown in Fig. 8. At intervals truss-rods 14 extend across un-
 35 derneath the center sills, engaging shoes 15, secured thereto, and are connected with the side sills in any suitable manner, thus provid-
 40 ing lateral strengthening and supporting tension members by which the load is further supported in the center. The center sills are pref-
 45 erably connected at intervals or for their full length either below and above, or both, by any suitable means, as lattice-work or longi-
 tudinal plates or angles 16, as shown in Fig. 5, or by suitable cross-braces wherever neces-
 sary. Upon such underframing or platform structure the floor 18, of wood, may be laid,
 suitable stringers or joists 19 being first laid, if desired, along the top of the side and center
 sills and over the cross-sills 7, or the floor may
 be of metal plates laid upon the side, center,
 and cross sills.

For the purpose of providing a superstructure framework post members 20 and 21 of
 50 channel or other suitable form are secured at the corners to the side and end sills, as shown, while on each side at the middle and above the
 body-bolsters are post members 22 and 23, such corner and side posts being connected
 with upper longitudinal reinforcing members
 55 24 of channel or other suitable shape. Similar post members 25 of plate or channels are
 erected on the inner sides of the body-bolster posts 23, secured to the side sills and incorpo-
 60 rated with bolster-brackets 13, as shown in Fig. 8, and at their tops with the upper lon-
 gitudinal members 24, while between such main posts on the inside are erected at inter-
 vals supplemental posts 26 of single or other
 65 form, which are joined with and serve to bind together the side sills and floor-beams at the

bottom and are also connected with the top longitudinal members 24.

The sides of the superstructure framework are reinforced and braced against vertical
 70 strains by diagonal compression members 27 of structural forms, as channels, bearing at the middle against the upper ends of posts 22
 underneath the top member 24, sloping down-
 wardly toward each end and bearing against
 75 the body-bolster posts 23, being secured to such upper and lower bearing members in any
 suitable manner.

When it is desired to provide a box-car su-
 perstructure, the side members are merely ex-
 80 tended upwardly to a suitable height, as shown in Figs. 8 and 10, the opening 28 for the door
 being provided by employing two posts 22' at the middle on each side of a suitable space, the
 other construction being the same as has been
 85 just described.

The top of the car may be of any conven-
 90 ient construction, and good results may be had by continuing the post members 26 across, pro-
 viding roof-purlins 26', as shown in Fig. 9, or by securing supplemental roof-purlins to the
 95 tops of the various posts or members 24 and providing such other connecting or bracing
 devices as may be required in connection with the roof.

When it is desired to utilize metallic plates
 95 for the sides and ends, such plates may be conveniently secured to and between the outer
 posts and diagonal braces and the inner posts, as shown at 29, Fig. 5. When it is desired to
 100 make the sides and ends of wood, as indicated at 30, Figs. 5 and 10, the siding is laid over
 the outer sides of the superstructure frame-
 work, being secured to strips 31, laid along
 the posts and brace members and secured there-
 105 in by bolts countersunk in the wood.

It will thus be seen that means are provided
 in the framing structure throughout, includ-
 110 ing the underframing, sides, and ends, for incorporating with it floors, sides, and ends of
 either metal or wood, and my improved car-
 framework is therefore well adapted to either
 type of car or to combinations of both types.

As thus constructed, my improved car-
 115 frame is entirely composed of metal so incorporated as to provide simplicity and economy
 of construction with strength, durability, and adaptability to various forms or designs of
 upper construction. The foundation struc-
 120 ture, the sides, and ends are well connected and braced, the strains are equally disposed
 throughout, the parts are few and simple in construction and erection and being composed
 of commercial rolled shapes avoid the ne-
 cessity of complicated and expensive pressing
 125 and forming machinery,

Changes and variations may be made in the
 design, details, or other elements of the in-
 130 vention by the skilled mechanic; but all such changes are to be considered as within the
 scope of the following claims.

What I claim is—

1. In a metallic car, an underframe consisting of side sills, center sills, end sills and floor-beams of flanged structural members, the upper flanges thereof conforming to a common floor-level, and reinforcing end sills of structural members for the full width of the underframe extending above and below the top and bottom thereof, substantially as set forth.

2. In a metallic car, an underframe consisting of side sills, center sills, end sills and floor-beams of flanged structural members, the upper flanges thereof conforming to a common floor-level, and reinforcing end sills of structural members for the full width of the underframe above the top thereof, means for securing the members together, a lower cross supporting-bolster, and truss-rods engaging the bolster and secured at each end to the side sills, substantially as set forth.

3. In a metallic car, an underframe consisting of side sills, center sills, end sills and floor-beams of flanged structural members, the upper flanges thereof conforming to a common floor-level, and reinforcing end sills of structural members for the full width of the underframe extending above the top thereof, means for securing the members together, and transverse truss-rods supporting the center sills and secured to the side sills, substantially as set forth.

4. In a metallic car, an underframe consisting of side sills, center sills, end sills and floor-beams of flanged structural members, the upper flanges thereof conforming to a common floor-level, and reinforcing end sills of structural members for the full width of the underframe extending above the top, means for securing the members together, and transverse body-bolsters of structural members in engagement with the center sills and secured to the side sills, substantially as set forth.

5. In a metallic car, an underframe consisting of side sills of Z-bars having outwardly-extending upper flanges, center sills, floor-beams and end sills of flanged structural members, the upper flanges of said members conforming to a common floor-level, means for securing the members together, and reinforcing end sills of structural members for the full width of the underframe extending above the top thereof, substantially as set forth.

6. In a metallic car, the combination of side sills, center sills, end sills and floor-beams of flanged structural members, the upper flanges of said members conforming to a common floor-level, supplemental reinforcing end sills, post members for the sides and ends, and means for securing the members together, substantially as set forth.

7. A metallic car consisting of side sills, center sills, end sills and floor-beams of flanged structural members, the upper flanges of said members conforming to a common floor-level, supplemental reinforcing end sills, post mem-

bers for the sides and ends, and sides and ends of plates secured thereto, substantially as set forth.

8. In car construction, an underframe composed of center sills of flanged structural members, side sills of Z-bars having outwardly-extending upper flanges, floor-beams and end sills of flanged structural members, the upper flanges of said members conforming to a common floor-level, post members for the sides and ends, and means for securing the members together.

9. In car construction, an underframe composed of center sills of flanged structural members, side sills of Z-bars having outwardly-extending upper flanges, floor-beams and end sills of flanged structural members, the upper flanges of said members conforming to a common floor-level, post members for the sides and ends, diagonal side-bracing members, and means for securing the members together.

10. In car construction, an underframe composed of center sills of flanged structural members, side sills of Z-bars having outwardly-extending upper flanges, floor-beams and end sills of flanged structural members, the upper flanges of said members conforming to a common floor-level, post members for the sides and ends, top members for the sides and ends, diagonal side-bracing members, and means for securing the members together.

11. In car construction, an underframe composed of center sills, side sills having outwardly-extending upper flanges, floor-beams and end sills of flanged structural members, the upper flanges of said members conforming to a common floor-level, inner and outer post members incorporated with the side sills and floor-beams, and means for securing the members together.

12. In a car construction, an underframe composed of center sills, side sills, floor-beams and end sills of flanged structural members, the upper flanges of the said members conforming to a common level, body-bolsters of structural material, inner post members incorporated with the side sills and bolster ends, and inner and outer post members connected with the floor-beams and side sills, with means for securing the members together.

13. In car construction, an underframe composed of center sills, side sills, floor-beams and end sills of flanged structural members, the upper flanges of said members conforming to a common floor-level, angle-brackets connecting the floor-beams and end sills with the side and center sills, and reinforcing upper and lower end sills secured to the side and center sills.

14. In car construction, an underframe, composed of center sills of flanged structural members, side sills of Z-bars having outwardly-extending upper flanges, floor-beams and end sills of flanged structural members, the upper flanges of said members conforming to a com-

mon floor-level reinforcing end sills extending upwardly therefrom, and a floor structure laid over and supported by the side, center and cross sills and floor-beams, respectively.

- 5 15. In car construction, an underframe composed of center sills of flanged structural members, side sills of Z-bars having outwardly-extending flanges, floor-beams and end sills of flanged structural members, the upper flanges
10 of said members conforming to a common floor-level reinforcing end sills extending up-

wardly therefrom, post members for the sides and ends, a floor structure, and sides and ends incorporated with the said framework, and means for securing the parts together. 15

In testimony whereof I affix my signature in presence of two witnesses.

CYRUS M. CARNAHAN.

Witnesses:

JAS. J. McAFEE,
C. M. CLARKE.