

No. 661,698.

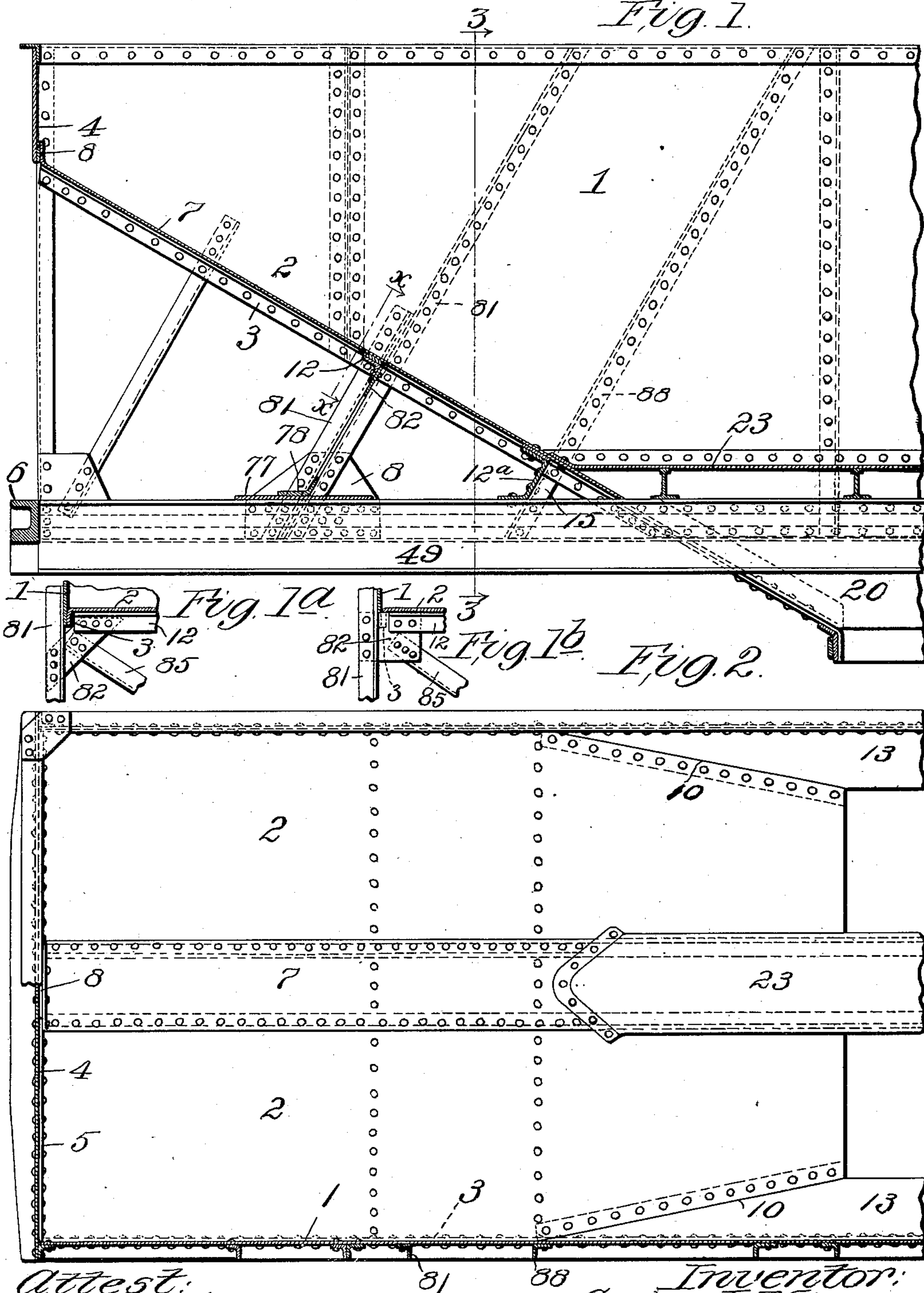
Patented Nov. 13, 1900.

G. I. KING.  
HOPPER BOTTOM CAR.

(Application filed Aug. 17, 1900.)

(No Model.)

2 Sheets—Sheet 1.



Attest:  
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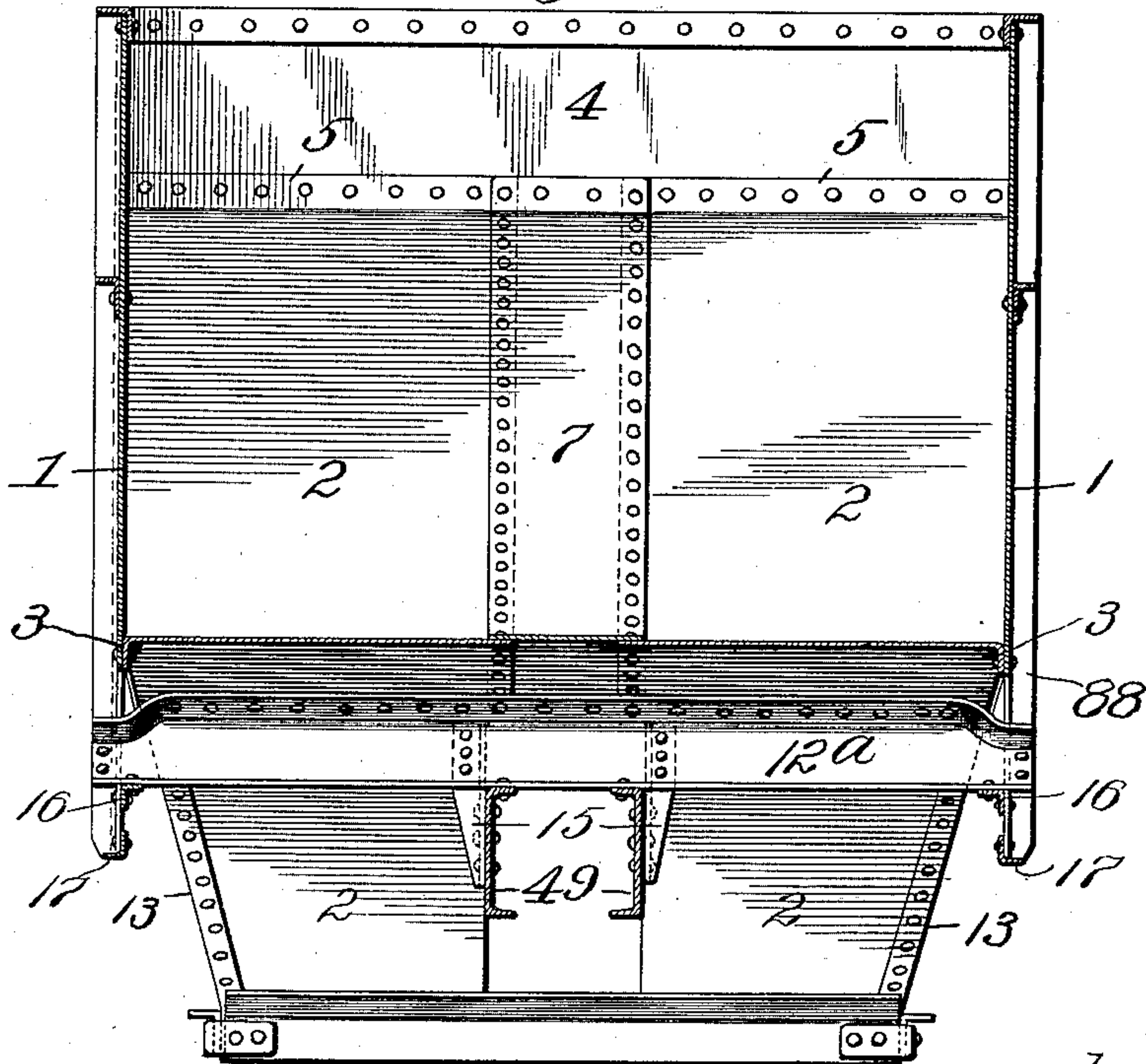
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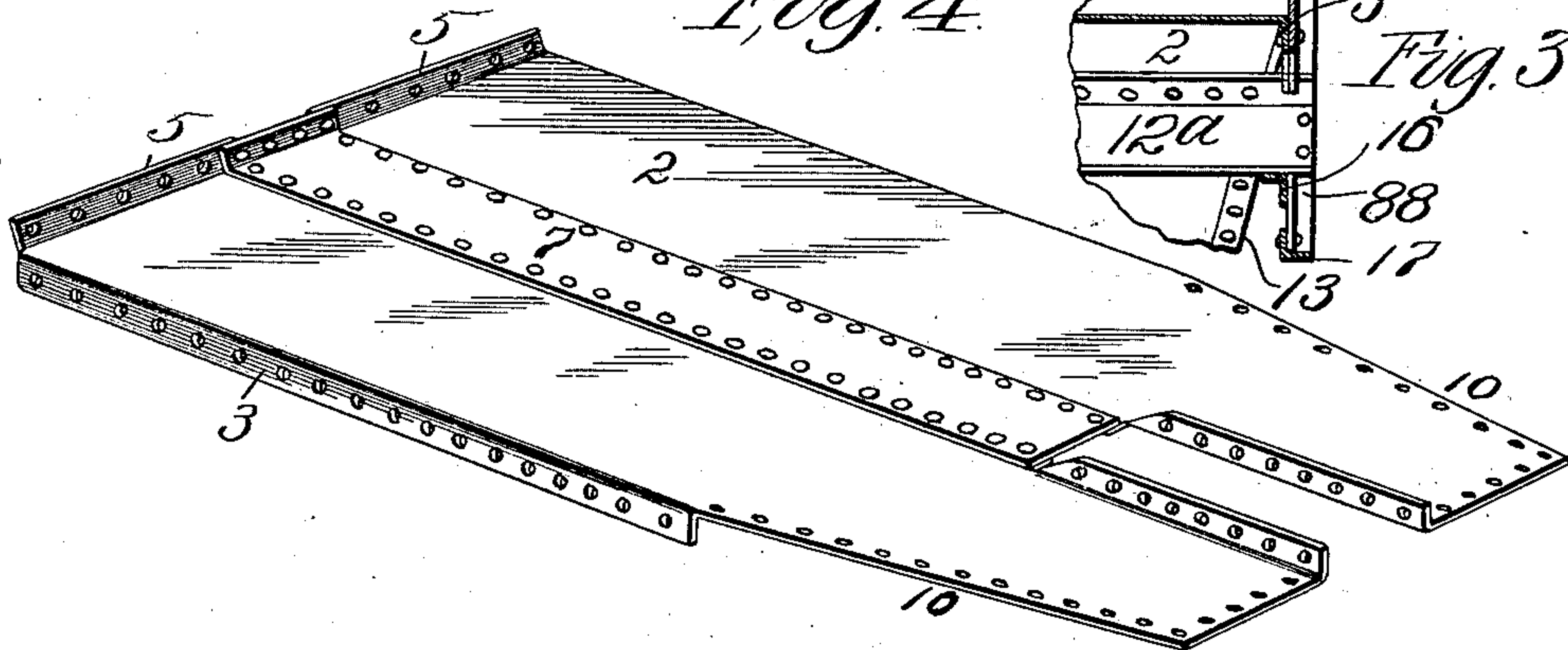
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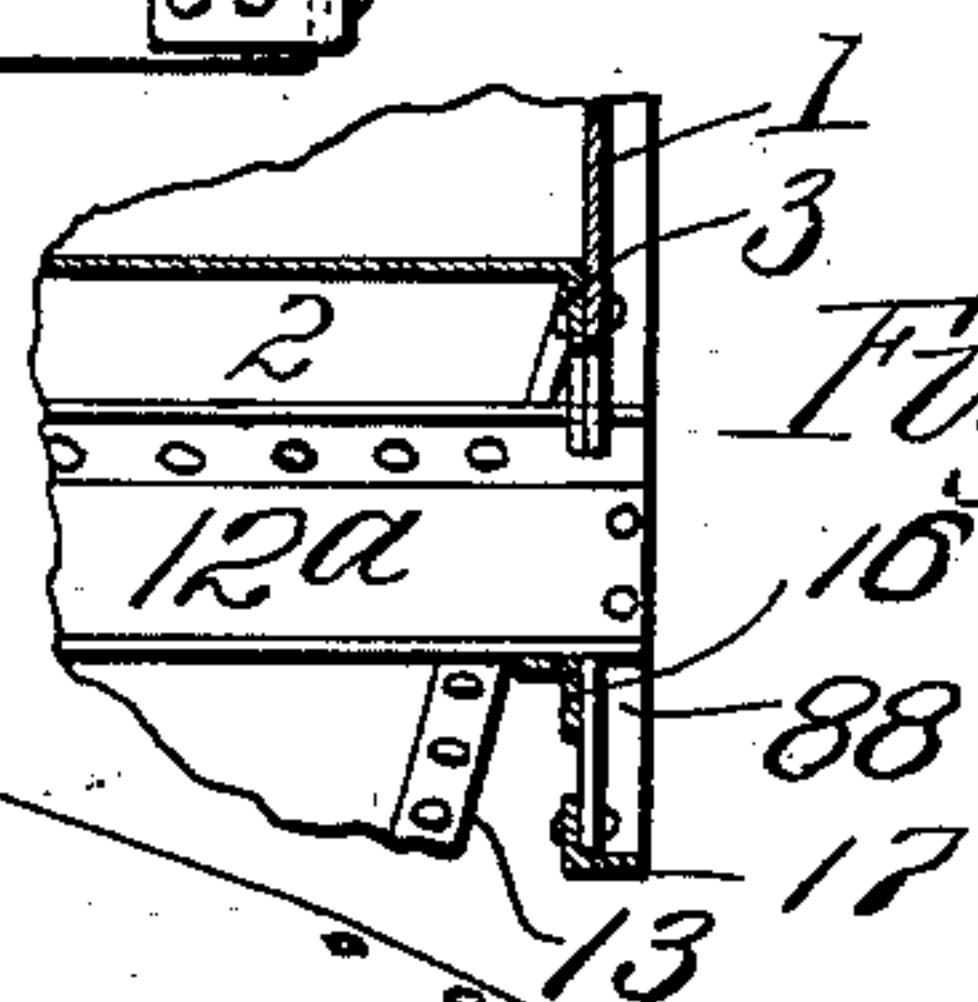
*Fig. 3.*



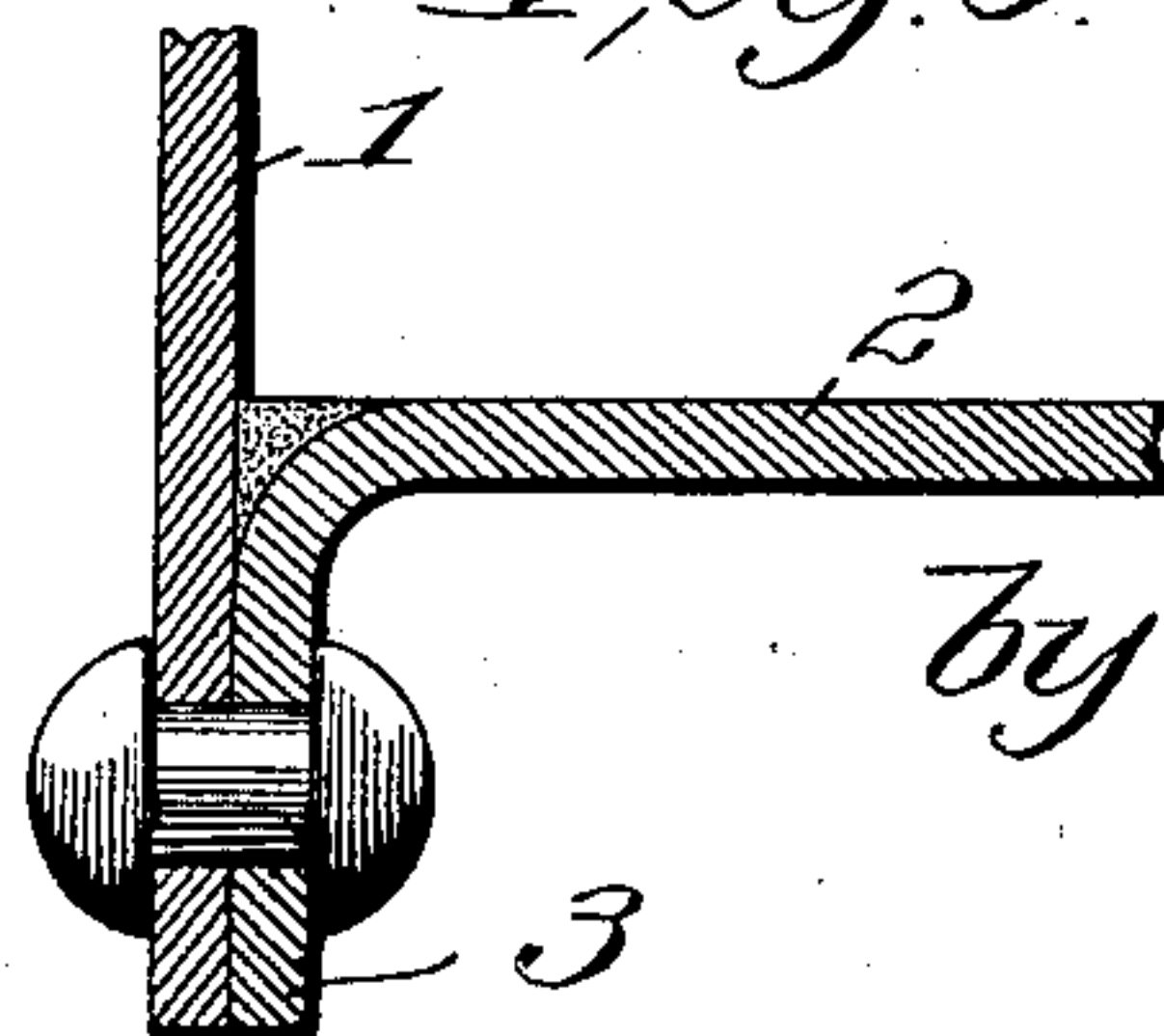
*Fig. 4.*



*Fig. 3a.*



*Fig. 5.*



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# UNITED STATES PATENT OFFICE.

GEORGE I. KING, OF DETROIT, MICHIGAN, ASSIGNOR TO THE AMERICAN CAR AND FOUNDRY COMPANY, OF ST. LOUIS, MISSOURI.

## HOPPER-BOTTOM CAR.

SPECIFICATION forming part of Letters Patent No. 661,698, dated November 13, 1900.

Application filed August 17, 1900. Serial No. 27,163. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE I. KING, a citizen of the United States, residing at the city of Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Hopper - Bottom Cars, 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 use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a vertical sectional view through one end of my improved hopper-bottom car. Fig. 1<sup>a</sup> is a detail sectional view on line *x x*, Fig. 1. Fig. 1<sup>b</sup> is a view corresponding to Fig. 1<sup>a</sup> and showing a modified form of connection between the floor-beam and the inclined stiffening-brace. Fig. 2 is a top plan view, partly in section, of one end of my improved car. Fig. 3 is a vertical sectional view on line 3 3, Fig. 1. Fig. 3<sup>a</sup> is a detail view showing the flange on the floor-plates cut away to receive the projecting ends of the floor-beam. Fig. 4 is a detail view of the floor-plates, showing the manner of flanging the edges thereof; and Fig. 5 is a detail sectional view showing the connection between the floor and side plates.

This invention relates to a new and useful improvement in hopper-bottom cars, the object being to form the different parts of which the car is composed of structural and pressed metal, the connections between the parts being so arranged that rivets can be driven by a machine instead of by hand, whereby a great saving in labor and time is effected.

With this object in view the invention consists in the arrangement, construction, and combination of the several parts, all as will hereinafter be described and afterward pointed out in the claims.

The construction shown in the accompanying drawings is similar to that illustrated in an application for United States Letters Patent filed by me on or about February 26, 1900, serially numbered 6,534, and my present invention is designed especially as an improvement upon the hopper-bottom car shown in my former application.

In the drawings, 1 indicates the side plates

of a car-body, which are preferably sheared to the proper shape.

2 indicates the floor-plates, which preferably extend longitudinally the car, said floor-plates having depending flanges 3 along their parallel sides, the lower edges of which flanges are designed to coincide with the lower edges of the side plates 1. By bending the side edges of the floor-plates downwardly, as shown in Fig. 5, it is possible to drive the rivets which secure the floor-plates to the side sheets by a suitable riveting-machine, all the rivets passing through these depending flanges and this portion of the side plate being accessible to the machine.

4 indicates the end plate, to which the floor-plates are secured through the medium of upwardly-extending flanges 5, formed on the upper ends of the floor-plates, as shown in Fig. 1. By providing the upwardly - extending flange at the ends of the floor-plates, so as to form a vertical connection with the end sheet, it is possible to use a machine for driving the rivets, and thus minimize time and labor in making this connection.

7 indicates a cover-plate which is centrally arranged and riveted at its edges to the inner edges of the floor-plates 2. This cover-plate 7 is flanged upwardly at its upper end and riveted to the end sheet similar to the floor-plates, a filler 8 being interposed between the flange of the cover-plate and the end sheet, as shown in Fig. 1.

The lower outer edges of the floor-plates 2 are sheared inwardly, as at 10, Fig. 4, to cooperate with the inclined side hopper-plates 13, said hopper-plates being provided with inwardly-extending flanges along their lower edges, which extend under the sheared portion 10 and are riveted to the floor-plates 2. It will of course be understood that where the outside hopper-plates are vertical the floor-plates will not be sheared at an angle, but will have parallel unflanged edges for attachment to the inturned flanges of the hopper-plates. The lower inner edges of the floor-plates are flanged upwardly (see Fig. 4) for the purpose of being connected to the center sills 49. There are the usual inside hopper-sheets 20, depending from the outer faces



of the side sills, said hopper-sheets being preferably interposed between the flanges 12 and the center sills. A hood 23 is arranged above the center sills where said sills pass through the body portion of the car.

6 indicates the end sills, to which end sills corner-posts and the side sills composed of the angles 16 and 17 are secured.

77 indicates the cover-plate for the body-bolster, the latter not being shown, upon which cover-plate is arranged an angle connection-plate 78.

80 represents connection-plates secured to the side sills opposite the ends of the body-bolster, to which connection-plates are secured the twin brace-bars 81, forming the inclined stiffening-braces at the ends of the car. In order to escape the joint formed by the flange 3 at the sides of the bottom plates, the floor-beam 12, to which the floor-plates are riveted, is cut short of said flange and an inclined connection-piece 82 employed, said connection-piece being secured to the depending flange of the floor-beam and between the twin brace-bars 81, as shown in Fig. 1<sup>a</sup>. To this connection-plate 82 the diagonal 85, forming one of the floor-supports, is secured. As shown in Fig. 1<sup>b</sup>, instead of having the connection-piece 82 inclined so as to escape the downturned flange of the floor-plate, a connection-plate 82<sup>a</sup> may be employed, as shown in Fig. 1<sup>b</sup>, the downturned flange of the floor-plate and the lower edge of the side plate being recessed or notched to permit this connection-plate 82<sup>a</sup> to project laterally therebeyond for attachment to the inclined stiffening-brace.

Instead of forming the inner floor-beam of two angles with lattice-work between them, as shown and described in my former application, I prefer to make the floor-beam 12<sup>a</sup> (see Figs. 1 and 3) of pressed metal, the web thereof being disposed at right angles to the inclination of the floor-plates, the bottom flange being secured to the center and side sills by suitable rivets, while the top flange is riveted to the floor-plates and at the ends of the beam bent downwardly to escape the flanges 3 of the floor-plates. Instead of bending the end of this beam to escape the downturned flanges at the sides of the floor-plates said flanges may be cut away, as shown in Fig. 3<sup>a</sup>, so as to receive the ends of the floor-beam, whereby the top flange of said beam is substantially parallel to the bottom flange throughout the length of the beam. The beam 12<sup>a</sup> is extended laterally beyond the side plates and secured to the inclined stiffening-braces 88, which inclined stiffening-braces extend upwardly along the side plates of the car-body, to which they are attached, and downwardly where they are secured to the side sills.

As shown in Fig. 3, angles 15 are riveted to the web of the floor-beam 12<sup>a</sup>, said angles being arranged on each side of the center

sills, to which they are riveted. By the use of these angles the floor-beam is tied to the center sills, and in the event that the center sills tend to deflect more than the plate-girder sides said center sills will be supported by the floor-beam through these angles 15. The angles 15 are employed to strengthen the structure and afford such support for the center sills, rather than placing reliance on the few rivets which secure the bottom flange of the floor-beam to the center sills.

As shown in Fig. 5, tar or other suitable substance may be employed to calk the seams between the side plates and side sheets for well-understood purposes.

It is obvious that instead of making the inclined floor of three plates, as shown in Fig. 4, one plate will be used wherever the size of the car permits it, said single plate being sheared and flanged, substantially as shown in Fig. 4. The only reason for making the floor of three plates, as shown in the drawings, is because no single plate is at present manufactured of such dimensions as to fit a car of the size from which the accompanying drawings are made. The car from which these drawings are made with respect to the body portion is thirty-two feet long and nine feet wide, inside measurements, and has a capacity of one hundred and ten thousand pounds. Of course where smaller cars are built it is possible to make the floor-plates in one piece.

I am aware that minor changes in the arrangement, construction, and combination of the several parts of my device can be made and substituted for those herein shown and described without in the least departing from the nature and principle of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination with the side plates, of the inclined bottom plates formed with downturned flanges which extend to the lower edges of the side plates, and securing devices which pass through said flanges and side plates; substantially as described.

2. The combination with the side plates and the end plate, of the longitudinal floor-plates formed with depending flanges at their sides which are coextensive in depth with the side plates, the outer ends of said floor-plates being provided with upwardly-extending flanges, and devices for securing said floor-plates to the side and end plates; substantially as described.

3. The combination with the side and end plates of a car-body, of inclined floor-plates arranged longitudinally, a cover-plate arranged centrally of the floor-plates, downturned flanges 3, at the side edges of the floor-plates which extend to the lower edges of the side plates substantially throughout the length of their inclined portions, and cooperate with the side plates at this point, devices for securing said flanges to the side plates,



and means for securing the outer end of the floor-plates to the end plate; substantially as described.

4. The combination with the side plates, of 5 inclined floor-plates, downturned flanges at the side edges of the floor-plates which cooperate with the lower edges of the side plates, and hopper-plates secured to the side plates and having inturned flanges at their lower 10 edges, the side edges of the floor-plates opposite said hopper-plates being unflanged and secured to the flanges of the hopper-plates; substantially as described.

5. The combination with the side plates, of 15 the inclined floor-plates, downturned flanges at the side edges of the floor-plates which cooperate with the lower edges of the side plates, the inner ends of the floor-plates being sheared or cut at an angle, and inclined hopper-plates 20 secured to the side plates and having inturned flanges at their lower edges extending under the floor-plates; substantially as described.

6. In a car, the combination with the center sills and the side plates, of inclined floor- 25 plates whose side edges are flanged downwardly and secured to the side plates, and whose inner edges are flanged upwardly and secured to the center sills; substantially as described.

7. In a hopper-bottom car, the combination 30 with the side plates, of the floor-plates provided with downwardly-extending flanges which are secured to the side plates, inclined stiffening-braces, a floor-beam arranged under the floor-plates, and a connection-plate 35 between said floor-beam and inclined stiffening-braces; substantially as described.

8. In a hopper-bottom car, the combination 40 with the side plates, of the floor-plates provided with downwardly-extending flanges which are secured to the side plates, inclined stiffening-braces, a floor-beam arranged under the floor-plates, a connection-plate be-

tween said floor-beam and inclined stiffening-braces, and diagonals secured to said connection-plate; substantially as described. 45

9. The combination with the side plates, and side and center sills, of floor-plates which are flanged downwardly at their side edges and riveted to the side plates, inclined stiff- 50 ening-braces secured to the side plates and to the side sills, a floor-beam comprising a web disposed substantially at right angles to the inclination of the floor-plates, a bottom flange which is secured to the side and center 55 sills, and a top flange which is secured to the floor-plates, said top flange being bent at the ends of the beam to pass under the flanges on the floor-plates, and said floor-beam being secured at its ends to the inclined stiffening- 60 braces; substantially as described.

10. The combination with the side walls of a car in the form of plate-girders, of a floor-beam carried by said side walls, and center sills which are supported by said floor-beams; 65 substantially as described.

11. The combination with the side walls of a car in the form of plate-girders, of floor-beams carried by said plate-girders, center sills, and devices carried by said floor-beams 70 for supporting the center sills; substantially as described.

12. The combination with the side walls of a car in the form of plate-girders, of inclined stiffening-braces, floor-beams secured to said 75 inclined stiffening-braces, center sills, and means for tying the center sills to the floor-beam; substantially as described.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, 80 this 14th day of August, 1900.

GEORGE I. KING.

Witnesses:

WM. H. SCOTT,  
F. R. CORNWALL.