

No. 723,067.

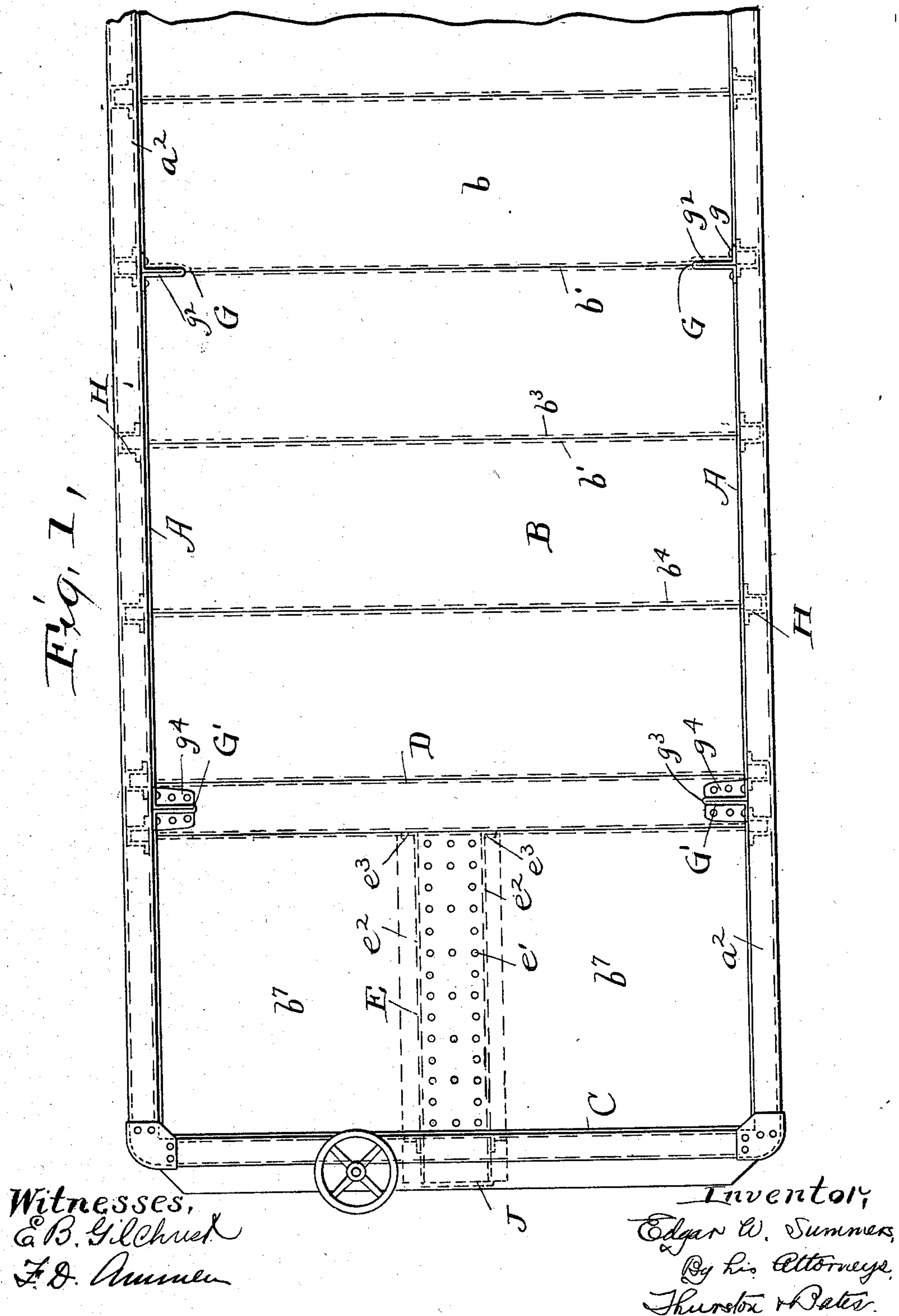
PATENTED MAR. 17, 1903.

E. W. SUMMERS.  
METALLIC CAR.

APPLICATION FILED MAR. 16, 1901.

NO MODEL.

4 SHEETS—SHEET 1.



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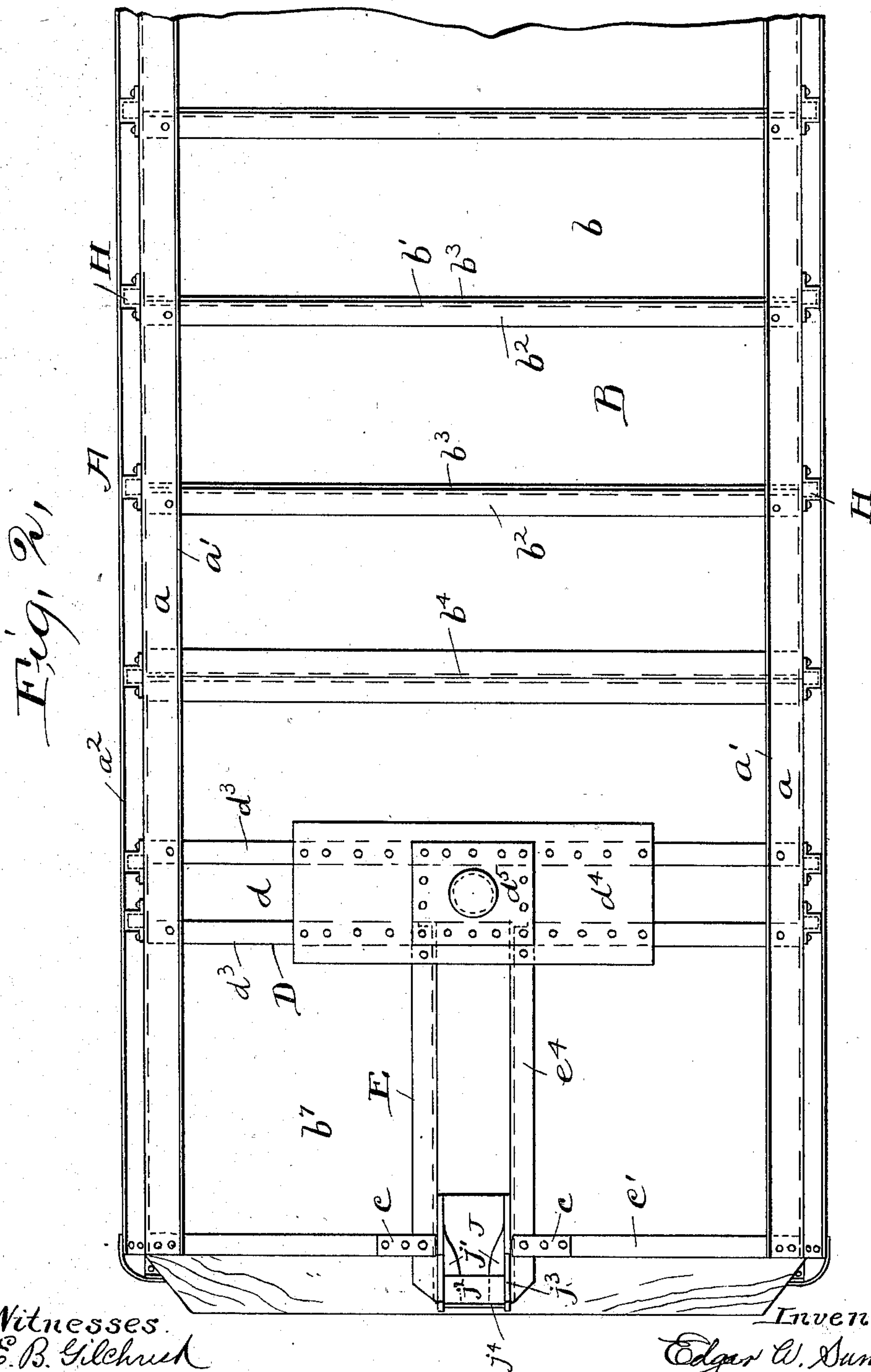
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4 SHEETS--SHEET 2.



Witnesses.  
E. B. Gilchuck  
F. D. Ammen

Inventor:  
Edgar W. Summers,  
By his Attorneys,  
Thurston & Bates.





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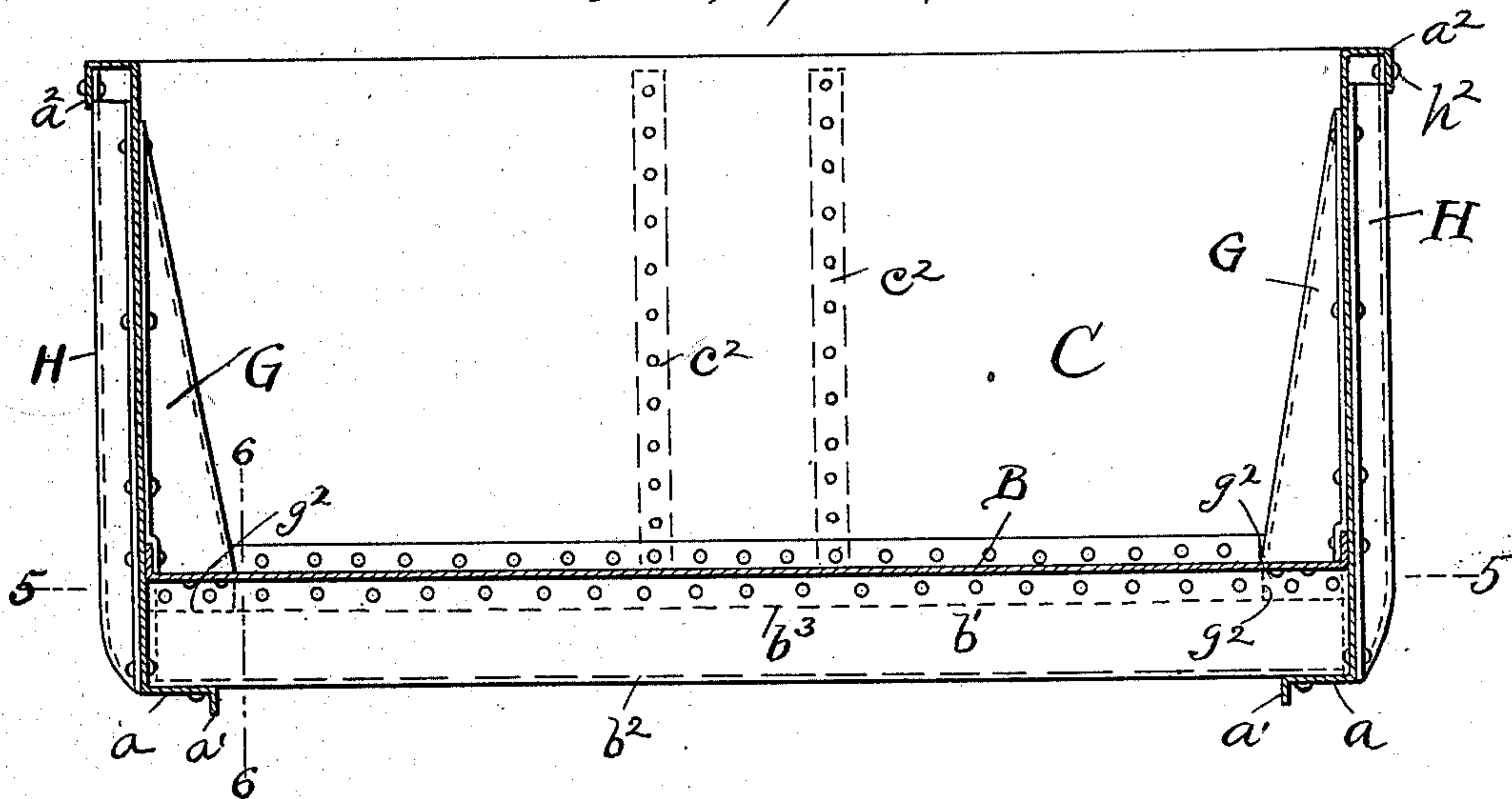
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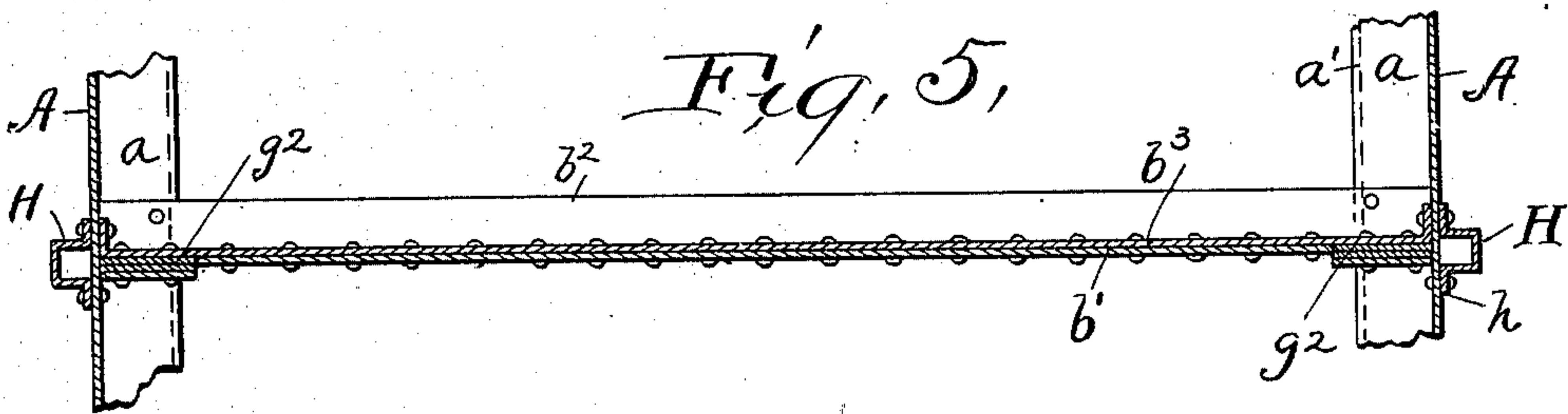
NO MODEL.

4 SHEETS—SHEET 4.

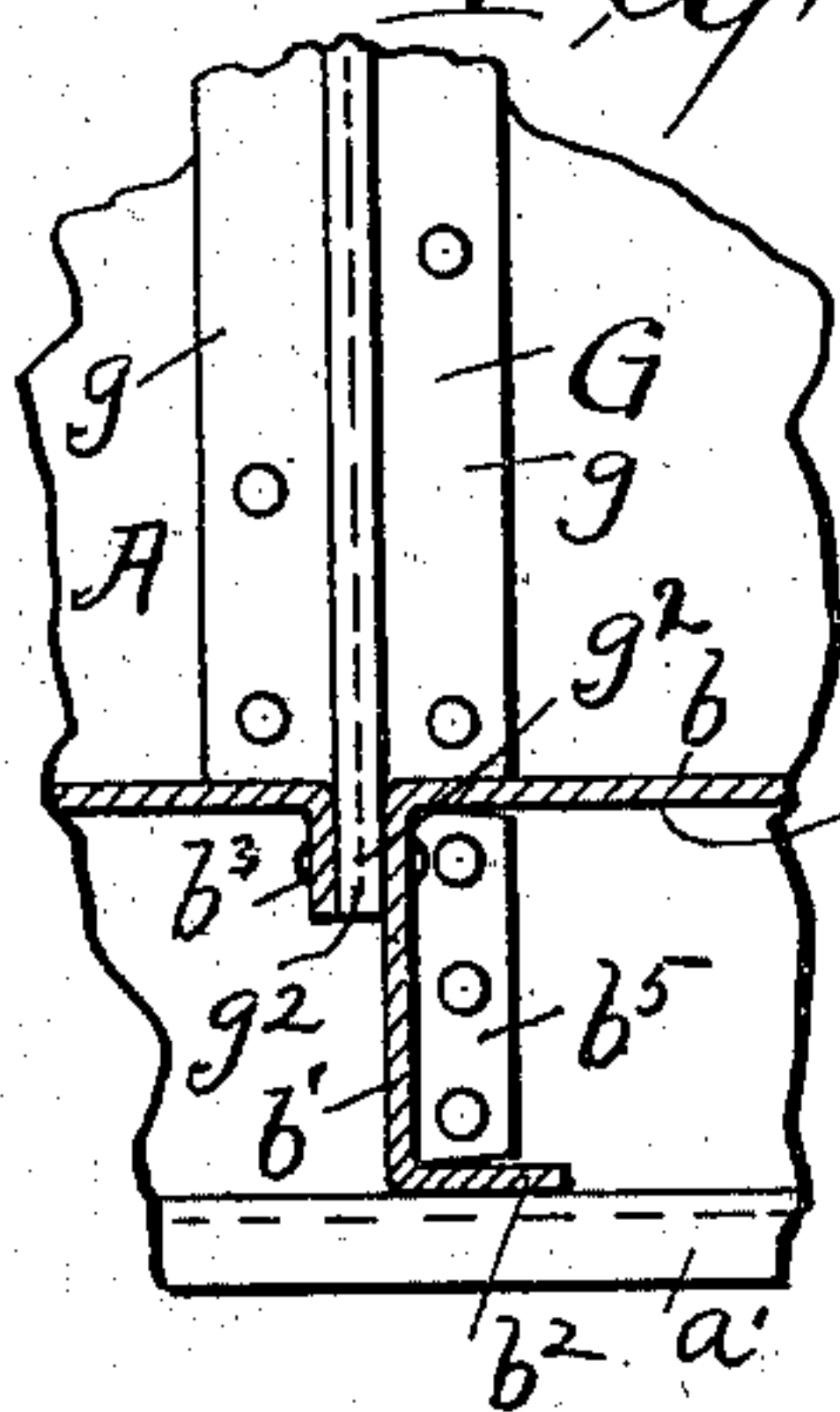
*Fig. 4,*



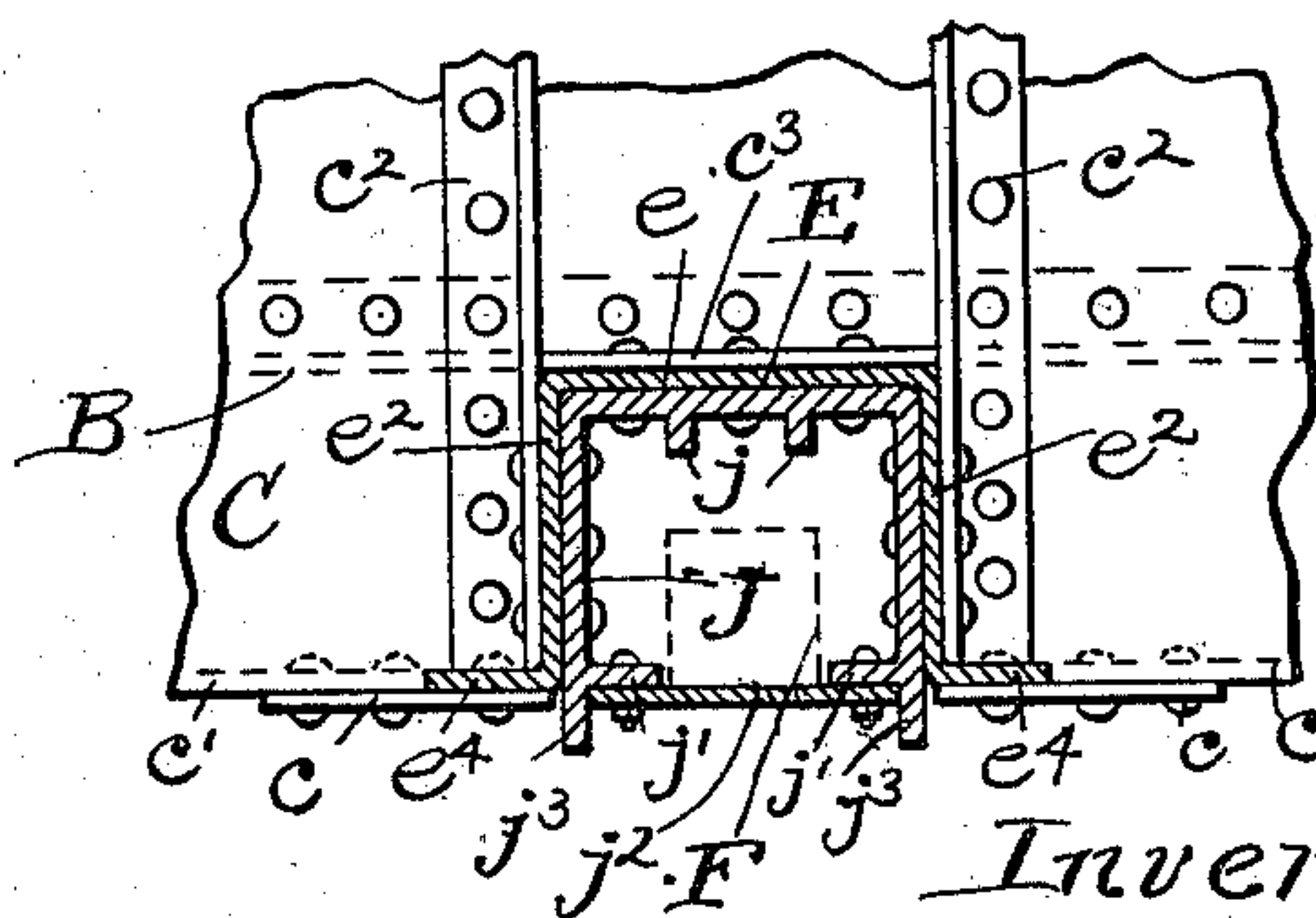
*Fig. 5,*



*Fig. 6,*



*Fig. 7,*



Witnesses  
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Edgar W. Summers,  
By his Attorneys,  
Thurston & Bates.



# UNITED STATES PATENT OFFICE.

EDGAR W. SUMMERS, OF AKRON, OHIO.

## METALLIC CAR.

SPECIFICATION forming part of Letters Patent No. 723,067, dated March 17, 1903.

Application filed March 16, 1901. Serial No. 51,425. (No model.)

*To all whom it may concern:*

Be it known that I, EDGAR W. SUMMERS, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented a certain new and useful Improvement in Metallic Cars, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The object of my invention is to provide a sheet-steel railway-car which shall combine the characteristics of lightness, strength, and rigidity with those of cheapness of construction and durability in service.

With this object in view I have turned my attention to all parts of the car; and the present invention relates to the construction and support for the floor of the car, to the bracing of the car sides, to the construction and arrangement of the bolster-beam, and the construction and arrangement of the draft-beam and its connection whereby the draft from one end of the car to the other is carried solely by the sides of the car without the necessity of intermediate longitudinal beams.

The invention may be summarized as consisting in the means which contribute to the above ends, as hereinafter more fully explained, and definitely set out in the claims.

The drawings clearly illustrate my invention.

Figure 1 is a top plan of a portion of the car constructed in accordance therewith. Fig. 2 is a bottom plan. Fig. 3 is a vertical longitudinal section. Fig. 4 is a vertical transverse section. Fig. 5 is a fragmentary horizontal section, being on the line 5 5 of Figs. 3 and 4. Fig. 6 is a fragmentary vertical section, being on the line 6 6 of Fig. 4; and Fig. 7 is a fragmentary vertical section on the line 7 7 of Fig. 3. Fig. 8 is an end view of the casting for reinforcing the draft-beam.

In the drawings, A A represent the sides of the car; B, the floor; C, the end; D, the bolster; E, the draft-beam; F, the draw-head, and G and H interior and exterior braces for the sides.

The floor consists of sheet-metal plates  $b$ , having their transverse edges turned downward and riveted together, so as to make a

continuous smooth surface on the upper side. One or both of these downturned edges is continued downward, as at  $b'$ , and then back parallel with the floor-plate, as at  $b^2$ , to form a channel-shaped cross-beam. I consider it usually most economical to form one edge  $b^3$  of the plate simply as a flange and riveting it to the side of the channel-beam formed by the adjacent plate; but where desired to save space in the depth of the beam I form a double channel-beam by the abutting edges to contiguous plates, as over the wheel at  $b^4$  in Fig. 3. In either event I have provided by this means a very efficient and cheap construction, for metal is saved over a construction where a complete channel-beam is employed separate from the floor-plate. The construction, moreover, is stiffer, metal is saved in rivets, and smoothness of the upper side of the floor is obtained.

The sides of the car consist of continuous vertical steel plates riveted together at their ends. The lower edges of these plates are bent inward, as at  $a$ , Fig. 4, and are bent downward, as at  $a'$ . The portion  $a$  comes directly beneath the cross-beams, and these portions are riveted to the bottom flanges  $b^2$  of those beams. The projecting flange  $a'$  preserves the alinement of the horizontal plate  $a$ . The floor-beams are flanged out at their ends, as indicated by  $b^5$ , and these flanges are secured by rivets to the side of the car. The ends of the floor-plates are flanged upward, as at  $b^6$ , and riveted to the car sides.

The car sides are braced on their inner sides by gusset-braces  $G$  of peculiar construction. These gussets consist of plates doubled upon themselves and having flanges  $g$ , which are riveted to the sides of the car. At their lower ends the double web portions  $g^2$  continue down between the floor-plates and are there secured by the same rivets which hold the two floor-plates together. That floor-plate which is simply flanged is offset, as shown, to allow for this projecting end  $g^2$ . These gusset-braces are provided along the sides of the car as often as necessary. I consider that a brace at each side at about every third floor-beam is a satisfactory disposition. The flanges  $g$  of these gusset-plates are



slightly offset inward to accommodate the upper inturned end  $b^6$  of the floor-plates.

On their outer sides the car sides are braced by suitable vertical members, (indicated by H.) These may be of the box-like form shown in Figs. 4 and 5 and secured to the sides of the car by outturned flanges  $h$ , which are riveted thereto. There are preferably as many of these outer braces for each side of the car as there are floor-beams. Those outer braces which are opposite the gusset-braces on the inside are secured by the same rivets. The upper edge of the car sides are flanged outward and downward, as at  $a^2$ , and these outturned flanges lie adjacent to the outer sides of the braces H and are riveted to the extreme upper ends thereof, as shown at  $h^2$ . This makes a very simple and cheap construction. The sides are all braced and the bracing is connected rigidly with the floor-beams. I so dispose the rivet-holes in the gusset-braces and outer braces that the same rivets will do for these braces and for the flanged ends of the floor where they overlap. The rivet-holes being disposed in the same manner on each gusset-brace and exterior brace, each brace may have its holes punched at one time by the same gang-punch.

The bolster-beam (indicated by D) consists of an inverted-U-shaped plate, as shown most clearly in Fig. 3, the upper surface  $d$  of which constitutes a portion of the floor, to the sides  $d'$  of which are riveted the downturned flanges  $b^3$  of the floor-plates, and the lower edges  $d^3$  of which are turned outward and riveted to a bottom plate  $d^4$ , and at the center of the beam to the usual center bearing-plate  $d^5$ . At their ends  $d^2$  the side plates  $d'$  are flanged inward and riveted to the sides of the car above the bolster. An inner brace  $G'$  is provided similar to the gussets  $G$ , except that the web portion  $g^3$  does not extend through the floor. At its lower end this brace has its web flanged outward, as at  $g^4$ , and riveted to the upper side of the bolster. The flanged edges of this brace overlap the edges of the braces H on the outer side of the car, and the same rivets serve to secure the flanges of the inner brace  $G'$  and the inner edges of the outer braces H, as shown. This makes a very rigid connection between the bolster and the floor and sides of the car.

The draft-beam (indicated by E) is also an inverted-U-shaped beam. It has a top plate  $e$ , which abuts the under side of the end plate  $b^7$  of the floor, to which it is secured by numerous rivets  $e'$ , these rivets being countersunk on their upper side to leave a smooth upper surface to the floor. The vertical sides  $e^2$  of this beam are flanged outward at their inner ends and riveted to the bolster, as shown at  $e^3$ . At the lower edges the beam is flanged outward, as at  $e^4$ , which lower edges are secured to the flanges  $d^3$  of the bolster and to the plate  $d^4$  and where the draft-

beam crosses the end C of the car to the lower end thereof by means of the plates  $e$ , which are riveted to the inturned flanges  $c'$  at the base of the car end and are also riveted to the flanges  $e^4$  of the draft-beam. This draft-beam lies between a pair of angle-bars  $c^2$ , which are riveted to the car end, and the vertical sides  $e^2$  of the beam are riveted to the adjacent sides of these angle-bars.

Within the draft-beam is the reinforcing member J, which is preferably a steel casting of the form shown in Figs. 3 and 7. This casting is secured within the draft-beam by the same rivets which secure the beam to the angle-bars  $c^2$  and to the outturned flange  $c^3$  of the car end and by some of the rivets which secure the draft-beam to the car-floor  $b^7$ . The casting has strengthening-webs  $j$  depending from its upper surface and has inturned flanges  $j'$  for confining the draw-head F. This draw-head is of any suitable construction. It rests on the plate  $j^2$ , carried between the webs  $j^3$  of the steel casting and abutting the under side of the flanges  $j'$ , to which the plate may be secured by bolts. The draw-head is guided by the inturned flanges  $j'$  and by the downwardly-extending flange  $j^4$  at the forward end thereof. By this construction the draft is carried directly from the draw-head through the steel casting to the draft-beam and from there by the floor-plates  $b^7$ , which form horizontal girders, to the sides of the car, by which it is transmitted to the other end. This is an important feature, as it obviates the necessity of longitudinal beams under the car, lightening the car, and leaving the base unobstructed, should it be desired to provide it with dumping features.

It will be observed that in the above-described car I have reduced the weight without sacrificing strength and rigidity by obviating longitudinal beams, by making the floor-beams continuous with the floor-plates, and, furthermore, by so placing the parts that the same rivets serve for several purposes. This reduction of weight is a very important factor, since the expense of hauling a load is dependent upon the weight thereof, and the lighter the car the greater the proportion which the paying weight—that is, the freight carried—bears to the whole weight, which means that for the same capacity the efficiency of the car increases with its lightness.

I claim—

1. A metallic car having a floor-beam formed by turning down the edge of a floor-plate, the extreme edge of said downturned portion being turned laterally, and said floor-beam being secured at its ends to the sides of the car.

2. A car having metallic sides and floor-plates which have end flanges riveted to the sides of the car and have downturned transverse edges making cross-beams, the ends of



said downturned portions being attached to the sides of the car, whereby the floor may be entirely supported by the sides.

3. A car having its floor-surface in a plane substantially parallel with the track, said floor having plates extending from side to side and provided with depending flanges extending transversely of the car, and supported on the car sides.

4. In a metallic car, a floor-beam formed by turning the edge of a floor-plate downward and then inward to make a beam of a channel shape in cross-section.

5. A floor construction for a car which consists of floor-plates bent downward at their meeting edges, at least one of said edges being formed into a channel-shaped beam, the ends of said beam being secured to the sides of the car beneath the floor, and the ends of said plates being flanged and secured to the sides of the car.

6. A floor construction for a car consisting of metallic plates abutting at their edges and secured together by downturned flanges, one of said flanges at least continuing downward and then turned in substantially parallel with the floor-plate to form a channel-shaped beam, the end of said beam being flanged and riveted to the car side, and the ends of said floor-plates being also flanged and riveted to the car sides.

7. In a metallic car, the combination of a side, floor-plates having downturned flanges, and braces on the inner sides of the car having flanges secured to the car sides and extending downward through the floor and secured to a downturned flange.

8. A metallic car having interior braces connecting its sides and floor, said braces consisting of the double gusset-plate having side flanges, the flanges being riveted to the sides of the car and the web extending down through the floor of the car between downturned flanges of the floor-plates, there being rivets passing through such downturned flanges and through such web.

9. In a metallic car, the combination with the sides of the car and the bolster, of interior braces in the form of flanged gusset-plates, said flanges being riveted to the sides of the car and there being lower flanges on the brace which are secured to the bolster.

10. In a metallic car, the combination, with external stiffeners, of sides which at the top are turned outward and then downward, the outwardly-extending part crossing over and resting upon the stiffener and the downwardly-extended part being riveted to the outer side of the stiffener.

11. In a metallic car, the combination of sides which at the top are turned outward and then downward, and braces on the outer side of the car which braces have their outer sides at their upper ends substantially flat and there secured to the downturned edge of said top.

12. In a metallic car, the combination, with sides which at their top are turned outward and then downward, of stiffening-braces on the outer side of the car, which braces have their outer sides substantially flat and extending between such downturned portion and the outturned portion and contacting with each portion so as to form a support for the outturned flange, said outer sides being riveted to the downturned portion and the remaining sides of said stiffeners being omitted at the upper end to allow access to such rivets.

13. In a metallic car, the combination of sides having their lower edges turned inward, and floor-beams extending crosswise of the car from side to side and lying above said intumed edges, said floor-beams being secured to the sides of the car, the sides extending above the floor.

14. In a metallic car, the combination of sides having their lower edges turned inward, and floor-beams extending crosswise of the car from side to side and having bottom flanges abutting said intumed edges and secured thereto.

15. In a metallic car, the combination with the car sides having their lower edges turned inward, and cross-beams extending crosswise of the car from side to side and above such intumed edges, said cross-beams being flanged at their ends and secured to the car sides and being flanged at their lower edges and there secured to the intumed edges of the sides.

16. A metallic car having its sides composed of longitudinal plates turned inward at their lower edges and then downward to form longitudinal braces.

17. In a metallic car, the combination with the car sides having their lower edges turned inward and then downward to form a longitudinal brace, and cross-beams between the sides of the car and above such intumed edges.

18. In a metallic car, a bolster-beam consisting of an inverted-U-shaped plate, the upper portion of which forms a portion of the floor-surface of the car.

19. In a metallic car, a metallic bolster-beam in the form of an inverted U combined with floor-plates having downturned flanges riveted to the sides of said U, the upper surface of the bolster-beam forming a portion of the floor-surface.

20. A metallic car having sides in the form of plate-girders, a horizontal floor extending from one side of the car to the other, and floor-beams extending across the car for supporting said floor, a pair of bolsters secured at their ends to said plate-girders, a draft-beam at each end of the car terminating at the corresponding bolster, the load-carrying floor at each end of the car being secured to the draft-beam and to the plate-girders and being adapted to carry the stress from the draft-beam to the girders, whereby the buffing and tugging



and hauling forces may be transmitted from one end of the car to the other by said plate-girders.

21. In a metallic car having its load-carrying floor substantially parallel with the car-track, a draft-beam at the end thereof, and a horizontal girder adapted to transmit the buffing and tugging forces directly therefrom to the car sides, combined with transverse floor-beams reaching from one side of the car to the other.

22. In a metallic car, a pair of bolsters, a pair of draft-beams each extending inward from an end of the car to the proximate bolster and terminating thereat, the only longitudinal buffing and tugging members between the bolsters being at the sides of the car, and horizontal plates contacting with said draft-beams and secured thereto and serving both to communicate the buffing and tugging strains to the sides of the car and as a portion of the load-carrying floor of the car.

23. In a metallic car, a draft-beam in the form of an inverted U, and a plate extending across said beam and riveted to the upper portion thereof and constituting a part of the load-carrying floor-surface of the car.

24. The combination with a bolster extending across the car and having an upper surface forming a portion of the load-carrying floor thereof, a draft-beam at right angles to the bolster, and a floor-plate secured to the draft-beam and to the bolster.

25. In a car, the combination of plate-girder sides having inside stiffeners and floor-beams extending crosswise of the car from side to side and secured to the said stiffeners, said plate-girder sides extending above the substantially horizontal floor.

26. In a car, the combination of longitudinal side-supporting members, a floor, bolsters, continuous transverse floor members, and draft and buffing members at the ends of the car each disposed in a substantially horizontal plane and connected at its opposite sides to said side-supporting members, substantially as set forth.

27. In a car, the combination of longitudinal side plate-girders, a floor, bolsters, continuous transverse floor members, and draft and buffing plates at the ends of the car each disposed in a substantially horizontal plane and connected at its opposite side edges to the lower end portions of said side girders, substantially as set forth.

28. In a car, the combination of side-supporting members, a floor, bolsters connected by said side-supporting members and the floor of the car, end sills, and a draft and buffing plate arranged in a substantially horizontal plane between each end sill and the adjacent bolster and connected directly to said end sill and bolster and connected to the said side-supporting members between the end sill and bolster, substantially as set forth.

29. In a car, the combination of plate-gir-

ders, side-supporting members, a floor connecting said side-supporting members, and draft and buffing members in the form of plate-girders each arranged with its web-plate in a substantially horizontal plane, and connected at its ends to the plate-girder side-supporting members, substantially as set forth.

30. In a car, the combination of plate-girder side-supporting members, a floor connecting said side-supporting members, draft and buffing plates at opposite ends of the car each arranged in a substantially horizontal plane and connected to said plate-girder side-supporting members, and draft-rigging attachments suspended from and attached directly to said draft and buffing plates, substantially as set forth.

31. In a car, the combination of longitudinal side-supporting members, bolsters, a draft and buffing member between each bolster and the adjacent end of the car, and continuous transverse floor members between the bolsters extending continuously from one side-supporting member to the other, substantially as set forth.

32. In a car, the combination of plate-girder side-supporting members which carry the entire weight of the cross floor-beams and their loads between the bolsters, and draft and buffing plates at the ends of the car each disposed in a substantially horizontal plane and connected to the lower end portions of the side-supporting members, substantially as set forth.

33. In a car, the combination of side-supporting members which carry the entire weight of the cross floor-beams and their loads between the bolsters, end sills, bolsters, and draft and buffing plates each arranged in a substantially horizontal plane between an end sill and the adjacent bolster and connected directly to said end sill and bolster and connected to the said side-supporting members between the end sill and bolster, substantially as set forth.

34. In a car, the combination of plate-girder side-supporting members, and draft and buffing members in the form of plate-girders each having a continuous web-plate arranged in a substantially horizontal plane and extending from one side-supporting member to the other and connected at its ends to the plate-girder side-supporting members, substantially as set forth.

35. In a car, the combination of plate-girder side-supporting members which carry the entire weight of the cross floor-beams and their loads between the bolsters, draft and buffing plates at opposite ends of the car each arranged in a substantially horizontal plane and connected to said plate-girder side-supporting members, and draft-rigging attachments suspended from and attached directly to said draft and buffing plates, substantially as set forth.



36. In a car having a substantially horizontal metallic floor, the combination of plate-girderside-supporting members which extend above the floor, and a floor-beam between the  
5 bolsters extending continuously crosswise of the car from side to side, said floor-beam having its upper edge adjacent to the floor-surface plates.

37. In a car having a substantially horizontal metallic floor, the combination of plate-girder side-supporting members which ex-  
10

tend above the floor, and floor-beams extending continuously crosswise of the car from side to side between the lower portions of the side plate-girders.

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

15

EDGAR W. SUMMERS.

Witnesses:

ALBERT H. BATES,  
H. M. WISE.