

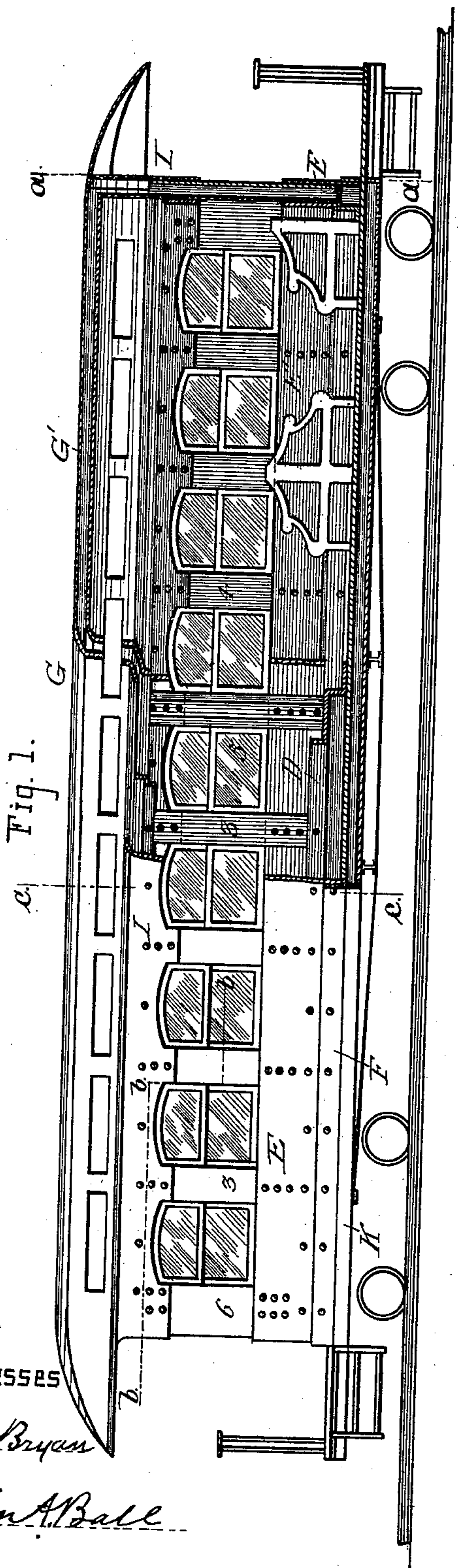
(No Model.)

2 Sheets—Sheet 1.

C. W. M. SMITH.
CAR CONSTRUCTION.

No. 563,423.

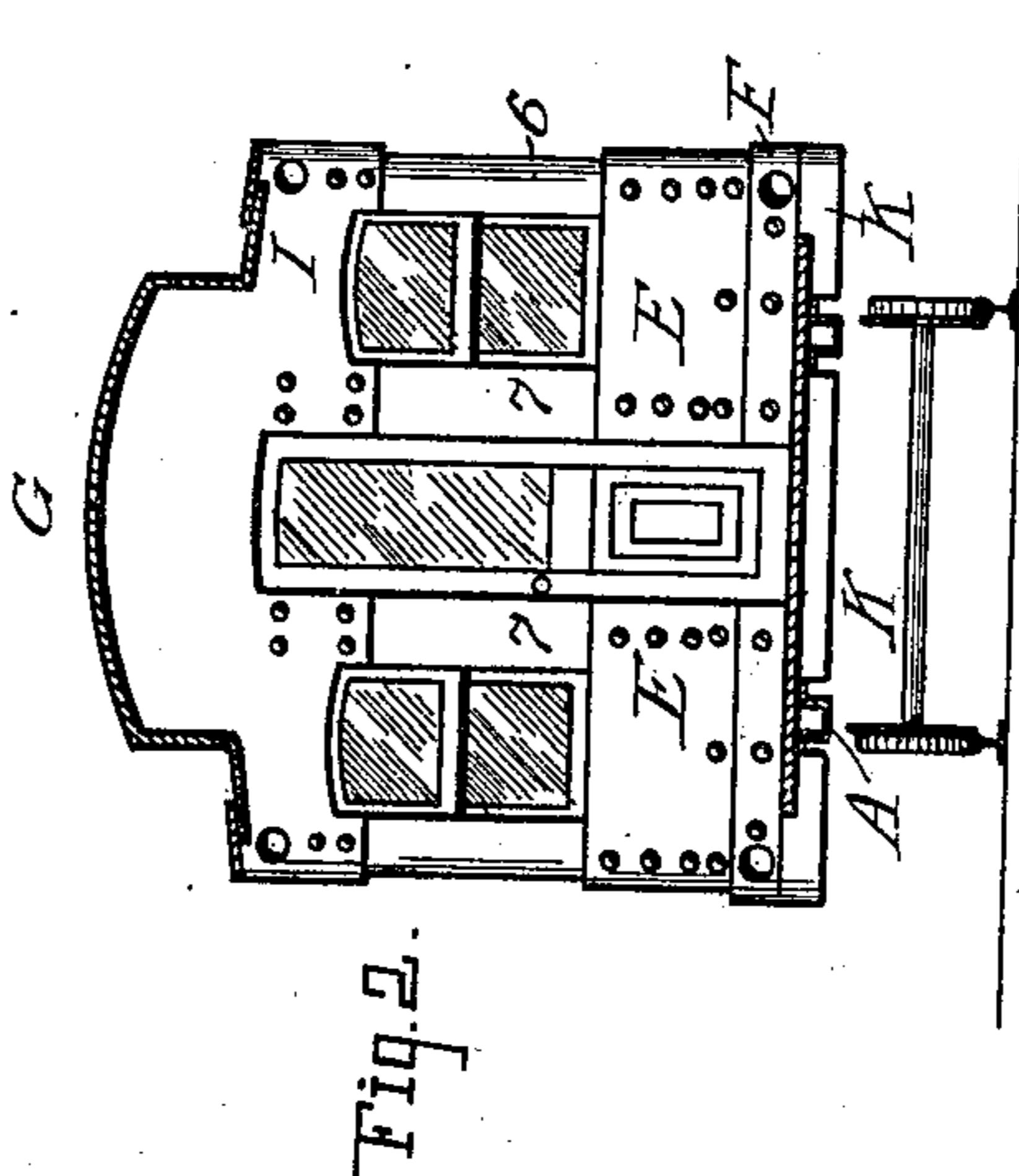
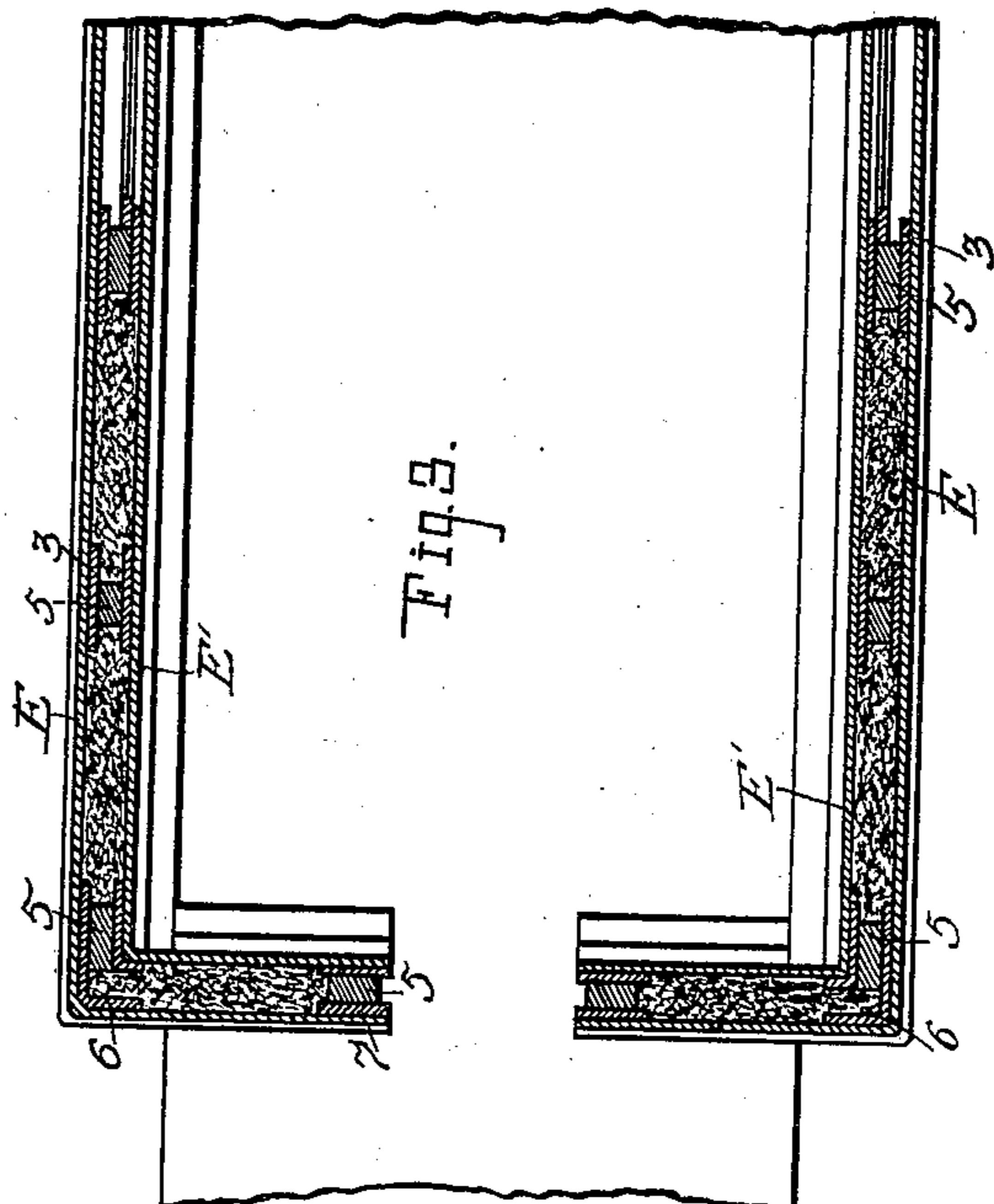
Patented July 7, 1896.



Witnesses

M. R. Bryan

John A. Ball



Inventor:

C. W. M. Smith

by Spear & Seely
Attorneys

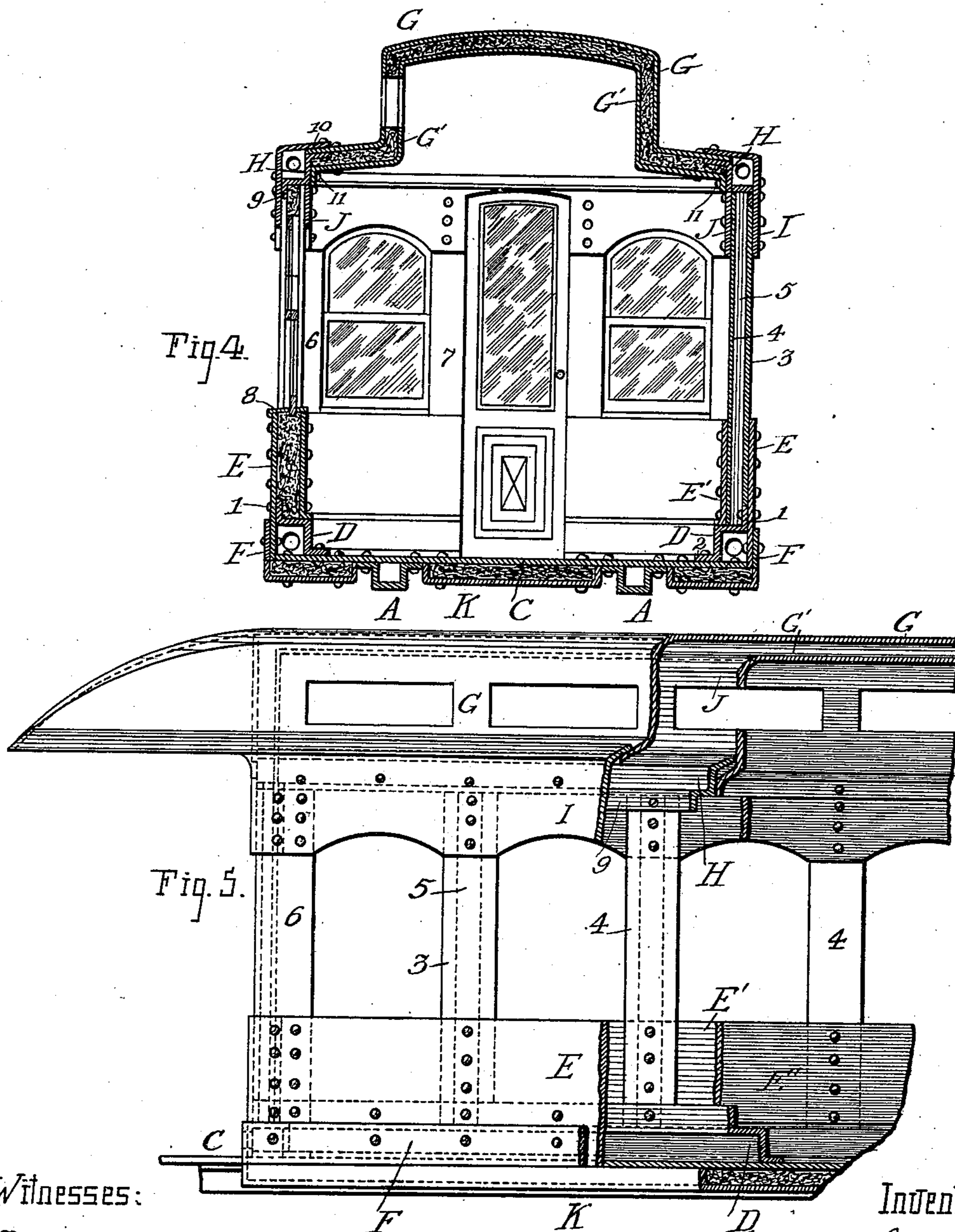
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UNITED STATES PATENT OFFICE.

CHESTER W. M. SMITH, OF SAN FRANCISCO, CALIFORNIA.

CAR CONSTRUCTION.

SPECIFICATION forming part of Letters Patent No. 563,423, dated July 7, 1896.

Application filed March 29, 1893. Serial No. 468,194. (No model.)

To all whom it may concern:

Be it known that I, CHESTER W. M. SMITH, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented certain new and useful Improvements in Car Constructions; and I do hereby declare that the following is a full, clear, and exact description thereof.

My invention relates to the construction of metallic railway cars, and particularly to improvements upon the cars described in my re-issued Letters Patent No. 11,023, granted August 13, 1889, and my Letters Patent No. 439,085, granted October 21, 1890.

The object of the present improvement is to provide a metallic car which shall be somewhat lighter and cheaper in construction than those referred to above, but in which no sacrifice of strength to lightness shall be made. That is, to provide for a better distribution of the weight of metal, so as to insure a relatively greater structural strength at the parts most exposed to strain. This is the general object of my invention, but there are certain others, depending upon features of construction, which need not be here specifically set forth, but which will clearly appear from the following description and in the accompanying drawings, in which—

Figure 1 is a side elevation of a car partly broken away. Fig. 2 is an end elevation, partly in section, on the line *a a* of Fig. 1. Fig. 3 is a horizontal section on the line *b b b* of Fig. 1. Fig. 4 is a transverse section on the line *c c* of Fig. 1. Fig 5 is an enlarged side elevation broken away.

A A represent the longitudinal sills which support the car-frame, and which are shown in the drawings as flanged *U*-beams, to which the floor *C* is bolted or riveted, Fig. 4. The floor, which is of the full width of the car, is preferably constructed of metallic sections united by lap-riveting, as in my Patent No. 439,085 referred to.

D D represent the metallic side beams, of right-angular cross-section and having flanges 1 and 2, to the latter of which the floor is secured. In my former patent each of these beams was united to another, so as to form a tubular beam or box-girder; but by my present

construction of the side of my car I make the latter themselves perform this office.

In both my patent and reissue I showed the sides of the car extending from base to roof, and only differing in the fact that in the re-issue the sides were formed of a continuous sheet of metal, while in the patent they are composed of lap-riveted sections. Both these constructions were faulty, first, because, as the side pieces were of the same thickness throughout, the distribution of weight was not proportionate relatively to the unequal strains upon different points, so that while there might be enough metal at any point there would be too much at some other. Moreover, whether the side pieces are made in sections or in one piece, it was necessary to cut window-openings bodily out of the metal. With my present construction I overcome both these disadvantages, and in the following manner:

The external side pieces *E* are continuous metal strips of only sufficient width to extend from the floor of the car to the bottom of the windows. They traverse the whole length of the car and are bent around the ends so as to extend to the entrance-doors, Fig. 2. Near their lower edges they are bolted to flanges of the beam *D*, Fig. 4, and extend down to the floor, thus forming themselves parts of hollow beams, of which the beams *D* are the other members. I refer to these as "external" side pieces, for, as I propose to make my car of a double thickness throughout sides, roof, and floor, I have provided interior side pieces *E'*, which rest upon the beam *D* and extend along the side and around the ends parallel to the pieces *E*.

F F are reinforcing-strips which pass around the lower edge of the sides and ends, Fig. 4, and are secured to the external side pieces, as shown at 2.

The windows of my car are not made by cutting openings in metallic sides, as in my former patents, but are formed by a combination of the side pieces, the roof, and a series of independent panels secured to both. Figs. 1, 3, and 5 fully illustrate the method of construction. These panels are each composed of two metal strips 3 and 4, between which is secured a wooden strip 5, the latter

forming a part of the window-frame. The combined panels are secured at proper distances apart between the outer and inner side pieces E E', and rest upon the beam D.

5 At the corners where the side pieces are bent panels 6 are inserted and secured to give stiffness at that point and also to form one side of the frames of the end windows, Fig. 3, and another panel 7 is set at each side of
10 the car-entrance where the side pieces terminate, so that the wooden strips may form the other side of the end windows and also serve as door-posts. These panels are the sides of the windows, while their bottoms are ledges
15 8, secured to the upper edges of the side pieces E E' at proper points, Fig. 4. The windows are completed by the roof itself when secured to the structure as thus far described.

The roof is composed of metallic thicknesses
20 G G', the outer of which projects at the ends of the car so as to form the hoods over the platforms. H H represent the upper corner-beams of substantially the same shape as the lower beams D, and having the flanges 9 and
25 10. The inner roof is flanged and secured to the beams H, as shown at 11, Fig. 4. The outer roof bears upon the flanges 10 of the beams H. Now to secure the side panels and to complete the windows, the roof is pro-
30 vided with depending side strips I and J, cut away to give the arched or any other desired shape to the top of the windows and riveted to each panel. The outer strip I is riveted to the outer roof G, Fig. 4. Thus it will be
35 seen that the panels bear above and below upon the beams H and D, respectively, and that they are jointly secured between the double side pieces at their upper and lower ends, respectively.

40 The side strips which form part of the roof extend around the ends of the car like the lower ones and in the same manner form posts of the end doors and windows.

Every part of the walls, roof, and floor of the
45 car, excepting at doors, windows, and ventilators, may be and preferably are packed with some non-conducting material, such as papier-mâché or asbestos. I prefer to secure below the floor separate chambers, as K, Fig.
50 4, to contain the packing, but to force the packing directly between the double walls and roof.

The advantages of this method of construction over that shown in my former patents
55 will be readily understood. In the first place I secure the greatest structural strength at the points where it is most required. If the whole side of the car is formed from metal of the thickness required to give enough strength
60 at or near the bottom where the greatest strain comes, then there will be an excess of metal above or along the line of the windows beyond what is necessary. The same remark applies to the construction of the roof.

65 By my construction I build my car of suffi-

ciently heavy material at the upper and lower parts, but can use lighter material for the panels to avoid the excess of weight and reduce the cost of construction. Again, instead of having to use the expensive process
70 of cutting out window-openings in heavy metal, such openings result naturally from my method of connecting my side pieces and roof by independent panels, which also form parts of the window-frames. The whole re-
75 sult of this method of construction is a practically indestructible fireproof car of lighter weight and lower cost, but in which a smaller amount of metal is so distributed as to produce a construction which in strength and
80 durability is fully equal to either of those described in my former patents.

I claim—

1. In a metallic car, the combination with the floor and roof, of the upper and lower
85 continuous double side strips, and independent vertical panels secured at their ends between said strips with interposed openings for the windows, as described.

2. In a metallic car, the combination with
90 the floor and roof, of upper and lower continuous metal side strips forming the tops and bottoms of the windows, independent vertical metal panels forming the sides of the windows and the intermediate wooden
95 strips to form the sides of the window-frames, connected at their ends to said side strips, as described.

3. In combination with double upper and lower metal strips extending along the sides
100 and around the ends of a car, a series of upright metal panels secured at their ends between said strips, and wooden strips between the panels forming parts of window and door frames.
105

4. In a metallic car, and in combination, a roof, a floor, upper and lower longitudinal corner-beams secured respectively to said
110 roof and floor, upper and lower continuous side strips secured to said beams, and a series of independent vertical panels connected at their ends to said upper and lower side strips as described.

5. In car construction, the double vertical metallic panels having an intermediate
115 wooden strip and adapted to form the sides of window-frames.

6. In car construction, parallel side pieces extending around the ends to the entrance-
120 door, in combination with an independent double vertical panel for closing and uniting the ends of such side pieces and forming parts of the door-frames, as described.

In testimony whereof I have affixed my signature, in presence of two witnesses, this 22d
125 day of March, 1893.

CHESTER W. M. SMITH.

Witnesses:

CHAS. E. KELLY,
CHAS. L. BACHE.