No. 628,575. Patented July 11, 1899.

F. E. CANDA.

CAR FRAME.

(Application filed Jan. 9, 1899.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1,

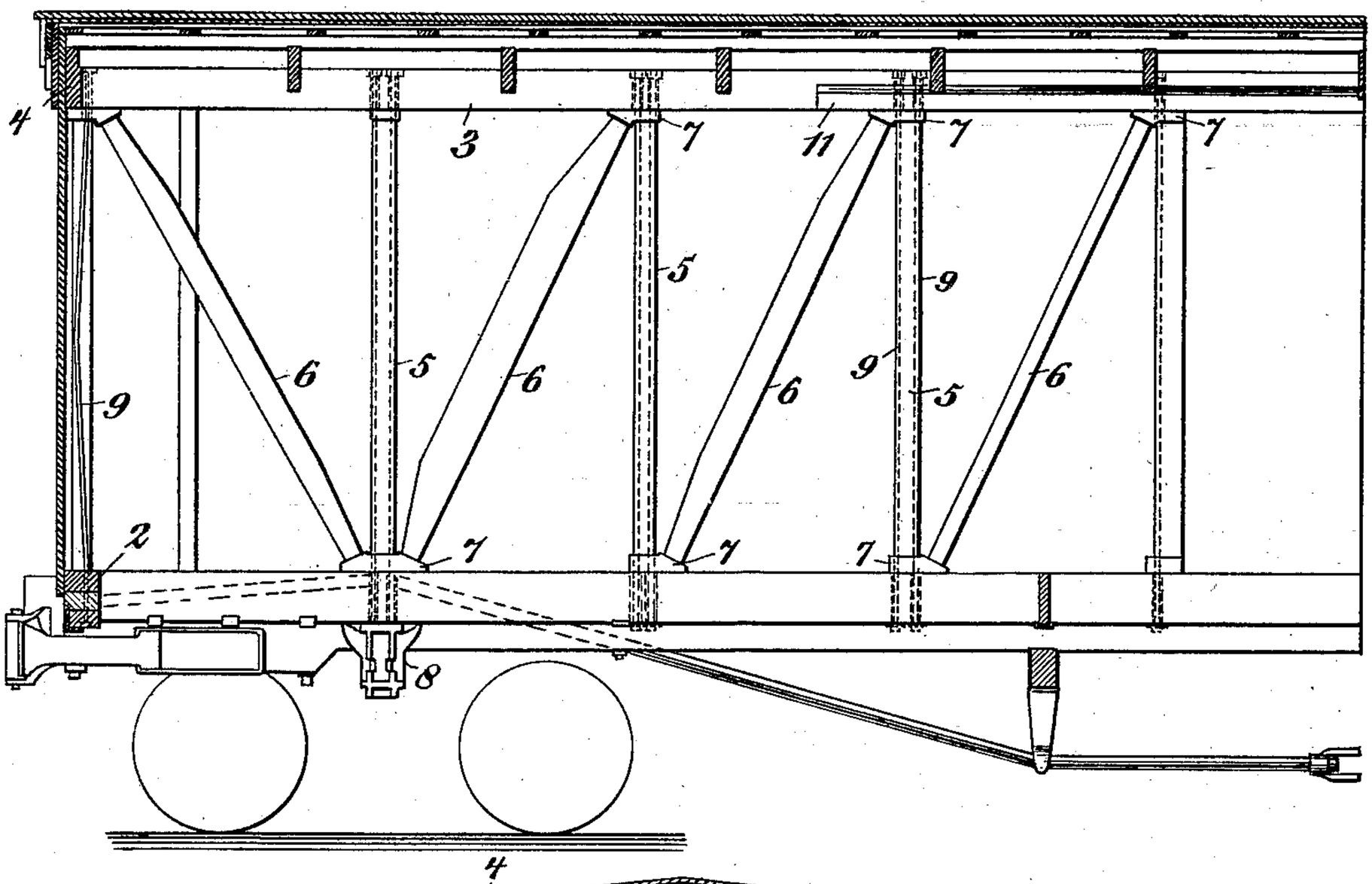
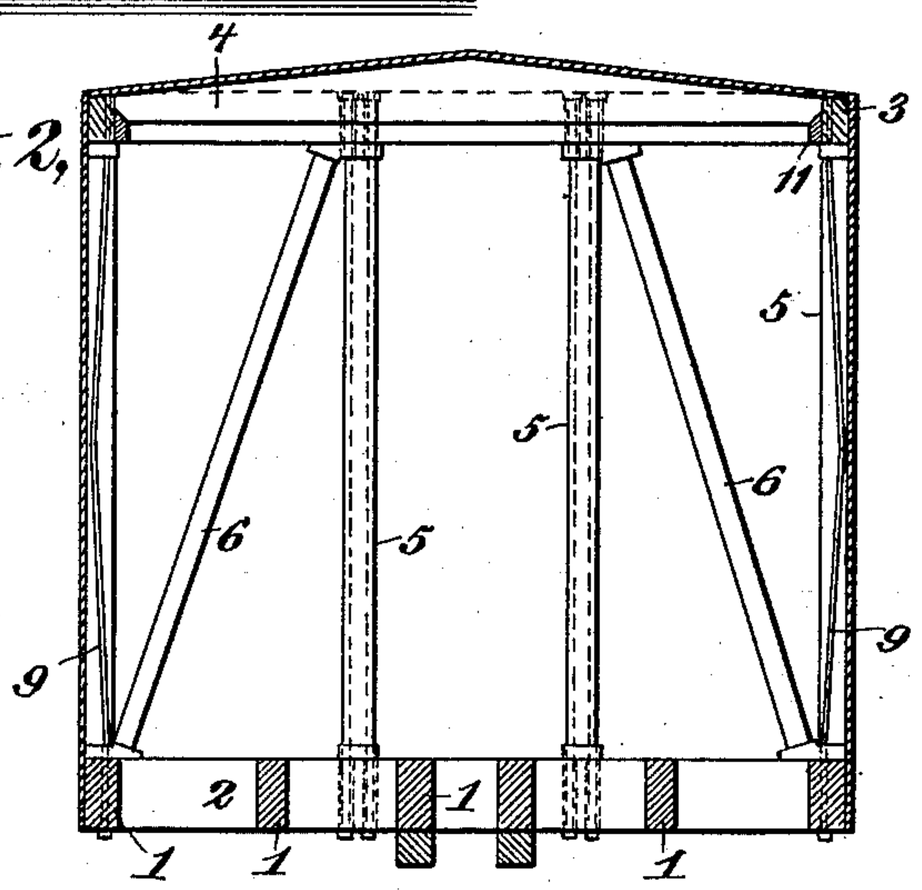


Fig. 2,



WITNESSES:

W. H. Haywood

Harry Goss

INVENTOR

Ferdinand E. Canda

BY

E. M. Marble & Son

ATTORNEYS

No. 628,575. Patented July 11, 1899.

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(No Model.) 2 Sheets—Sheet 2.

Fig. 3,

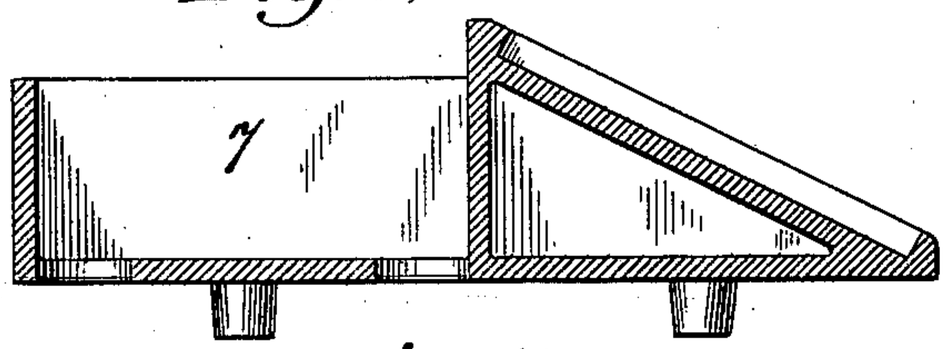


Fig. 4,

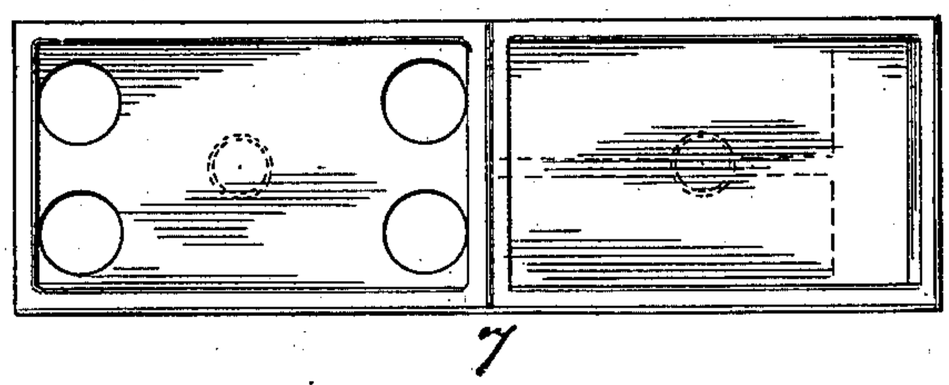


Fig. 5, Fig. 6,

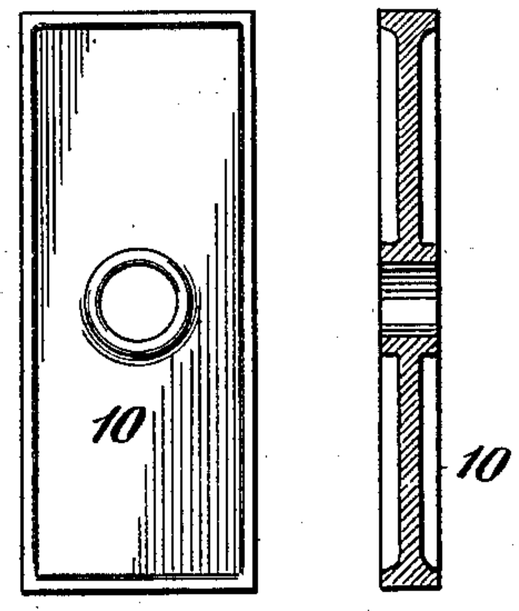


Fig. 9,

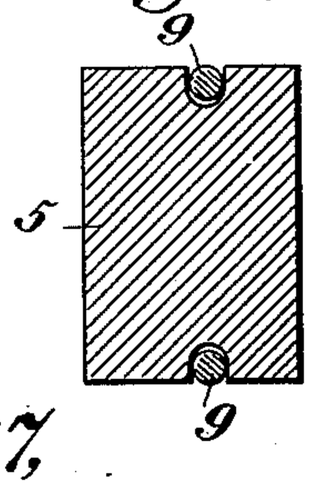


Fig. 10,

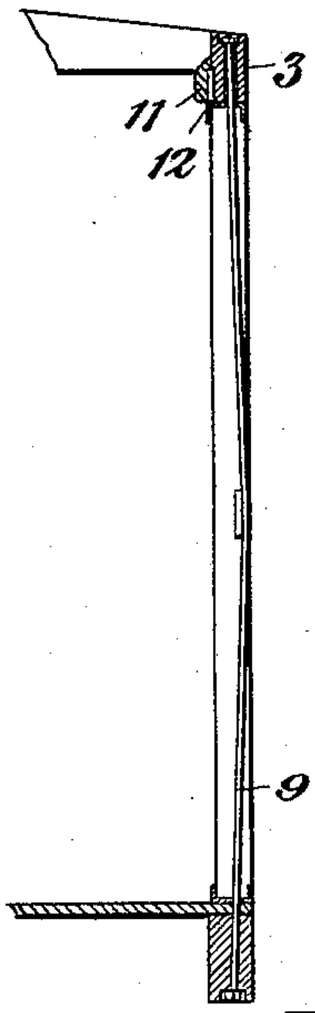


Fig. 8,

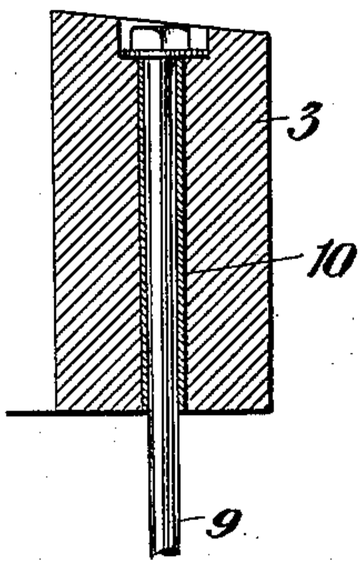


Fig. 7,

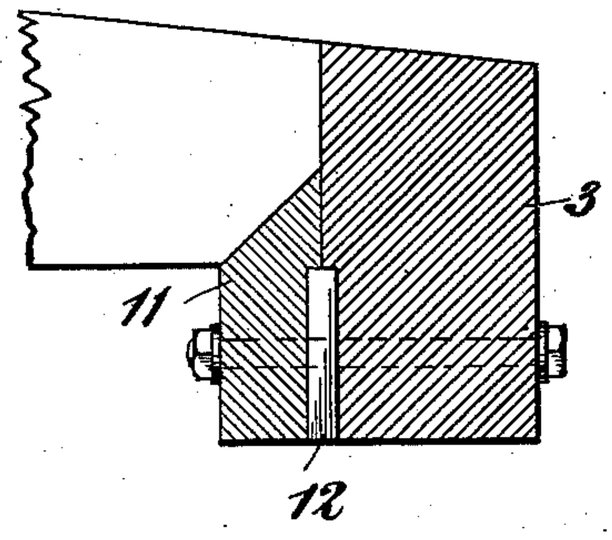
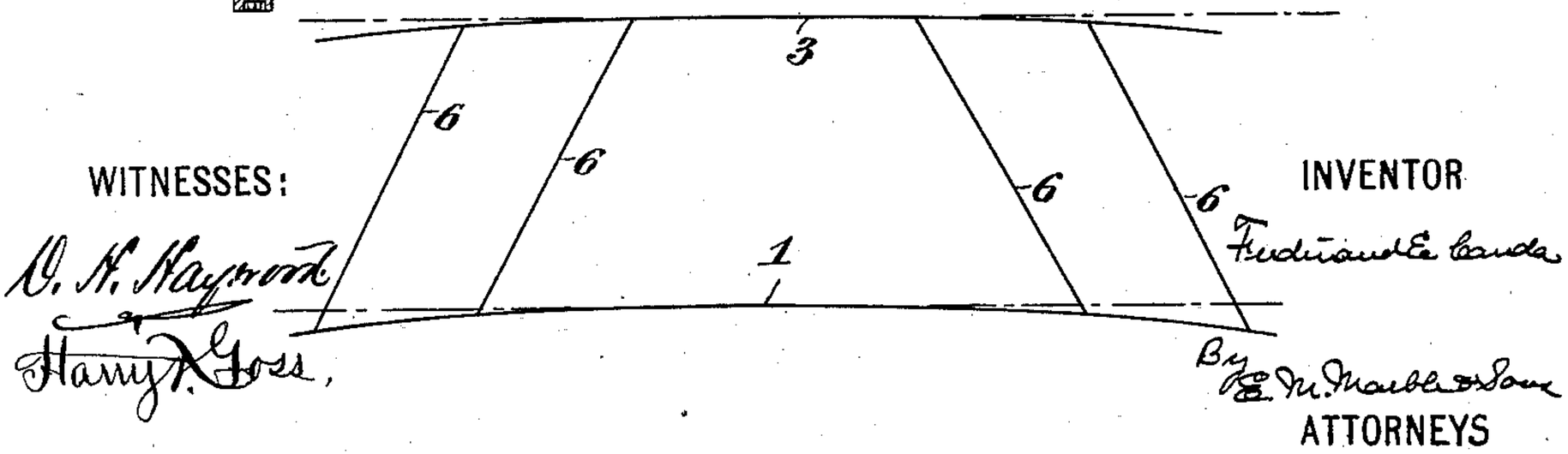


Fig. 11,



WITNESSES:

D. F. Hayward

Harry A. Goss,

INVENTOR

Ferdinand E. Canda

By E. W. Mabee & Son

ATTORNEYS

UNITED STATES PATENT OFFICE.

FERDINAND E. CANDA, OF NEW YORK, N. Y.

CAR-FRAME.

SPECIFICATION forming part of Letters Patent No. 628,575, dated July 11, 1899.

Application filed January 9, 1899. Serial No. 701,580. (No model.)

To all whom it may concern:

Be it known that I, FERDINAND E. CANDA, a citizen of the United States, residing in the borough of Manhattan, in the county of New York, city of New York, and State of New York, have invented certain new and useful Improvements in Car-Frames; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in car-frames; and it consists in the novel means provided for transmitting the strains of the vertical truss-rods of such frames direct to the truss-braces without the intervention of the wooden sills and side plates or other members which, by compressing under load, might cause the truss-rods to slacken, in the novel arrangement of said rods with relation to the posts, whereby they are caused to act as trusses for the posts to stiffen the posts against pressure exerted from the interior of the car outward, and generally in the novel combination, construction, and arrangement of the parts.

The objects of my invention are, first, to lighten and strengthen the frames of cars and to insure that each member of the car-truss shall carry at all times its due proportion of the load; second, to strengthen the posts of the car without increasing their weight, so that lighter posts may be employed than have been practicable heretofore, and, third, to make the car-frame as simple, inexpensive, and durable as possible. These objects are attained in the car-frame herein described, and illustrated in the drawings, which accompany and form a part of this specification, in which the same reference-numerals indicate the same or corresponding parts, and in which—

Figure 1 is a central longitudinal section of a portion of a freight-car constructed in accordance with my invention. Fig. 2 is a transverse vertical section of the car-body. Fig. 3 is a longitudinal section, and Fig. 4 a plan view, of one of the hereinafter-mentioned shoes which are interposed between the posts and braces and the sills and side plates. Fig. 5 is a side view, and Fig. 6 a cross-section, of one of the side-plate keys. Fig. 7 is a detail cross-section of one of the side plates and its reinforcing member, showing the location of the key shown in detail in Figs. 5 and 6. Fig. 8 is a detail cross-section of one of the side plates, showing a portion of one of the side-post truss-rods and the bushing surrounding the same, which serves to transmit the strain of the rod to the brace-shoe and so to the brace. Fig. 9 is a cross-section of one of the side posts shown in Figs. 1 and 2, showing the gains or grooves in which the truss-rods lie. Fig. 10 is an elevation of one of the side posts, with the sill beneath and the side plate above the same, and one of the truss-rods, showing a slightly-different method of setting the truss-rods out at the center of the posts; and Fig. 11 is a diagram illustrating the manner of framing camber in the truss independent of the under trussing of the car.

As car-frames are ordinarily constructed the truss-rods connecting the side plates and outer sills pass directly through holes in the side plates and sills and have washers at their ends between their heads and nuts and the sills and side plates, which distribute the strains of said rods to the sills and side plates. This method of distributing the strains of the truss-rods is unsatisfactory, because when the car is heavily loaded the washers sink into the wood, slacking the truss-rods and causing a false distribution of the load through the truss, by which an excessive proportion of the load is thrown upon certain of the members of the truss, while other members receive only a fraction of their due proportion of the load. Because of this it has been customary to design the various members of the truss so that each may carry much more than its due proportion of the load, notwithstanding which fact cars thus constructed frequently lose their camber and get out of shape and require continual and expensive repairs to keep them in condition for use. What is required is that the strain of the truss-rods shall be transmitted to the braces and thence to the sills and plates without the intervention of any object which by compressing may slacken the truss-rods, and thus cause a false distribution of the load. This I have accomplished by placing on the ends of all of the braces and posts of the car malleable-iron shoes, which

rest against the sills and side plates and are spaced and secured to the same, according to the length of panel required, and by providing metal bushings between the heads and nuts of said rods and such shoes, said bushing also passing through the sills and side plates, so that the strain of the truss-rods is transmitted directly through metal to the braces without the intervention of wood or other readily-compressible material in substantially the direction of the grain of the timber, in which direction it is practically incompressible. In a car so constructed and with the truss-rods properly drawn up the load must be transmitted through the members of the truss in accordance with the intentions of the designer, and each member of the truss must bear its due and intended proportion of the load, and the truss is entirely free from members which by compressing as soon as load is applied to the car may throw the truss out of shape.

Referring now to the drawings, 1 1 are the longitudinal sills of a car; 2, an end sill; 3 3, side plates; 4, an end plate; 5 5, the side and end posts, and 6 6 the braces.

7 7 are the shoes, located at the ends of the diagonal braces and posts. These shoes are provided with dowels, as shown in the detail views, Figs. 3 and 4, which fit into corresponding dowel-holes in the sills and side and end plates. The shoes employed in different portions of the car differ slightly in form, that over the body-bolster 8, for instance, having recesses for two diagonal braces; but in general construction they are similar. The shoes located at points where both posts and braces terminate are provided with pockets for both brace and post, and where no diagonal brace terminates near a post such post may also be provided with a shoe.

9 9 are the vertical truss-rods. Each truss-rod passes through holes in the sill and in the side or end plate and through holes in the shoe of the corresponding post, and is provided with bushings 10, Fig. 8, above its upper shoe and below its lower shoe, also passing through the same openings in the side or end plate and the sill and abutting against the shoes, thus serving to transmit the strain of the truss-rods direct to the shoes, and so to the braces, without the intervention of the sills and side and end plates. The pressure thus transmitted is substantially in the direction of the grain of the braces, in which direction timbers are practically incompressible. When the truss-rods are once drawn up, therefore, the whole truss-frame is rigid and there are no parts which by compressing as soon as load is applied to the car will permit the truss-rods to slacken and thus cause a false distribution of the load upon the various members of the truss.

The posts 5 of the car do not carry any portion of the load, their function being to support the sheathing and to resist pressure from the interior of the car outward. In order to enable these posts to resist such stresses the better, I so arrange the vertical truss-rods that they serve not only to distribute the load of the car through the truss, but to stiffen the posts. For this purpose I employ two truss-rods for each post, one arranged on either side thereof, and the posts are provided with gains or grooves to receive the truss-rods, which extend from the inner side of each post, at the ends thereof, to the outer side of the post, near the center thereof. The truss-rods are sprung into these grooves when put in place, and when drawn up they stiffen the posts greatly. I am thus enabled to use very much smaller and lighter posts than have been used heretofore. Instead of gaining the posts they may be provided with breast-pieces 5′ at the center, as shown in Fig. 10, which perform the same function of setting the truss-rods out at the center.

As shown in Fig. 4, each of the shoes for the braces and posts is provided with four holes for the passage of truss-rods. This is done in order that both right-hand and left-hand shoes may be cast from the same pattern; but one set of holes of each shoe is used, however—viz., the inner set.

At the center of the car the side plates are subjected to the accumulated pressure transmitted by the various braces. In order to avoid unnecessary weight, it is desirable that the side plates shall be as light as possible. For this reason I make the side plates themselves of a strength sufficient to withstand the strains in the end portions of the car and reinforce them in the central portion of the car by reinforcing-plates 11. (Shown in Figs. 1, 2, 7, and 9.) These reinforcing-plates are bolted to the side plates and are also keyed thereto by means of a number of flat keys 12, (shown in detail in Figs. 5 and 6,) which are embedded within shallow gains in the side plates and reinforcing-plates, as shown in Fig. 7. The reinforcing-plates thus bolted and keyed to the side plates become practically parts thereof so far as ability to withstand the strain is concerned.

Because of the rigidity under load of the trussed car-frame above described and the efficient distribution of the strains by the truss-rods to the braces I am able to employ braces of much less weight than those heretofore used in cars of equal capacity, thus reducing the weight of the car greatly. As already stated, the stiffening of the side and end posts by the truss-rods makes possible the use of much lighter posts than are ordinarily used, and the reinforcing of the side plates in the center of the car makes it possible to use in other portions of the car side plates of less strength and weight than are ordinarily employed.

To counteract the slight inevitable sinking down of the floor of a car under a heavy load, due to the elasticity of the parts, it is customary to camber cars at the center, so that when heavily loaded their floors may sink

down in the center merely to the level of the portions of the floor which are directly above the supports; but heretofore such camber has been produced by drawing up the under truss-rods. This is objectionable, because it imposes additional and unnecessary strain upon the under truss-rods, the sills, and other parts of the under trussing. I obviate this objection by forming the camber in the car-frame itself independent of the under truss-rods. The brace-shoes are so spaced that the panels of the side plates between the door-frames and the first and second braces to the right and left thereof are about one-eighth of an inch longer than the corresponding panels of the sills, the length of the braces, however, being that which would be required were the upper and lower brace-shoes spaced the same distance apart. In other words, the upper shoes of the first and second braces are so spaced that the length of each of said braces exceeds slightly what would be the distance between its shoes were both sill and side plate straight. This produces a slight normal camber in the car-frame, as indicated diagrammatically in Fig. 11, in which the sills, side plates, and braces are indicated, the camber being much exaggerated, while in dotted lines are shown what would be the positions of the sills and side plates if they had no camber. The same effect may be obtained by spacing the shoes uniformly and by making the first and second braces on each side of the door slightly longer than would be required were the car to have no camber. In such a car the under truss-rods are merely drawn taut and are not drawn sufficiently tight to increase this normal camber. The strain on the truss-rods, sills, and other parts of the under trussing are thus greatly reduced.

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

1. In a trussed car-frame, the combination, with the upper and lower members of the truss, and braces between the same, provided with shoes at their ends, of truss-rods passing through said upper and lower truss members and provided with non-compressible spacing-pieces abutting against the shoes, whereby the strain of said truss-rods is transmitted to said shoes without the intervention of compressible members, substantially as described.

2. In a trussed car-frame, the combination, with the upper and lower members of the truss, and braces between the same, provided with shoes at their ends, of truss-rods passing through said upper and lower truss members and provided with metal bushings abutting against said shoes, by which the strain of the truss-rods is transmitted to said shoes without the intervention of compressible members, substantially as described.

3. In a trussed car-frame, the combination, with the upper and lower members of the truss, and braces between the same, of truss-rods passing through said upper and lower truss members and provided with metal bushings by which the strain of the truss-rods is transmitted to the braces without the intervention of the upper and lower members of the truss, substantially as described.

4. In a trussed car-frame, the combination, with the upper and lower members of the truss, and braces between the same provided with shoes at their ends, of truss-rods connecting the upper shoe of one brace with the lower shoe of another brace, without the intervention of the upper and lower members of the truss, substantially as described.

5. In a trussed car-frame, the combination, with the upper and lower members of the truss, posts between the same, and diagonal braces, of truss-rods connecting the upper and lower truss members, extending outward from the top and bottom toward the center of the posts, and forming with the posts trusses, thereby bracing the posts against outward pressure from the interior of the car, substantially as described.

6. In a trussed car-frame, the combination with the upper and lower members of the truss, and posts between the same, provided with shoes at their ends, of truss-rods connecting the braces, passing through openings in said shoes, provided with metal bushings extending from said shoes to the heads of said rods, and bracing the posts, substantially as described.

7. In a car-frame, the combination, with posts, of a truss-frame comprising upper and lower truss members, braces, and truss-rods located adjacent to the posts, extending outward from the top and bottom toward the center of the posts, and forming with the posts trusses, thereby bracing the posts against outward pressure from the interior of the car, and transmitting the strains of the truss, substantially as described.

8. In a car-frame, the combination, with posts having in their sides longitudinal grooves extending outwardly from the ends of the posts toward the central portions thereof, of truss-rods within said grooves, and serving to stiffen the posts, substantially as described.

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

FERDINAND E. CANDA.

Witnesses:
H. M. MARBLE,
E. M. MARBLE.