(No Model.)

3 Sheets—Sheet 1.

W. ROBINSON.

STREET CAR.

No. 551,047. Patented Dec. 10, 1895.

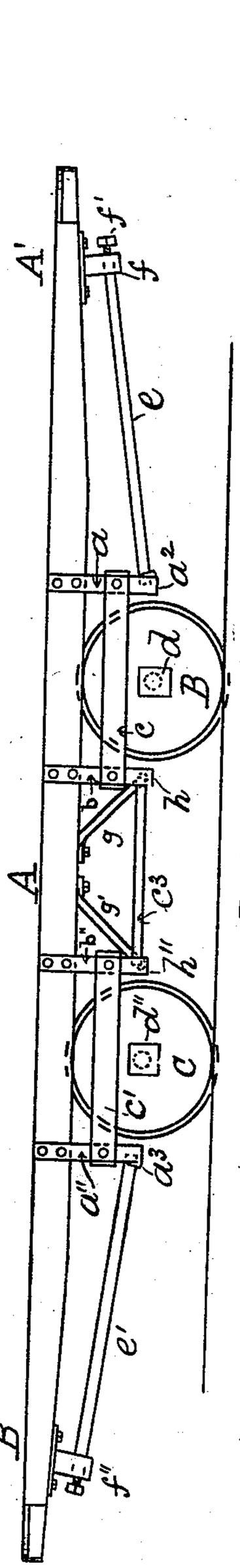

FIG. 2

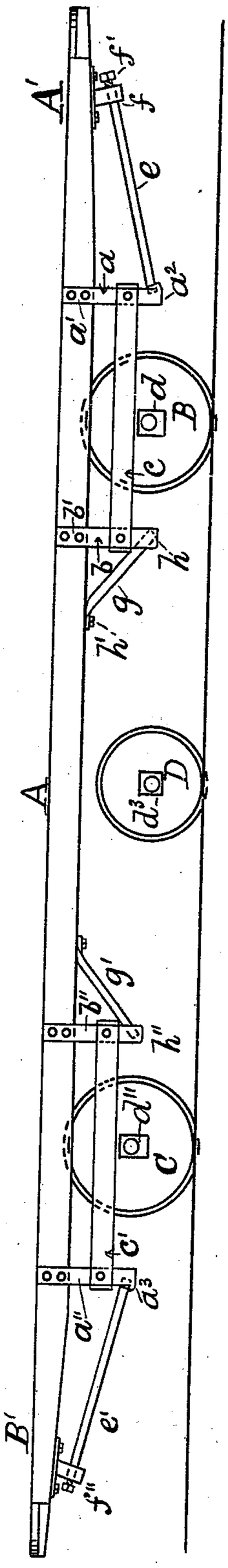

FIG. 1.

WITNESSES:

Jas. H. Ripley.

C. E. Grant.

INVENTOR:

Wm. Robinson.

ANDREW B. GRAHAM, PHOTO-LITHO. WASHINGTON, D.C.

(No Model.) 3 Sheets—Sheet 2.

W. ROBINSON.

STREET CAR.

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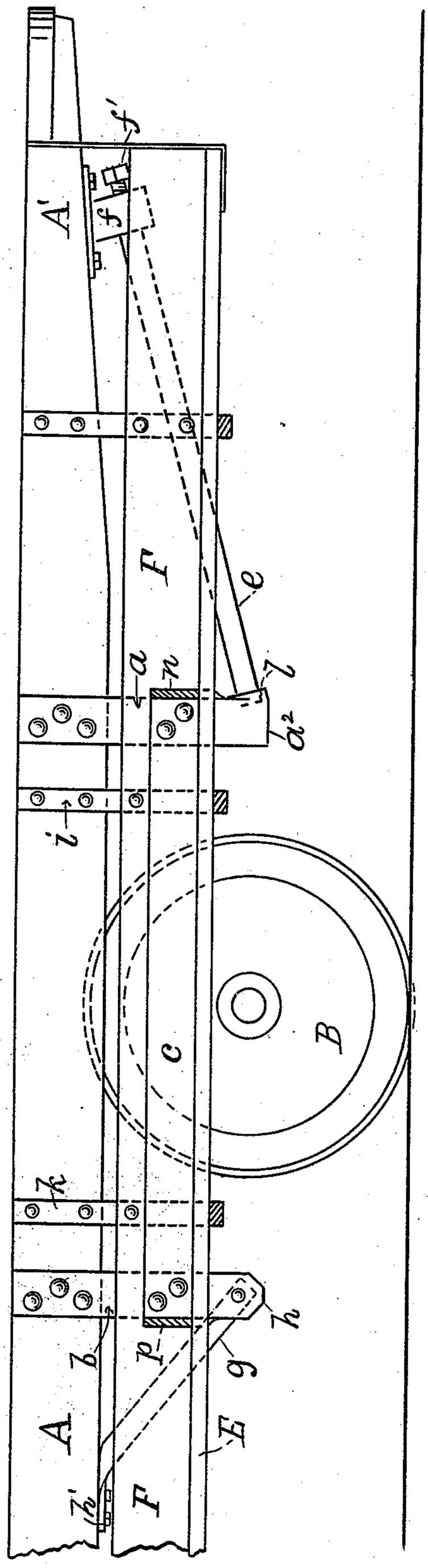

FIG. 2.

WITNESSES:

Jas. H. Ripley.

C. E. Grant.

INVENTOR:

Wm. Robinson.

ANDREW B. GRAHAM, PHOTO-LITHO. WASHINGTON, D.C.

(No Model.) 3 Sheets—Sheet 3.

W. ROBINSON.

STREET CAR.

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FIG. 4.

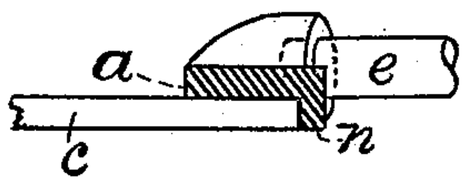


FIG. 7

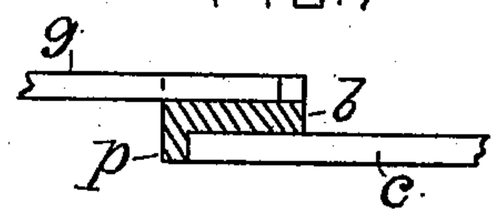


FIG. 5.

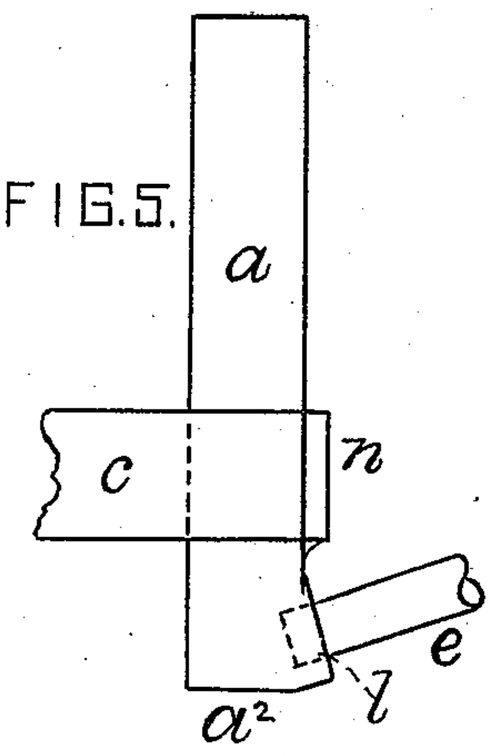


FIG. 6.

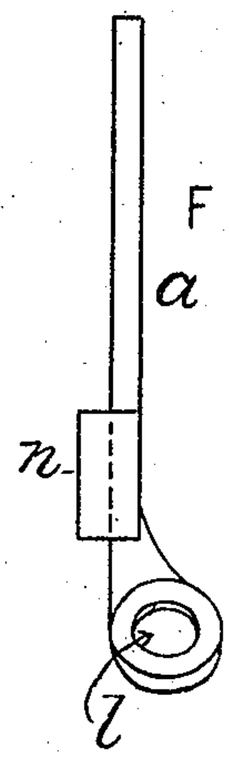


FIG. 8.

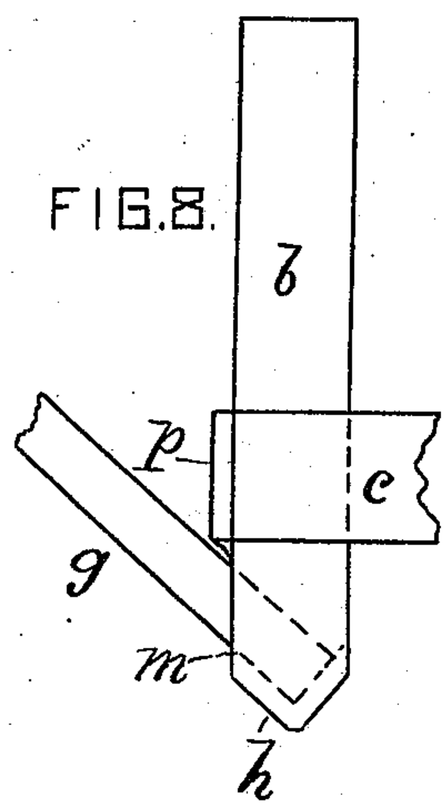


FIG 9

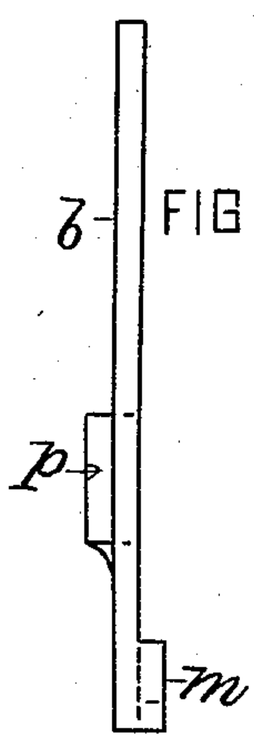


FIG. 10.

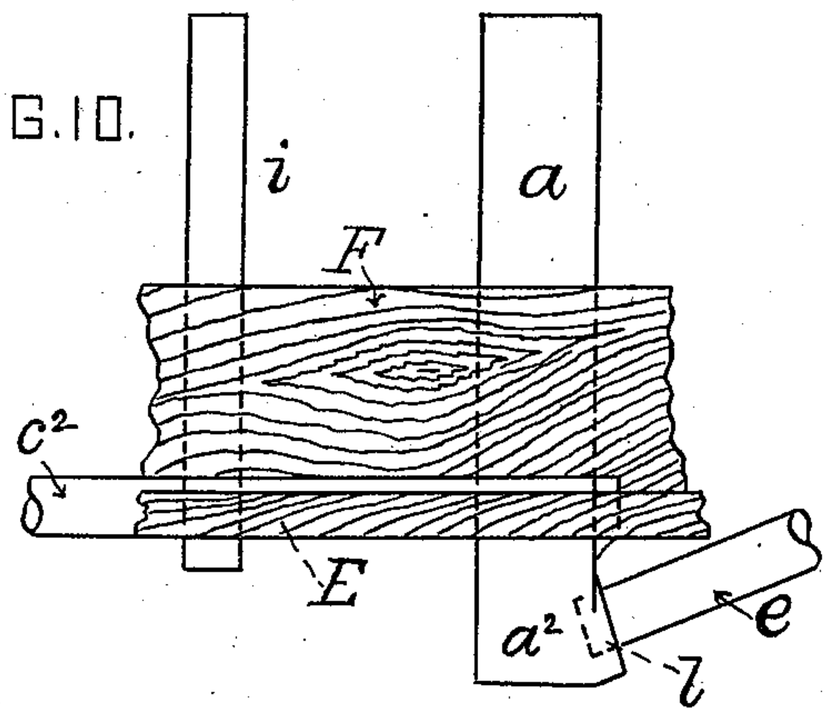
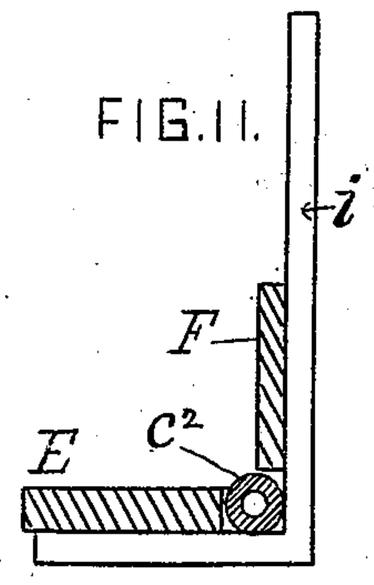


FIG. 11.



WITNESSES:

Jas. H. Ripley

C. E. Grant.

INVENTOR:

Wm. Robinson.

UNITED STATES PATENT OFFICE.

WILLIAM ROBINSON, OF BOSTON, MASSACHUSETTS.

STREET-CAR.

SPECIFICATION forming part of Letters Patent No. 551,047, dated December 10, 1895.

Application filed April 6, 1893. Serial No. 469,271. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM ROBINSON, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented a new and useful Improvement in Street-Cars, of which the following is a specification.

In open street-cars the ends of the car usually project so far beyond the wheels that it is difficult to truss up the ends properly without serious inconvenience. The truss connections usually run below the journal-boxes, thus interfering with the convenient removal of the wheels and journal-boxes and their replacement. When swiveling or movable trucks are used, this difficulty is exaggerated.

The object of my invention is to overcome the above-named objections and to produce a car-truss simple, effective, and convenient and which shall not interfere with the easy removal of the wheels, axles, and journal-boxes.

The nature of my invention will be understood from the description which follows, reference being had to the accompanying drawings, which form a part of this specification, in which—

Figure 1 is a side elevation of a car-frame provided with flexible or movable trucks, illustrating my invention. Fig. 2 is a similar view showing the application of my invention to four-wheeled cars. Fig. 3 is an enlarged side elevation of one end of the car-frame. Figs. 4, 5, and 6 show, respectively, top, front, and edge views of one of the truss-brackets with its connections, while Figs. 7, 8, and 9 show, respectively, top, front, and edge views of the other truss-bracket with its connections. Fig. 10 is a front view, and Fig. 11 a cross-section detail illustrating another form of a part of the truss.

Similar letters of reference indicate corresponding parts in all the figures.

A shows the floor-framing of an open street-car, said framing being provided with the rigid pendent brackets *a b*. These brackets are rigidly secured to said frame A at their upper ends, as shown at *a' b'*.

The brackets *a b* are preferably located at opposite sides of the wheel B and at a suitable distance from said wheel. The said brackets *a b* are connected together by means of a rigid brace or truss-rod *c*, riveted, bolted, or otherwise securely attached or connected to said brackets *a b*. Said brace *c*, which I prefer to make of steel, is located above the journal-box *d* of said wheel B. The lower ends of the brackets *a b* project, preferably, some distance below the brace *c*.

The brace or truss-rod *e* engages the lower end a^2 of the bracket *a*, while the upper end of said brace *e* engages adjustably the bracket *f* at or near the end of the car, as shown.

The brace *g* engages the lower end *h* of the bracket *b* and is preferably rigidly secured thereto, while the upper end of said brace *g* is secured to the car-frame A, as shown at *h'*. Said brace *e* is provided with the adjusting-screw *f'* in the usual manner.

The operation is as follows: To truss up the outer end A' of the car-frame A, the outer end A' of the frame is jacked up in the usual manner and the adjusting-screw *f'* set up to the proper point, whereby the brace *e* acts as a truss, bracing the outer end A' of the car against the lower end a^2 of the bracket *a*, said bracket *a* in turn being braced against the bracket *b* by the brace *c*, joining said brackets *a* and *b*. Furthermore, the brace *g*, secured to the lower end of the bracket *b* and to the car-frame A, braces said bracket *b* and prevents it from yielding to the pressure brought upon it by the brace *c*. Thus the various brackets and braces described form together a very rigid truss, which effectually holds up the outer end A' of the car-frame A, while at the same time said truss does not interfere with the ready removal or replacement of the wheels and axles or journal-boxes, since the brace *c* passes above the same. The opposite end B' of the car is trussed in exactly the same manner as described in connection with the end A', said trussing being illustrated also at the end B' of said car-frame. In the latter case the brackets *a'' b''* are rigidly connected together by the brace *c'*, while the truss-rod or brace *e'*, braced against the lower end of the bracket *a''* and against the bracket *f'''*, holds up the end B' of the car. The brace *g'* forms the rigid resistance in this case against the yielding of the bracket *b''*.

An inspection of Figs. 3, 10, and 11 will show that the lower ends of the brackets *a b* are dropped considerably below the line of

the foot-board E, and it will be observed that the farther the lower ends of the brackets *a b* project below the brace *c* the greater will be the truss leverage and resistance of the truss-rod or brace *e*.

When a four-wheeled car is used, as shown in Fig. 2, I prefer to connect the lower ends of the brackets *b' b''* rigidly together by means of the brace or truss-rod c^3, as shown. This truss-rod c^3 may be used either in addition to the braces *g g'* or independently thereof and replacing the same.

The various horizontal braces *c c' c*^{3} are provided, when necessary, with means for preventing buckling. In the case shown, for instance, in Fig. 3 the brace *c* is represented as a flat steel bar having its lower edge extending downwardly back of the foot-board E, while the step-irons *i k* extend downwardly back of said brace *c* at points as near as practicable to the wheel B. Thus the brace *c* is hugged tightly between said foot-board E and the step-irons *i k*, whereby buckling is prevented.

Where space will allow, I prefer to use the tubular brace or truss c^2, as shown in Figs. 10 and 11, instead of the flat brace or truss *c*, already described. In this case the truss c^2 is sufficiently rigid of itself to prevent buckling however it may be located. It will not, therefore, be necessary to take measures for the prevention of buckling of the tubular brace or truss c^2.

When the tubular truss c^2 is used, it is conveniently located in the corner space of the step-irons and between the foot-board E and the toe-guard F, as shown in Figs. 10 and 11.

The brackets *a b* I prefer to make of suitable castings or forgings, or of a combination of both, their lower ends being provided with sockets or shoulders *l m* for the reception of the braces or truss-rods *e* and *g*, as shown clearly in Figs. 4, 5, and 6, and also in Figs. 7, 8, and 9.

The bracket *a* is also provided with a shoulder or socket *n*, against which the brace or truss-rod *c* finds lodgment. The bracket *b* also is provided with the shoulder or socket *p*, against which the opposite end of the brace *c* abuts. Thus the ends of the brace or truss-rod *c* press against solid castings or forgings and do not depend for their bracing resistance upon rivets or bolts, which might shear off under extreme pressure.

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

1. A car truss consisting essentially of dependent brackets secured to the car frame at opposite sides of the journal box, and independently of the pedestal, a rigid pressure brace connecting said brackets above the line of said journal box, said pressure brace being independent of the foot board, and a pressure truss brace extending from the lower end of one of said dependent brackets diagonally upward to another bracket located at or near the outer end of said car frame, substantially as described.

2. A car truss consisting essentially of dependent brackets secured to the car frame at opposite sides of the journal box, and independently of the pedestal, a rigid pressure brace connecting said brackets above the line of said journal box, said pressure brace being independent of the footboard, a pressure truss brace extending diagonally upward from the lower end of one of said dependent brackets to another pressure bracket secured at or near the outer end of said car frame, and a brace extending from the lower end of the other dependent bracket to a suitable resisting medium, substantially as described.

3. A car truss consisting essentially of the dependent brackets *a*, *b*, secured to the car frame at opposite sides of the journal box, and independently of the pedestal, a pressure brace independent of the footboard, connecting said brackets above said journal box, the diagonal pressure truss rod or brace *e* extending from the lower end of one of said dependent brackets to a position at or near the outer end of said car frame, and the brace *g* extending diagonally from the lower end of the other dependent bracket to the car frame, substantially as described.

4. The combination, with the car frame A, of the dependent brackets *a*, *b* at opposite sides of the journal box *d*, the pressure brace connecting said brackets above their lower ends, the pressure truss brace *e* supporting one end of said car frame against the lower end of said bracket *a*, dependent brackets *a''*, *b''*, secured to said car frame at opposite sides of the journal box *d''*, a pressure brace connecting said brackets *a''*, *b''* above their lower ends, the truss brace *e'* supporting the other end of the car against the lower end of the bracket *a''* and the pressure brace c^3 connecting the lower ends of the intermediate dependent brackets *b*, *b''*, the whole forming a car truss, substantially as described.

5. In a car truss, the independent brackets *a*, *b*, provided with shoulders or sockets *n*, *p* located above the lower ends of said brackets, said shoulders or sockets affording stops for the ends of one of the pressure truss braces, substantially as described.

6. In a car truss, the independent bracket *a* provided with shoulders or sockets on its opposite sides, said shoulders or sockets affording, respectively, stops for truss braces extending in opposite directions from said bracket.

7. In a car truss, the combination, substantially as described, of two dependent brackets having their upper ends secured to the car frame at opposite sides of the journal box, independently of the pedestal, a rigid truss brace connecting said brackets above their lower ends and braces extending from the lower end of each of said brackets, one of said braces trussing up the outer end of said car frame.

8. In a car truss, the combination, substan-

tially as described, of two dependent brackets having their upper ends secured to the car frame at opposite sides of one of the journal boxes and independently of the pedestal, and their lower ends extending below the footboard, a rigid truss brace connecting said brackets above their lower ends, said truss brace being located at the angles of the step irons between the footboard and the vertical part of said step irons, and truss braces extending from the lower end of each of said brackets, one of said braces trussing up the outer end of said car frame.

9. A car truss consisting essentially of four dependent brackets having their upper ends secured to the car frame and arranged in pairs, the members of each pair, respectively, being located at opposite sides of one of the journal boxes, but independently of the pedestal, rigid truss braces extending above the journal boxes and connecting the members of each pair of brackets, another truss brace connecting the lower ends of the two intermediate brackets on a lower level than the truss braces just described, and truss braces extending from the lower ends of the outer brackets to the outer ends of the car frame and supporting the same, substantially as described.

WILLIAM ROBINSON.

Witnesses:
C. E. GRANT,
JAS. W. RIPLEY.