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PATENTED DEC. 18, 1906.

S. M. CURWEN.  
CONSTRUCTION OF CARS.  
APPLICATION FILED OCT. 25, 1905.

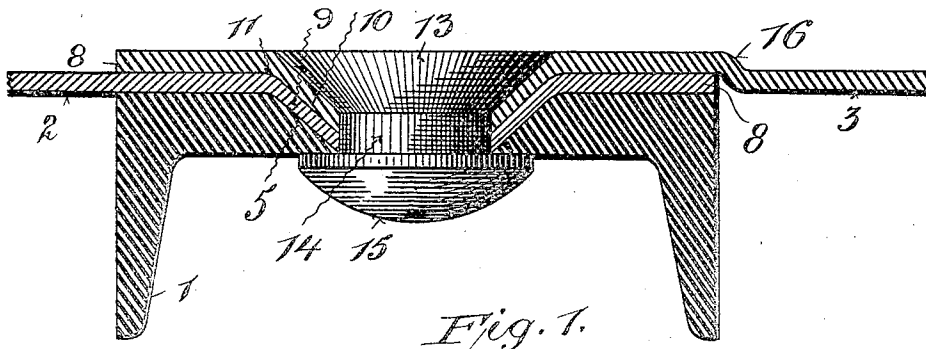


Fig. 1.

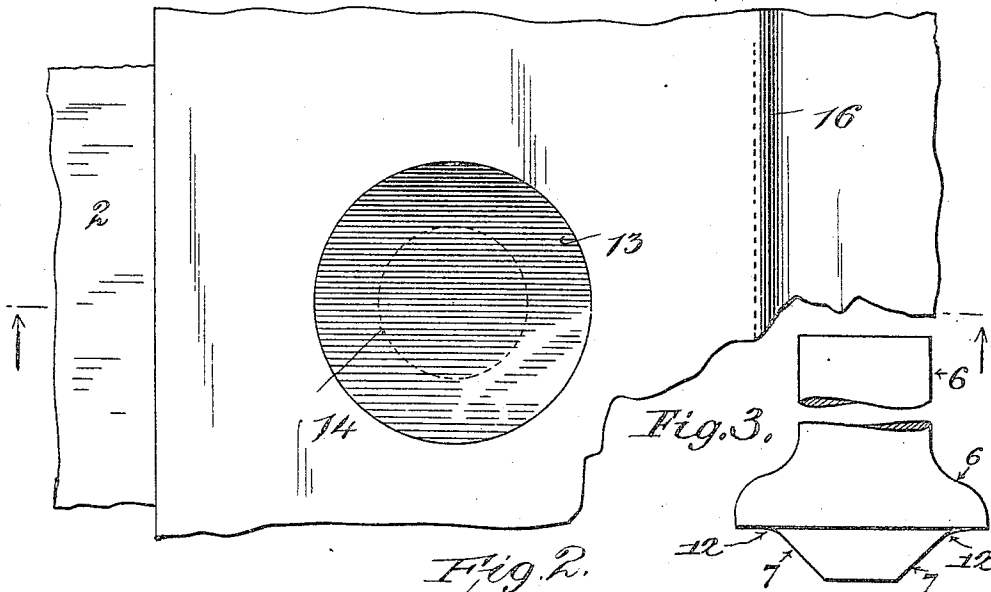


Fig. 2.

Fig. 3.

Witnesses  
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# UNITED STATES PATENT OFFICE.

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## CONSTRUCTION OF CARS.

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Specification of Letters Patent.

Patented Dec. 18, 1906.

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*To all whom it may concern:*

Be it known that I, SAMUEL M. CURWEN, a citizen of the United States, and a resident of the city and county of Philadelphia, State of Pennsylvania, have invented certain new and useful Improvements in the Construction of Cars Wholly or in Part of Metal, of which the following is a specification.

While my invention may be advantageously used in other relations, it has particular application to the construction of cars in which metal sheathing is employed for the outside or inside covering.

In the construction of cars in which metal sheathing has been employed the edges of the plates or sheets have been overlapped and secured together by rivets, the heads of which project from the exposed surface of the sheet. Apart from the question of looks or appearance, which is of more or less importance, the question of result in strength is of the utmost importance in constructing these cars. The framework or under body of a car construction wholly or partly of iron is necessarily heavy and strong, while the superstructure, for obvious reasons, should be as light as possible. This necessitates the employment (where the superstructure is wholly or partly of metal) of metal sheathing or plates and requires that the plates be comparatively very thin, thereby producing as light a construction as possible. Likewise the uprights or supporting-posts are necessarily made as light as possible. For this latter purpose and intermediate with the ends of the car different forms of irons, such as angle or channel iron, are employed. The use of these produce lightness and strength. In the use of these comparatively thin plates and light yet strong uprights with the sheathing riveted thereto weaknesses have been developed, especially in the union of the plates with each other. More especially it has been noted that the plates have a tendency to shear the rivets, and where the riveting is had near the edge of the plate the tendency is to unduly strain the edge, which brings about a weakness of the union of the plates with each other and with the uprights and to a greater or less extent expanding and opening up the joints, permitting deterioration of the metal and weakening the structure.

My invention has for its object to obviate these disadvantages and in an economical and expeditious manner obtain a flush surface where the sheathing or plates are united,

relieve the rivets of considerable strain, and permit the riveting to be done closely adjacent to the edge of the plates without weakening them and at the same time relieve their edges of considerable of the strain which has heretofore existed.

For a more particular description of my invention reference is had to the accompanying drawings, in which similar reference characters designate similar parts.

In the drawings accompanying this specification, Figure 1 is an enlarged sectional view illustrating one embodiment of my invention, the section being taken on the line 1 1 of Fig. 2. Fig. 2 is a sectional elevation of a further embodiment of my invention. Fig. 3 is a side elevation of a portion of a tool which may be used in practicing my invention.

Referring to Figs. 1 and 2, 1 indicates an upright or rib formed of channel-iron, and 2 and 3 indicate the sheathing or plates having their edges overlapped and riveted to the upright, as will now be described.

The following is a description of the method in which I have utilized my invention in actual practice, which can be of course modified to suit particular conditions, viz: The uprights or ribs are erected upon the car-frame, and the holes for the rivets are located and formed therein. The plates are clamped against the post and marked for the formation of their rivet-holes. The rivet-holes formed in the plate in the upright are then countersunk or coned, as shown at 5, the countersink preferably extending throughout the thickness of the rib, so as to make its cross-section wholly or substantially conical. The plates are then placed in position, held there by clamps, and the rivet holes marked off or located. By use of a suitable tool, such as shown in Fig. 3, in which 6 is a head or shank and 7 a conical projection therefrom substantially conforming to the dimension and configuration of the countersunk rivet-holes in the rib, the metal surrounding the apertures in the edges 8 of the plates is pulled in or driven into the countersunk recess 5, one plate being so treated after the other, so that the metal of both plates surrounding their rivet-holes is depressed so as to form conical projections 9 and 10, extending as to the plate immediately against the rib into the countersunk rivet-hole 5 and as to the outer or overlapping plate 3 into the conical depression thus

formed in the underlying plate. In order to smooth the union of the plates 2 and 3, I prefer to slightly round off the edges of the conical projections, as shown in Fig. 1 at 11. 5 This may be done with the tool shown in Fig. 3 by giving it a suitable configuration, as at 12. The plates, ribs, post, or uprights are then secured together by a rivet. This rivet has a conical head 13 and stem 14 and the 10 usual projection. The same is inserted through the aperture which extends through the rib and plates, so as to bring the coned head into the conical depression, and then by placing a flat-headed tool against the 15 outer surface of the head 13 the rivet is driven home, producing the usual circular head 15 and firmly uniting all the parts. To aline the plates, the overlying one, as 3, may have its edge offset, as at 16.

20 The result of this construction is a greatly-strengthened structure as compared with those heretofore in use, in which the sheets are flat and riveted in the usual manner, so that the sheets tend to shear the rivet under 25 the stresses incident to the use of the car. As indicated above, the "pulling" of the sheets into the countersunk opening recess 5 brings all the stresses against this countersunk portion, the bent part of the sheets, and the enlarged ends of the rivet. This wide distribution of the shearing stresses renders them

harmless and permits a much smaller rivet to be used for the same strength than had heretofore been possible. Moreover, the head 13 of the rivet may be, and preferably 35 is, made flush with the external surface of the sheathing, so that a smooth surface is available for the finishing paint of the car, and all unsightliness is avoided.

From the foregoing it will be readily understood that my invention may be practiced in several ways without departing from its spirit. 40

Having thus described my invention, what I claim is— 45

In a car structure, a rib or plate with a countersunk perforation, two plates, one overlapping the other with registering perforations drawn and bent into said countersunk perforation, the outer of said plates 50 being bent so as to have its main portion in the plane of the other plate, a rivet passing through said perforation and holding portions of the said plates in said countersunk part of the perforation, and holding said 55 plates and rib in their proper relative positions.

Signed this 7th day of October, 1905.

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