Sept. 6, 1927. 1,641,885

K. C. GARDNER

CROSS BRACE

Filed June 23, 1927

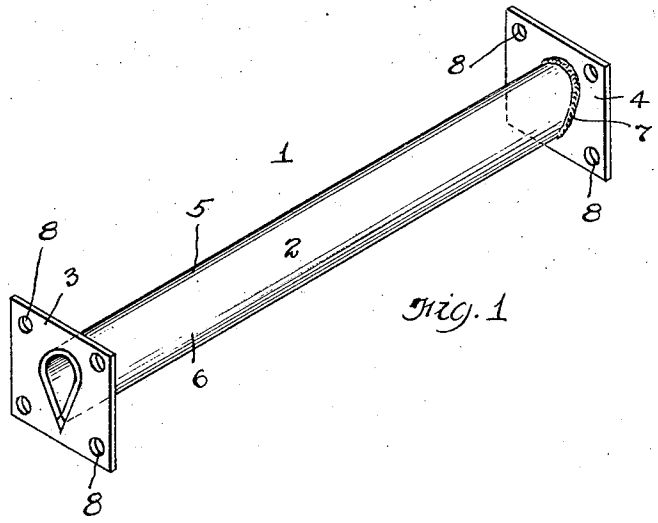


Fig. 1

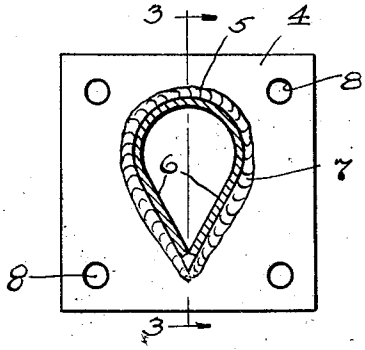


Fig. 2

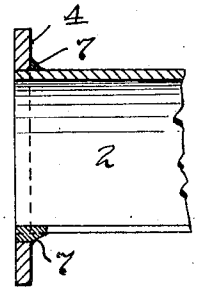


Fig. 3

INVENTOR.

Kenneth C. Gardner

BY

Fay, Oberlin & Fay

ATTORNEYS.

Patented Sept. 6, 1927. 1,641,885

UNITED STATES PATENT OFFICE.

KENNETH C. GARDNER, OF GREENVILLE, PENNSYLVANIA, ASSIGNOR TO THE GREENVILLE STEEL CAR COMPANY, OF GREENVILLE, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

CROSS BRACE.

Application filed June 23, 1927. Serial No. 200,835.

This invention as indicated relates to a cross brace. More particularly it comprises a brace adapted to be placed transversely of railway cars to maintain the sides thereof in position and strengthen the entire structure. It is especially important in connection with railway cars of the gondola and hopper type in which material in bulk is frequently dropped from steam shovels and other loading apparatus, subjecting said cars to severe strains. The invention is intended primarily for metal car constructions, but it may be found desirable in connection with car bodies of other material such as composition sheets, or wood combined with metal, or other combinations thereof.

The principal object of the present invention is to provide a brace which may be formed of three plates which when united into an integral structure preferably by means of a welding operation, will provide a structural unit in which no part of the metal has been subjected to undue strain. It also permits of the use of a central structural element of lighter gauge than the end members, thus providing for strength at the points where the greatest strains are to be met, and adequate strength without undue weight through the central portion of the structure. Furthermore, should the parts through undue exposure be subjected to conditions which would cause corrosion, the heavy gauge of the metal at the ends of the structure would prevent the failure of the structure at the ends prior to the wear of the structure over the body portion and the cross brace thus would have a uniform period of service throughout all of its structural parts.

It has heretofore been proposed to form car braces by bending certain portions of the metal to form flanges, but this operation unless carried out with care may result in microscopic lines of fracture adjacent the point of bending or in a thinning of the metal at a point where it should be of greatest thickness. This involves the use of relatively heavier gauge material throughout the structure in order to supply adequate strength at the points where such heavy gauge is required. Thus an excess of material beyond what is required at certain parts of the structure inevitably results.

The present invention provides for the proper proportioning and distribution of the material in the members used to make up the brace so that the terminal members may be of heavier gauge and the intermediate portion of lighter gauge, with the entire structure fully adequate to meet the conditions under which it is to be used. The central member is preferably a hollow member and may be in the form of a tube or other hollow structure of any desired cross-section. The preferred form of construction, however, contemplates the use of a central member formed of an elongated sheet of metal, or equivalent material, of suitable gauge bent or formed upon a radius of sufficient size to prevent injury to the texture of the sheet at the point of curvature, and having its sides substantially flat and approaching each other adjacent the lower edges.

The end plates, which are to serve as flanges for the central member, are of any necessary degree of thickness to withstand the strains which will be placed upon them when they are riveted or otherwise secured to the sides of the railway car. The plates will be apertured to correspond with the cross-section of the central or intermediate member and when the structure is made of metal preferably will be secured to said member by means of electric welding whereby a fillet of metal is formed at the inner meeting line of each end plate and the adjacent outer surface of the intermediate member when the end of said intermediate member is engaged through the aperture in the end plate. In addition to the features just described, the construction permits of any desired size of end plate, and provides for the placing of bolt or rivet holes at the most favorable points through the end plates forming the end flanges of the completed brace.

To the accomplishment of the foregoing and related ends, said invention then consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawing:

Fig. 1 is a perspective view showing a car brace with the end plates secured to the

body portion thereof; Fig. 2 is a transverse sectional view of the structure shown in Fig. 1; and Fig. 3 is a central longitudinal sectional view taken along the line 3—3 shown in Fig. 2, looking in the direction of the arrows.

In the form of construction illustrated in the drawing, the improved brace 1 is formed of three plates of sheet metal, the central or body portion 2 comprising an elongated plate bent to hollow form of a specific cross-section and the end portions 3, 4, comprising substantially square plates having the central portions punched through to provide in each an aperture of the cross-section of the ends of the body portion. The body portion is formed of an elongated plate of sheet metal bent or folded by means of suitable apparatus to provide a central brace section having a rounded upper edge 5 of substantially semi-circular extent as viewed in cross-section and having sides 6 of substantially flat inclined portions approaching each other adjacent the lower edge. The end plates are preferably punched in a suitable machine adapted to provide an aperture of substantially the exact cross-section of the body portion, and said plates are then telescopically engaged over the extreme ends of the body portion, respectively, until the rearward or outer faces thereof are substantially flush with the ends of said body portion. By means of a suitable electric welding apparatus, a welded joint is then formed between the inner edge of each end plate and the adjacent surface of the body portion of the brace. The welding operation may take different forms but preferably is produced by means of a direct current welding machine wherein a fusible electrode is employed to form a fillet 7 of metal about the meeting point of each end plate with the body portion on the inner side of said end plate. When the inner side or inner surface of an end plate is referred to it is intended to designate the portion of the plate toward the middle portion of the central member 2. This operation fuses the added metal to the adjacent surfaces of the end plate and the body portion, and firmly unites the end plates and body portion to each other, to an appreciable depth within the space over which said parts are in telescoped relation.

During the operation of punching the openings in the end plates for the ends of the body member, suitable openings 8 may also be punched to form the rivet or bolt holes in the end plates which plates when united to the body member form the flanges of the brace structure. The welding operation just described is, of course, performed upon the end plates at each end of the body member and may be carried on either simultaneously or successively. The structure thus formed presents a brace having flange plates of suitable gauge integrally united therewith at each end and provided with the desired apertures for securing the same to the structure to be braced.

The fillet formed in the welding operation not only integrally unites the adjacent parts and closes the seam between each end plate and the body member securely, but also serves to prevent the entrance of moisture at the points of juncture. The bending of the body member, as stated, is upon a substantial radius and no change in the molecular structure of the body portion takes place.

The end plates obviously are not subjected to any bending stresses and are therefore free of microscopic fractures or changes in texture which might afford a point for the entrance of moisture and the development of rapid oxidation. The end plates have perfectly flat rearward faces affording a maximum area of contact with the adjacent structure when secured thereto and have no curved flanges which might be warped out of shape owing to stresses impressed in the metal at the time they were formed.

The construction described provides for economical production without introducing any structural weakness. It permits of the elimination of excess material at points where it is not needed, and accommodates the structure exactly to the character of work to be performed by it. The construction permits the provision of braces in repair work which are proportioned to the prospective period of further service of structures undergoing repair, rather than greatly in excess of such prospective term of service, or, on the other hand, below the necessary degree of strength as a whole, or in part, for the work still to be performed by such repaired structures.

This feature of the invention is therefore of great importance from a manufacturing and operative standpoint, and the results attained are of much economic value.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention—

1. A brace member for railway car bodies having an elongated hollow central member and separate flat end plates integrally secured thereto by a fillet at the inner surface of each end plate and spaced from the end of said central member.

2. A brace member for railway car bodies having an elongated hollow central member and flat end plates integrally secured thereto, by a fillet formed by electric welding unit-

ing the inner surface of each end plate to the adjacent outer surface of central member, said fillet being spaced from the respective ends of said central member.

3. A brace member for railway car bodies having an elongated central member formed of metal of predetermined gauge and end plates formed of flat metal of heavier gauge than that of said central member and integrally united thereto.

4. A brace member for railway car bodies having an elongated central member formed of metal of predetermined gauge and end plates formed of flat metal of heavier gauge than that of said central member and integrally united thereto by a fillet formed by electric welding uniting the inner surface of each end plate to the adjacent outer surface of central member.

5. A brace member for railway car bodies having an elongated hollow central member formed of sheet metal folded upon a central median line to provide a rounded upper edge and flattened approaching side walls, and end plates provided with apertures to receive the ends of said central member, and means integrally uniting said end plates to said central member.

6. A brace member for railway car bodies having an elongated hollow central member formed of sheet metal folded upon a central median line to provide a rounded upper edge of substantially semi-circular cross-section, and substantially flat inclined side walls approaching each other adjacent their lower edges, and end plates engaged over and integrally united to said central member.

7. A brace member for railway car bodies having an elongated hollow central member formed of sheet metal folded upon a central median line to provide a rounded upper edge and flattened approaching side walls, and end plates provided with apertures to receive the ends of said central member, means integrally uniting said end plates to said central member and rivet holes formed at spaced points through said end plates.

8. A method of forming a cross brace for railway car bodies which comprises the steps of bending an elongated strip of sheet metal of suitable gauge along a central median line to form a hollow central member, perforating two plates of sheet metal of heavier gauge centrally to provide apertures of a size suitable to telescopically receive the ends of said central member and simultaneously forming a plurality of rivet holes through said end plates, engaging said end plates upon the respective ends of said central member and forming a fillet of metal integrally uniting the inner surfaces of said end plates with the adjacent surface of said central member and sealing the joints between said members.

Signed by me this 18th day of June, 1927.

KENNETH C. GARDNER.