

(No Model.)

C. C. BENSON.
RAIL BOND FOR ELECTRIC RAILWAYS.

No. 568,713.

Patented Sept. 29, 1896.

Fig. 1.

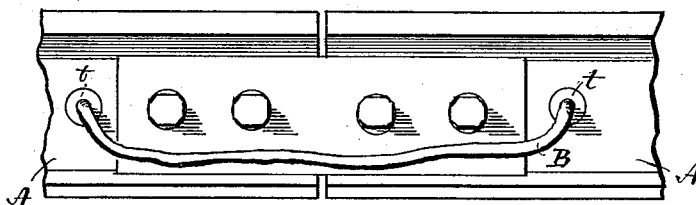


Fig. 2.

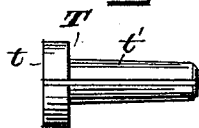


Fig. 3.

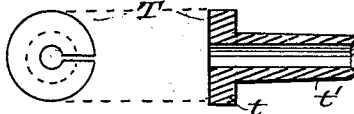


Fig. 4.

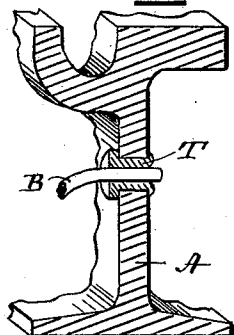
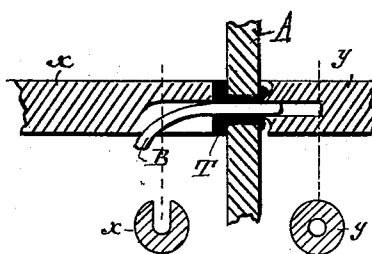


Fig. 5.



Witnesses:
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UNITED STATES PATENT OFFICE.

CHARLES C. BENSON, OF COVINGTON, KENTUCKY.

RAIL-BOND FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 568,713, dated September 29, 1896.

Application filed December 1, 1894. Serial No. 530,523. (No model.)

To all whom it may concern:

Be it known that I, CHARLES C. BENSON, a citizen of the United States, residing at Covington, Kenton county, Kentucky, have invented new and useful Improvements in Rail-Bonds for Electric Railways, of which the following is a specification.

My invention relates to what are commonly known as "rail-bonds"—the electrical connections between successive rails of an electric railway where the current is "grounded" at the wheel-base of the motor-car, or the track is employed as a return-circuit; and it consists in an improved construction of the same intended to meet and overcome certain difficulties developed by experience in the use of such bonds. The conductivity of the iron of the rail being normally much less than that of the copper or brass, of which the connections (or "bonds") are usually made, it is necessary to provide and maintain a large contact-surface in perfect contact condition—a condition very difficult to maintain, owing to the fact, first, that the connection is made at the vertical web of the rail, which is comparatively thin; second, the tendency of the iron to rust and destroy the conductivity of the contact-surfaces, and, third, the inability of most forms of conductors to secure absolute contact over the required surface and to maintain the same against the encroachments of moisture and the displacing action of the constant vibration to which the rails are subject in use. Screws or bolts are found inefficient for the latter reason, and I have therefore discarded them.

To the end of meeting these conditions most efficiently and producing at the same time a cheap joint, easily applied and durable, my invention consists in a bond having a connecting-wire and split collar, the latter adapted to be driven into the aperture of the web, and thereby compressed upon the connecting-wire, and then condensed longitudinally by pressure so applied to expand the collar radially in its holding-aperture and further shrink it about the connecting-wire, and producing an upset rim riveting the collar in the web, and forming a perfect and durable contact of surfaces between the upset rim and the flange at the other side of the

web, thereby setting and maintaining the metal of the collar in absolute contact with that of the rail.

My improved rail-bond and the mode of application are illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation of two contiguous rails with the rail-bond in place. Fig. 2 is a side view; Fig. 3, an end view and axial section of the thimble used in making the connection; Fig. 4, a cross-section of a rail through the connecting-thimble; and Fig. 5, a horizontal section of a rail through the thimble, showing the upsetting and backing tools used in making the joint.

Referring now to the drawings, A A designate two abutting rails of an electric street-railway, and B a short section of wire used to form an electrical connection between the rails.

In making the bond I employ brass thimbles T, such as shown in Figs. 2, 3, and 4, having a flanged head *t* at one end, a slightly-tapered shank *t'*, and split axially at one side. Holes are drilled through the web of the rails at convenient points beyond the "fish-plates" and the surface around the aperture at both sides cleared of rust or scale. The thimbles T, with the wire B inserted in the same, are then placed in the apertures of the web and driven home by a tool *x*, Fig. 5. The parts are so proportioned that in driving home, the thimble is closed in around the wire B, making a snug and tight fit. An upsetting-tool *y* is then driven against the opposite end of the thimble, as indicated in Fig. 5, upsetting the end of the thimble to form an overlapping margin and also to condense the shank of the thimble longitudinally and cause it to expand radially, the original tool *x* being used as a backing, and the metal of the thimble is thus forced against the rail at all surfaces in contact, including the inner face of its flanged head, and also against the inclosed wire throughout the entire length of the thimble. The contact-joints so made are in absolute contact and impervious to air or moisture, the softer metal of the thimble filling all the minute inequalities of the surface against which it is compressed, and the connection so formed

is proof against displacement or injury from these causes or from jarring of traffic on the rails.

5 The surfaces are so proportioned as to give the proper amount of conductivity according to established laws.

10 As a mechanical equivalent or variant of my invention and within its scope I may employ a thimble having no flanged head, but so proportioned as to form a head by upsetting in driving into the rail, the head being completed and expanded by the further upsetting of the metal throughout in forming the opposite retaining rim or head, as previously
15 described.

I claim as my invention, and desire to secure by Letters Patent of the United States, as follows:

The improved rail-bond for electric rail-

ways consisting in a conducting-wire carried 20 at opposite ends through the webs of abutting rails in split thimbles having flanged heads; the electrical contact-joint being formed by driving the thimble to intimate contact of its flanged head with the external 25 surface of the rail and then expanding the thimble radially against the inclosed wire and the inclosing rail-web by upsetting longitudinally to form an opposite retaining-head, substantially as set forth. 30

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

CHARLES C. BENSON.

Witnesses:

L. M. HOSEA,

THOMAS M. CHUCK.