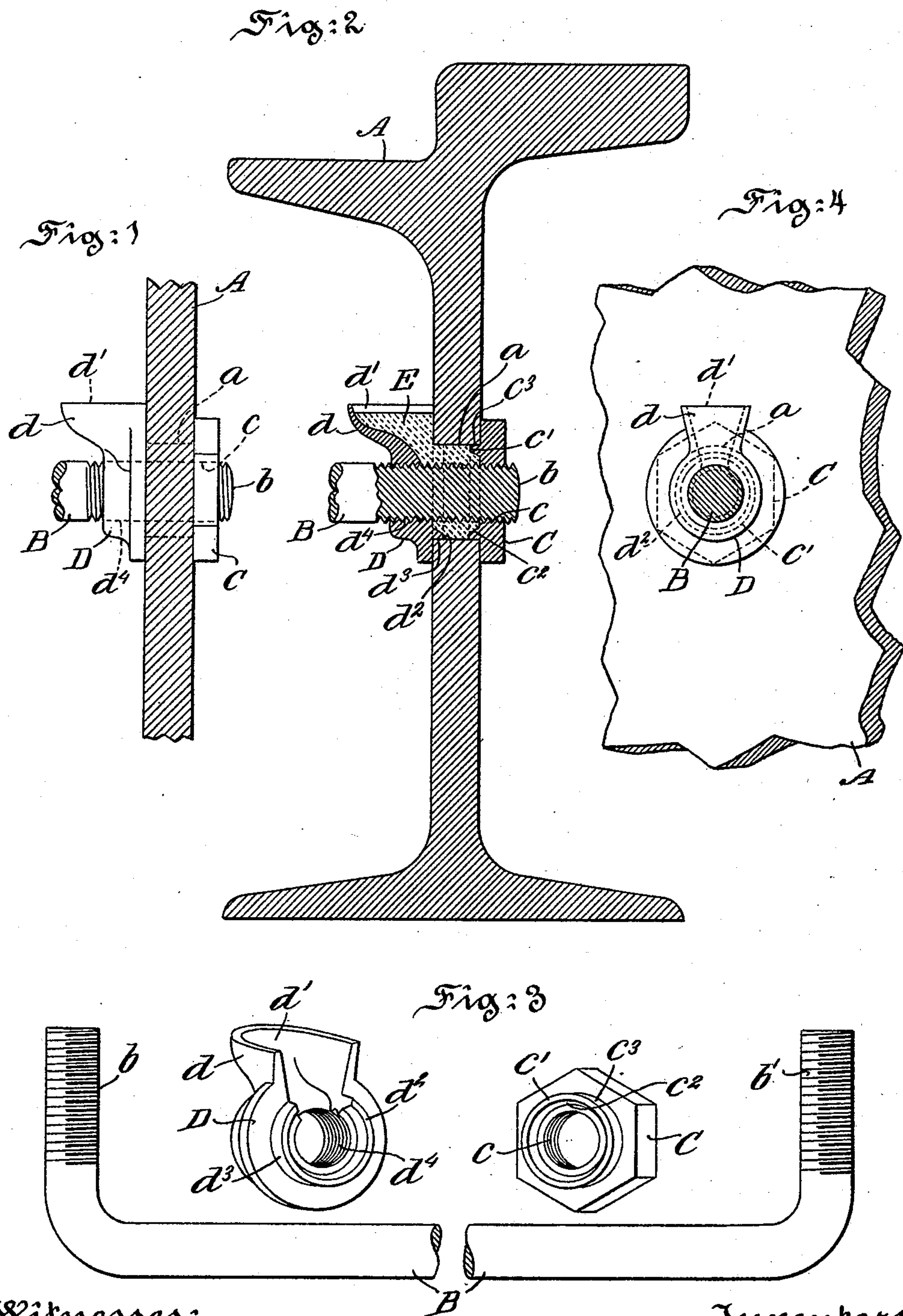


(No Model.)

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BOND FOR ELECTRIC RAILWAYS.

No. 528,788.

Patented Nov. 6, 1894.



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# UNITED STATES PATENT OFFICE.

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## BOND FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 528,788, dated November 6, 1894.

Application filed September 20, 1894. Serial No. 523,558. (No model.)

*To all whom it may concern:*

Be it known that we, HENRY BERT NICHOLS and FREDERICK H. LINCOLN, both citizens of the United States, residing at the city of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have jointly invented certain new and useful Improvements in Bonds for Electric Railways, of which the following is a specification.

Our invention has relation to bonding joints or connections for electric railways; and in such connection it relates more particularly to the construction and arrangement of the bond so as to permit of an air and water tight joint or connection of the same with rails being established and maintained.

The principal objects of our invention are, first, to provide a simple, durable and effective air and water-tight joint or connection of a bond with rails for electric traction purposes, and, second, to provide a bonding joint for the rails of electric railways in which the members thereof are readily applied to the rails and metallic matter in a molten condition is introduced and permitted to expand to establish and maintain an air and water-tight connection of the bond-wire with the rails.

Our invention stated in general terms, consists of a bonding joint or connection for electric traction systems or railways constructed and arranged in substantially the manner hereinafter described and claimed.

The nature and general features of our invention will be more fully understood from the following description taken in connection with the accompanying drawings forming part thereof, and in which—

Figure 1, is a view partly in vertical section and partly in elevation of the bonding joint or connection for electric railways embodying the characteristic features of our invention, showing the bonding wire in broken section and the two detachable members of the device applied and engaging with the opening in the rail and one of said members provided with a pour-hole through which molten metallic material is introduced to establish an air and water tight connection of the rail with the bonding-wire or vice versa. Fig. 2, is a similar view, showing the bonding

wire slit through the center thereof and the two members of the connection in application to the rail and also showing the molten metallic material or substance in an expanded condition in connection with the rail, bonding-wire and members of the device, establishing thereby an air and water tight connection of said bonding-wire with the rail. Fig. 3, is a perspective view, showing the detail construction and arrangement of the several members of the device of our invention detached from the rail; and Fig. 4, is a side elevational view of the rail and jam-nut with its pour-hole and a transverse section of the bonding wire.

Referring to the drawings A, is the rail of any ordinary well known construction provided with an opening *a*.

B, is the bonding wire formed preferably U-shaped and having the outer portion of the arms *b* and *b'*, thereof threaded and adapted for insertion through openings *a*, of two abutting rails A.

C, is a hexagonal or other suitable form of nut, having a flat or smooth face with a threaded bore *c*, and having formed with the rear face thereof an annular flange, rim or projection *c'*, which is located adjacent to or mid-way between the outer periphery of the nut and the inner threaded bore *c*, thereof and which annular flange, rim or projection *c'*, on the rear face of the nut C, is made tapering on the under side at *c<sup>2</sup>*, and has a flat upper face *c<sup>3</sup>*, as clearly illustrated in Fig. 3, and in order that the nut C, may snugly fit against the wall of the opening *a*, in the rail A, as clearly shown in Fig. 2.

D, is a cap or jam-nut provided with a rear tapering recessed body *d*, which has formed integral therewith a pour-hole *d'*, and on the opposite surface of this nut D, is provided a rib, rim or projection *d<sup>2</sup>*, having a lower flat or smooth surface *d<sup>3</sup>*, so as to snugly fit the wall in the opening *a*, of the rail A.

The nut D, has a threaded internal bore *d<sup>4</sup>*, adapted to engage with the threaded portion of the bonding wire B.

E, is metallic material, as lead, tin, antimony or other preferred material, employed in a molten condition and introduced through the pour-hole *d'*, of the cap or jam-nut D, into



the space between the wall of the opening *a*, of the rail A, and the threaded portion of the bonding-wire B, to establish in the cooling an air and water tight connection of the bonding-wire B, with the rail A, for preventing electric leakage and for maintaining an absolutely perfect electrical ground connection of the rails with the motor car and overhead electric conductor in a trolley system.

It may be here remarked that hitherto, as practice has demonstrated, great difficulty has been experienced in the establishing of an air and water tight bonding connection in electric traction roads, of the rails thereof with each other, and various expedients have been resorted to and numerous devices have been employed for such purpose, but they have been only partially satisfactory, due to the fact of electric leakage and the want of an air and water tight connection of one rail with another, which is absolutely necessary in order to insure efficiency in the operation of electric railways. In a bonding joint or connection of our invention and embodying the characteristic features thereof as above explained, the hitherto objectionable features and difficulties encountered are entirely overcome and an absolutely perfect air and water tight bonding connection is established and maintained.

In use, the bonding connection of our invention is employed, as follows:—The nuts C and D, constituting two members of the device for application to the bonding wire B, are secured to place in the opening *a*, provided in each rail A, with the rims, flanges or projections of the nuts engaging therewith, as shown in Figs. 1, 2, and 3, and with the internal threaded bores thereof in engagement with the wire B, so as to permit of the establishing of a solid or substantial connection of the same with the rails when molten metallic material E, is introduced through the pour-hole *d'*, which in cooling and expanding establishes the required air and water tight connection of the several parts of the device with each other and the rails, thereby insuring most excellent results.

It will be manifestly obvious to those skilled in the general art to which our invention appertains, that as to details modifications with respect to the arrangement of the nuts may be made as well as to the form of the pour-hole of one of them without departing from the spirit of our invention.

Having thus described the nature and objects of our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A bonding joint or connection for electric railways, comprising a rail provided with an opening, a bonding wire, nuts engaging therewith and provided with flanges engaging the opening of said rail, one of said nuts provided with a pour-hole to permit of molten metallic material being introduced into the same so as to expand and establish an air and water tight connection of the rail with said bonding wire, substantially as and for the purposes described.

2. A bonding joint or connection for electric railways, comprising a rail provided with an opening, a bonding wire, nuts detachably engaging said wire and provided with flanges, rims or projections adapted to snugly fit the wall of said opening, one of said nuts provided with a pour-hole and a material or substances introduced through said pour-hole, substantially as and for the purposes described.

3. A bonding joint or connection for electric railways, comprising a rail having an opening, a nut engaging said bonding wire and the rear rim or projection thereof engaging the wall of said opening, a cap or jam-nut with a pour-hole engaging said bonding wire and wall of the opening of said rail, and a molten metallic substance introduced through said pour-hole to establish an air and water tight connection of said rail with said bonding wire, substantially as described.

4. The combination, with rails provided with openings, of a bonding wire having the arms threaded and extending through said openings, each of said openings engaged by nuts having threaded bores applied to the arms of said bonding-wire, one of said nuts provided with a pour-hole, and a metallic substance introduced through said pour-hole to establish between and with the members of said bond and said rails an air and water tight connection, substantially as and for the purposes described.

In testimony whereof we have hereunto set our signatures in the presence of two subscribing witnesses.

HENRY BERT NICHOLS.  
FREDERICK H. LINCOLN.

Witnesses:

THOMAS M. SMITH,  
RICHARD C. MAXWELL.