Nov. 7, 1933. F. H. NEFF 1,933,564

BONDING RAIL

Filed Oct. 24, 1927

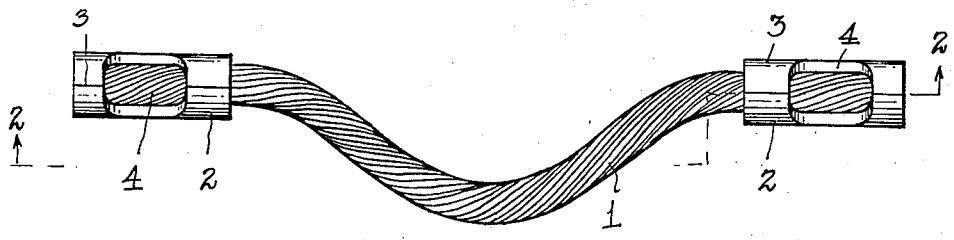


Fig. 1.

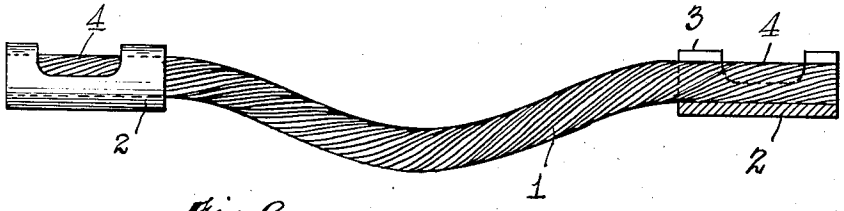


Fig. 2

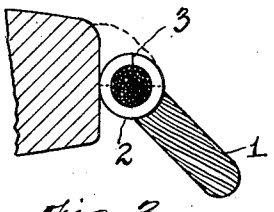


Fig. 3

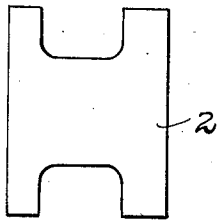


Fig. 4.

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Patented Nov. 7, 1933 1,933,564

UNITED STATES PATENT OFFICE

1,933,564

BONDING RAIL

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Application October 24, 1927. Serial No. 228,218

3 Claims. (Cl. 173—278)

The present improvements, relating, as indicated, to rail bonds, have more particular regard to bonds which have bodies composed of laminations or strands and which are designed to have their terminals attached to the rail either by an arc or gas flame. This method of attaching bonds of the type in question obviously presents a number of difficulties if the ends of such a laminated or stranded conductor body are to be all homogeneously united with the adjacent rail face. As is well understood, the bond body is usually composed of copper or equivalent metal of relatively lower melting point than the steel of the rail, and due to the fact that the metal, copper, has no plastic or pasty condition as it approaches the melting temperature, but disintegrates from the solid state to beads of melted copper which exude from the solid, leaving a porous brittle structure commonly called burnt copper and generally known to be very weak mechanically, special provision is required in the design and assembly of elements that enter into the bond terminal so that the ends of the component strands will not be burnt off but united by a solid mass of metal with the rail face.

The object of the present invention is to provide a bond of the type in question with a terminal that is specially adapted for union in the manner described with the rail, i. e., by solid mass of built up metal formed through the agency of an electric arc or gas flame of corresponding high temperature.

To the accomplishment of the foregoing and related ends, the invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims, the annexed drawing and the following description setting forth in detail certain structure 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 plan view of a bond embodying my present improvements; Fig. 2 is a side elevation of the same, one end being shown in longitudinal section, as indicated by the line 2—2, Fig. 1; Fig. 3 is an end elevation of such bond as viewed from the left in Fig. 1; and Fig. 4 is a plan view of a stamping or equivalent piece of metal, from which the terminal is formed, as it appears previously to being applied to the end of the bond body.

In the bond thus illustrated, as generally in bonds of the type hereinbefore referred to, the body 1 is of flexible stranded construction, e. g., twisted copper cable. The ends of such cable are respectively enclosed in sleeves 2 that constitute thereof the terminals whereby the bond is attached to the rail. These sleeves will preferably be likewise made of copper, although they may be made of ferrous metal, if desired.

The sleeve 2, particularly where made of copper, will be of relatively heavy cross-section and is most conveniently fashioned by being cut or stamped from sheet metal and rolled into tubular form. The piece of metal composing the sleeve may be thus rolled or formed incidentally to the application thereof to the end of the bond body or it may be applied as a sleeve to the latter and subsequently compressed tightly on such end. In either case the parallel or meeting edges will desirably be brought into closely contacting relation so as to form in effect a closed seam 3.

The outline of the stamping, or equivalent piece of metal from which the terminal sleeve 2 is thus formed, is best shown in Fig. 4. Such blank, it will be seen, is of general rectangular form with an oblong recess in each of two parallel sides, viz., those which are brought together to form the seam 3. As a result, an opening 4 (see Figs. 1 and 2) is provided in the upwardly directed face of the sleeve when in the position it is designed to occupy for the purpose of attaching the same to the rail. The transverse extent of such opening is approximately equal to a semi-circle and strands in the end of the bond body are exposed to a corresponding extent.

In applying the bond to the rail, the terminals are held thereagainst by any suitable means so as to direct the openings 4 upwardly, the proper position of such terminals being as illustrated in Fig. 3, where the surface to which they are to be applied is in the plane of the sheet. The angle at which the body of the bond, i. e., the portion lying between the terminals, is disposed with respect to the common axis of the latter may vary to suit conditions, such body (see Fig. 3) being illustrated as inclining at an angle of approximately 45 degrees from the vertical.

At the beginning of the operation, the welding flame or arc is initially directed on the end of the terminal and specificially on the portion of the sleeve 2 lying beyond the opening or slot 4 therein, and this portion of the terminal is melted down and blown back into the slot with the result that the ends of all of the strands or wires that enter into the terminal are interfused and their perfect union with the body of metal that is built up on the sleeve thereby assured.

Such built up body of metal, it will be understood, is formed by melting a metallic pencil in

the arc or gas flame, or where an electric arc is employed as the heating medium, the electrode may itself be such a metallic pencil. The drops of molten metal in either case will be caught by the approximately horizontal edges of the sleeve where they are cut away to form such slot or opening 4. At the same time as the end of the sleeve and the enclosed strands of the bond are melted down, the portion of the rail face adjacent to the terminal becomes sufficiently highly heated for the copper or other metal employed in thus building up the terminal to unite with such face or firmly attach itself thereto and thus provide a satisfactory electrical connection between the bond terminal and the rail.

While, as indicated by the foregoing description, it is considered preferable in applying the bond to the rail first to melt down the end of the terminal sleeve, i. e. the portion lying beyond the slot 4, the heating can on the other hand be started in the slot, the strand-portions therein exposed be melted down, and the end of the sleeve be then melted down and blown back into such slot.

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. As an article of manufacture, a rail bond having a stranded conductor body, and means binding the same circumferentially together at the end and at a zone spaced back, said means including a metal sleeve surrounding said body completely in two zones and incompletely therebetween to form a recess in one side at the base of which a corresponding portion of the body is exposed.

2. As an article of manufacture, a rail bond having a stranded conductor body, and a metal sleeve plurally surrounding said body, said sleeve being formed from a blank of general rectangular form having complementary recesses in two opposite sides whereby a pocketed weld opening is provided in said sleeve, and the component strands of said body extending through said sleeve and being laterally exposed in said opening below the surrounding edges.

3. As an article of manufacture, a rail bond having a stranded conductor body, and a generally H-shaped metal piece compressed as a sleeve on and surrounding said body at spaced zones leaving an opening therebetween through which a corresponding portion of the body is exposed with bounding framing edges thereabout.

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