Sept. 7, 1937. G. GORT 2,092,505

RAILWAY RAIL BOND AND METHOD OF APPLICATION

Filed April 21, 1936

Fig. 1

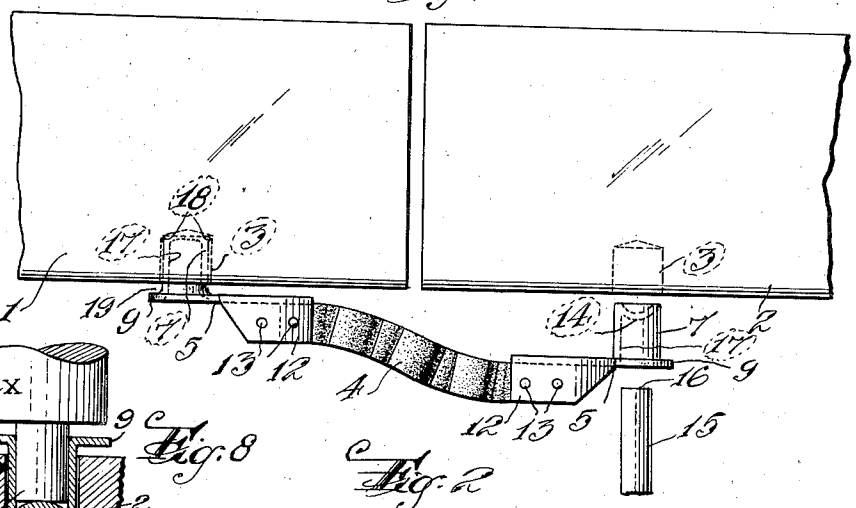


Fig. 8

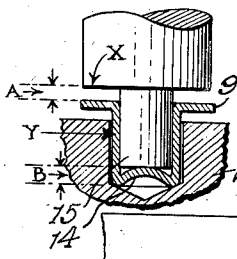


Fig. 2

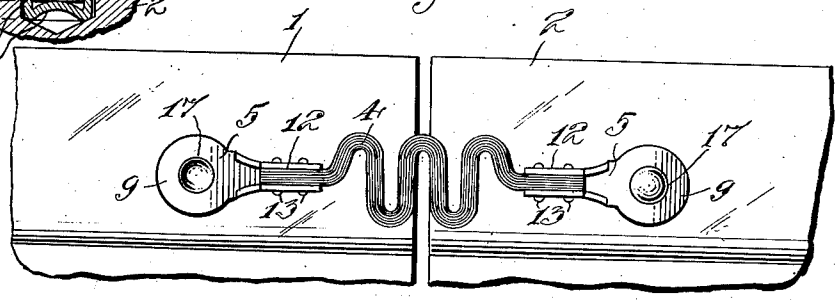


Fig. 3

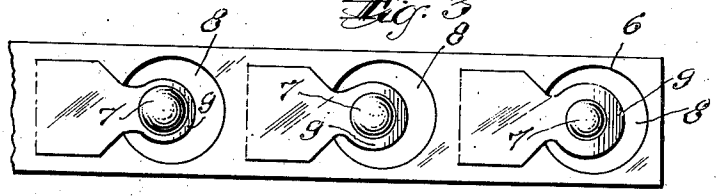


Fig. 4

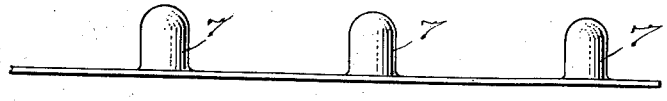


Fig. 5

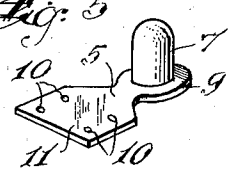


Fig. 6

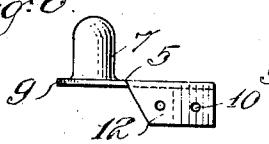
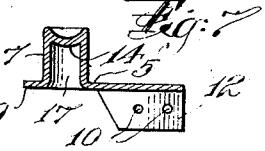


Fig. 7



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RAILWAY RAIL BOND AND METHOD OF APPLICATION

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6 Claims. (Cl. 173—280)

This invention relates to improvements in a railway rail bond and method of applying the same.

Heretofore many types of rail bonds have been suggested and used, some of which are applied to the web of the rail, in which case, the bond must be of considerable length; that is to say, longer than the angle or splice bar, or plate, which type of installation has several objections.

In my improved bond and method of application, the bond is applied to the head or ball portion of the rail, quite near the adjacent ends of the rail, so that if the rail end be broken, it will usually affect the bond and thereby the signal circuit, whereby the defective rail may be repaired or replaced. A bond applied to the web of the rail beyond the splice plate will not give this protective feature.

One of the objects of my invention is to provide a rail bond which may be applied to the rail ends in a simple and relatively inexpensive manner, yet provide efficient installation.

Another object of my invention is to provide a rail bond which will be extremely flexible, yet have high current conductivity.

Another object of my invention is to provide a bond which can be removed without great trouble, yet at the same time can be used over again.

These and other objects will be clear to one skilled in this art, on a reading of the specification, taken in connection with the annexed drawing, wherein:

Figure 1 is a view looking down on the top of two rail ends, showing one end of the bond connected to one rail end, while the other is indicated in position ready for installation.

Figure 2 is a side view of Figure 1.

Figure 3 is a view showing different steps in the manufacture of the terminal comprising part of the rail bond.

Figure 4 is a side view of Figure 3.

Figure 5 is a perspective view of the terminal in one stage of manufacture.

Figure 6 is a side view of the terminal shown in Figure 5.

Figure 7 is a sectional view through the completed terminal.

Figure 8 shows one method of applying the rail bond to a rail.

In the various views, wherein like numbers refer to corresponding parts, 1 and 2 illustrate the head or ball portion of two rails, the web and flanges not being shown. The end of each rail is provided with a hole 3 relatively near the ends of the rails, the hole being of a suitable diameter and depth. For the type of bond illustrated, the depth of the hole 3 may be approximately ¼", while the diameter is approximately ⅜".

The bond itself is composed of a plurality of soft metal strips 4, preferably of good conducting material such as copper. These strips are arranged somewhat as shown in Figure 2, to allow for expansion and contraction of the rails and for installation purposes; that is to say, the holes 3 do not require to be drilled in the rail heads at any precise distance from the rail ends. To each end of the bundle of metal strips 4, there are attached terminals 5 which may be made somewhat as shown in Figures 3 and 4, wherein, in the first operation, indicated at 6, the lug portion 7 is formed down and from the metal cut out of the space 8. In the next succeeding step, the lug 7 is drawn out to a larger diameter, while the flange 9 is narrowed up from the corresponding flange in the first operation.

In the next succeeding operation to the left, looking at Figure 3, the metal of the terminal is brought to substantially its final diameter, as is the flange 9, the space 8 being somewhat greater than in either the two preceding steps.

In the next operation, the terminal is cut out from the strip, at which time, if desired, holes or perforations 10 may be made in the flat portion 11 of the terminal, after which the portion 11 is formed up so as to provide two sides 12, forming a channel-shaped seat for the ends of the flexible conductors 4. After the end of the conductor strip is placed in position in the channel portion of the terminal 5, rivets 13 are passed through the holes 10 and corresponding holes made in the bundle of strips 4, and forced into locking position.

As an alternative construction, the holes 10 need not be made in the terminal, but after the sides 12 are formed, and the end of the conductor 4 put in position, the parts may be spot-welded or even arc-welded together. However, before the terminals are assembled to the strip 4, the lug 7, which is formed like a cup, has the bottom of the cup formed inwardly at 14 into a somewhat conical or semispherical shape. Thus the complete bond is ready for installation on the rails 1 and 2. The diameter of the lug 7 is slightly less than the diameter of the hole 3, whereby the lug 7 may be readily pushed into the hole 3, after which a tool, such as a punch 15, having a flat end 16, is passed into the interior 17 of the cup, into engagement with the conical portion 14. Hammer blows are then applied to the punch 15 or equivalent tool, forcing the portion 14 into

reverse position, and into engagement with the bottom of the side walls 18 of the holes 3, thereby securely anchoring the lugs 7 into the holes 3.

When it is desired to remove the rail bond from the rail, a suitable tool may be passed behind the flange 9, within the space 19, and the lugs 7 can then be pried or forced out of the holes 3.

To use the bond over again, all that is required is to force the bottom of the cup-shaped lug 7 into the position shown in Figure 7 by a suitable tool, when the bond may be re-applied as above described.

From the above description, it will be seen that the lug used in making the rail bond is made from one piece of good current-conducting material, such as copper, and that a standard flat-end punch or hammer is all that is required for installing the bond after the holes have been made in the rails. The terminals, and at least the outside strips of the conductor 4, may be plated with any suitable material such as cadmium.

Should one of the strips comprising the conductor 4 become broken, the others are sufficient to carry the current, and such breakage can be detected by inspection before the circuit is opened; that is to say, it is quite improbable that all of the laminations comprising the conductor will break at the same time. The conductors of a stranded cable may become broken without being readily detected, whereas a conductor in strip form may be quite easily observed if it becomes broken.

In Figure 8, I have shown a very satisfactory form of applying the bond to a rail. In this figure, the punch has a reduced end 15, the same as shown in Figure 1, to fit the hole 17 in the lug 7, and an enlarged portion having a flat surface X adapted to engage the flange 9 of the lug 7 when the punch is driven into the lug as and for the purposes described. Initially, the distance A between the surface X and the flange 9 is less than the distance B which is the approximate distance the punch travels in flattening out the conical portion 14 of the lug 7.

In operation, when the surface X of the punch strikes the flange 9, the metal in the side wall Y of the lug 7 is driven into the space between the punch and the side wall of the hole in the rail, thereby making a very tight connecting fit on the sides of the hole, as well as flattening the conical surface 14 as heretofore described.

While I have indicated certain steps in the manufacture of the bond per se, these steps may be varied without departing from the spirit of my invention or the scope of the appended claims.

What I claim is:

1. In combination; a rail having a shallow cylindrically shaped cavity with a bottom wall, and a metallic terminal having a part formed to receive and hold the end of a flexible electrical current conductor, said terminal being formed from a single piece of suitable sheet metal and having an integral projecting cup-shaped flanged lug to fit into the cavity, said lug having its botttom initially bulged inwardly into the interior of the cup, but forced into reversed position within the cavity to anchor the terminal therein.

2. The method of bonding railway rails which consists in drilling a cavity of the proper diameter and of shallow depth into the ball portion of each end of two adjacent rail ends, then inserting into each cavity an initially inwardly reversibly bottomed, cup-shaped lug of a terminal, the said terminals being connected together by a flexible electrical conductor and then through the medium of a flat-end punch, forcing the said initially inwardly reversible bottom of each lug cup into generally reverse position against the lower side wall of its cavity.

3. The method of attaching a lead to a railway rail which consists in drilling a cavity of the proper diameter and depth into a suitable portion of the rail, then inserting into the cavity an initially inwardly reversibly bottomed, cup-shaped lug of a rail bond terminal, then taking a flat end tool and forcing said initially inwardly reversible bottom of the cup outwardly into intimate contact with the lower parts of said rail cavity.

4. The method of bonding railway rails which consists in drilling a cavity of the proper diameter and depth into a suitable portion of each end of two adjacent rail ends, then inserting into each cavity a flanged, initially, inwardly, reversibly bottomed, cup-shaped lug of a terminal, the said terminals being connected together by a flexible electrical conductor, then anchoring the lugs into their respective cavities by taking a tool having parts of at least two diameters, one part to fit the interior of a lug, while the other part fits over the flange of the lug, and forcing some of the metal of each lug flange into its rail cavity between the side wall thereof and the punch, as well as reversing and expanding the bottom of the lug against the lower side walls of its cavity.

5. The method of bonding railway rails which consists in drilling a cavity of the proper diameter and depth into the ball portion of each end of two adjacent rail ends, then inserting into each cavity an initially inwardly reversibly bottomed, cup-shaped lug of a rail bond terminal, the said terminals being connected together by a flexible electrical conductor, and then, through the medium of a suitable tool, forcing some of the exterior portion of each lug being operated on into its rail cavity between the side wall thereof and the tool, as well as reversing and expanding the bottom of said lug into intimate contact with the lower parts of its rail cavity.

6. In combination with the ball of a railway rail end having a relatively shallow cylindrically shaped cavity therein, a metallic terminal connected to a flexible electrical conductor of good current-conducting material, said terminal having a projecting lug, the lug being cup-shaped to fit into the rail cavity with the bottom initially formed conically inwardly within the interior of the cup but capable of being forced into reversed position wholly within the cavity to grip the rail metal.

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