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E. A. EVERETT
BOND FOR RAIL JOINTS
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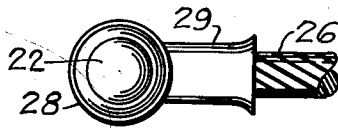


Fig. 2

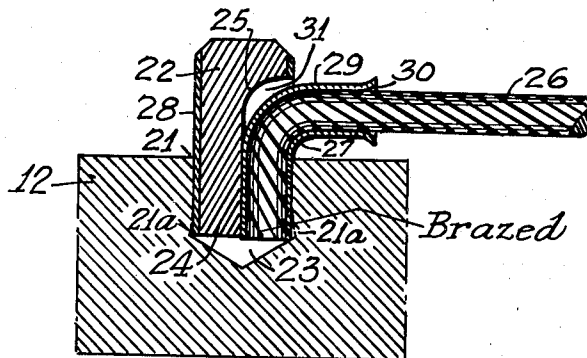


Fig. 1

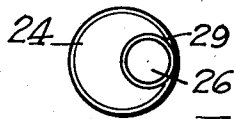


Fig. 3

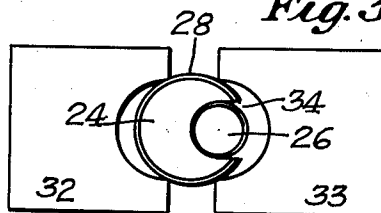


Fig. 4

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BOND FOR RAIL JOINTS

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5 Claims. (Cl. 173—280)

This invention relates to connectors for bonds for rail joints and the like and has for an object to provide a bond that may be applied to the ball of the rail or to the base of the rail; a bond that is secured to a bottomed hole in the rail; a bond having a terminal with a conductor attached to the terminal by means of a bell-mouthed sleeve. Another object of the invention is to attach the conductor to a plug to be driven into a hole in the rail in which a channel is formed in the plug to receive the conductor and the plug is afterwards pressed into cylindrical form before applying to the rail hole. Other objects of the invention will be more particularly understood from the following specification and from the accompanying drawing showing a variety of forms of the invention, and in which:

Fig. 1 shows in section the application of a channel form of plug with a conductor and sleeve secured in a bottomed hole in the rail;

Fig. 2 is a top plan view of the plug and conductor in Fig. 1;

Fig. 3 is a bottom plan view of the end of the plug and conductor in Fig. 1;

Fig. 4 shows an arrangement for forming the plug into a cylinder after the conductor is inserted in the channel.

This application is a continuation in part of the invention disclosed in the following co-pending applications: Serial No. 641,596, filed November 7, 1932 (now Patent 2,074,379, March 23, 1937); Serial No. 665,737, filed April 12, 1933, now Patent 2,112,694, March 29, 1938; Serial No. 700,841, filed December 4, 1933; Serial No. 56,865, filed December 31, 1935, and Serial No. 99,432, filed September 4, 1936.

It has been common practice to bond rail joints by one or more solid wires secured in a hole in the rail by a channel pin. It is well known that bond wires of this type crystallize and deteriorate at the point where they enter the channel of the channel pin. To remedy this condition and also to enable stranded cable to be used for bonding with channel pins, a sleeve of copper or other bendable material is used for the end of the conductor with the sleeve formed in a bell mouth where the conductor leaves it. This reinforces the conductor and tapers the connection between the light bond wire and the solid rail and thereby reduces the effects of crystallization. When stranded cable is used in the sleeve it is brazed thereto or otherwise made as solid as possible so that it will stand the pres-

sure and maintain its shape as the plug is driven into the hole.

In the channel pin construction a longitudinal U-shaped channel is formed in the plug or pin which has an opening corresponding to the diameter of the channel. When a channel pin with this type of channel applies the conductor to the rail hole, it does not completely surround the conductor and make a perfect cylinder corresponding to the rail hole. In the present invention, the plug is made somewhat oversize and after the conductor is inserted in the channel the plug is then formed by pressure into a complete cylinder before it is applied to the rail and which completely fills the hole in the rail.

In the above applications the bond is secured to a bottomed hole in the rail by a plug which is a driving fit in the rail hole. The rail hole is drilled in the usual manner and is a complete cylinder with parallel walls and with a conical end. The plug has a flat nose and is driven against this conical end so that in practice it spreads at the inner end and forms a tapered attachment between the plug and the rail with the larger part of the taper at the bottom of the hole. Driving the plug to secure this form of attachment is called a driving fit although the plug may be easily inserted in the rail hole. The material that is drilled out of the rail hole is replaced by the plug and is at least as solid as the rail was before drilling, so that the load-supporting quality of the rail is not impaired when the load is supported by compression.

The stranded conductor 26 is preferably brazed in the tube 29 before the tube is inserted in the channel of the plug. This makes the end of the conductor solid where it is compressed in the rail hole and enables it to hold its shape.

Rail bonds are applied at rail joints where the splice bars are located and it has been necessary to avoid these bars in applying the bonds, either by making the bond long enough to go around the bar, or to apply the bond to the ball of the rail above the bar or to the base of the rail outside the bar.

In the drawing, 12 is a portion of rail which is drilled at 21 for the plug 22 with a bottomed hole having the conical end 23. The plug has a flat face or nose 24 which engages the conical end 23 of the hole and spreads outwardly at the inner end as indicated by the dotted lines 21a as the plug is driven in the hole. The plug is provided with a channel 25 to receive the conductor 26 and sleeve 29 which are bent at 27 below the outer end of plug 22 so that the con-

ductor is protected as the plug is driven into the hole. The flat nose of the plug is provided to cause expansion of the plug as the point is driven against the conical end of the hole. It is found

5 in practice that if the edges of the flat nose are tapered to any great extent in the direction of the conical end of the hole that the nose will not expand in the hole by driving on the outer end.

10 The plug 22 is provided with a copper sleeve 28 which is part of the welded copper coat of the steel that the plug is made from. The conductor 26 is placed in the sleeve 29 which is provided with the bell mouth at 30 and the conductor is brazed in the sleeve where it occupies

15 the channel of the plug to complete the solid stock of the plug so that it spreads uniformly against the conical end of the hole. The cross-section of the plug is much greater than the cross-section of the channel. This enables the plug to be driven with considerable force against the conical end of the rail hole without deforming the plug outside the rail hole. The sleeve is bent, at a right angle with the conductor as

20 it leaves the rail hole and the channel of the plug 22 is curved as indicated at 31 to correspond with the bend of the sleeve but provided with sufficient clearance to enable the plug to be driven into place. This construction presents

25 a solid head of the plug for driving purposes.

30 The channel of the plug 24, Fig. 4, has open sides as indicated at 34, to permit the conductor 26 to enter the channel. In order to close the channel and to provide a perfect cylinder for the plug before it is driven in the rail hole it is re-formed in the separable dies 32 and 33 which press the plug into cylindrical form and which may be made somewhat oversize to provide for this operation. The flat nosed plug in Fig. 1 is

35 made from steel with a welded copper coat and is expanded in the rail hole by driving on its outer end. The copper coating makes a yielding surface that forms a better seal with the walls of the rail hole than is obtained by a plug of steel alone, the copper also forms a large non-

40 rusting contact area between the plug and the rail. The action of a cylindrical plug that is expanded in the rail hole is not the same as a tapered pin driven into a cylindrical hole in the rail. In practice the pin must be softer than

45 the stock of the rail so that the excess thickness of the tapered pin is shorn off as it is driven into the hole, without materially tightening the connection by expanding the pin in the hole.

A tapered type of channel pin does not expand in the rail hole by the driving action to bind the conductor in the channel in the manner obtained by this invention.

The construction shown provides an attachment between a stranded conductor and a rail made from a channel shaped, flat nosed plug with the conductor in the channel and the plug expanded in a bottomed hole in the rail and variations thereof may be made without departing

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from the invention.

Having thus described my invention, I claim:

1. In combination a rail with a hole therein, a cylindrical plug with a channel therein, a stranded conductor with a sleeve surrounding

15 the end of the conductor and having a bellmouth where the conductor leaves the sleeve, said sleeve inserted in said channel and secured in the rail hole with the plug as the plug is expanded in the hole by driving and said sleeve being bent

20 to project from the channel at right angles to the axis of the cylindrical plug.

2. In combination a rail with a hole therein, a cylindrical plug for driving into the rail hole having a longitudinal channel therein, a stranded

25 conductor, a sleeve surrounding the end of said stranded conductor, said sleeve being bent at a right angle and inserted in said channel and extending to the end of the plug, said plug being expanded in the rail hole by driving on its

30 outer end.

3. In combination a rail with a hole therein, having a bottom with a conical end, a cylindrical plug with a longitudinal channel therein and having a flat nose, a stranded conductor inserted

35 in said channel and secured in the rail hole by driving the flat nose of the plug against the conical end of the hole.

4. In combination, a rail with a conical ended hole therein, a cylindrical plug having a flat nose and a longitudinal channel therein for driving

40 into said rail hole, a stranded conductor, a sleeve on the end of said conductor and inserted in said channel from the side, said plug being expanded in the rail hole by driving on its outer end to conform to the cylindrical rail hole.

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5. The method of attaching a rail bond to a rail having a hole therein, comprising forming a cylindrical plug larger in diameter than the rail hole with a longitudinal channel therein, inserting a stranded conductor in said channel, pressing the plug to close the channel and fit the hole and driving the plug into the rail hole.

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