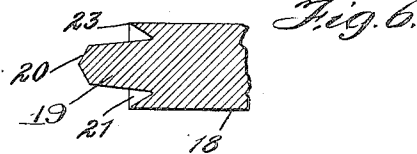
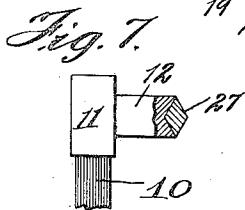
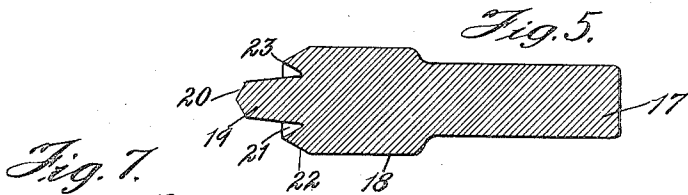
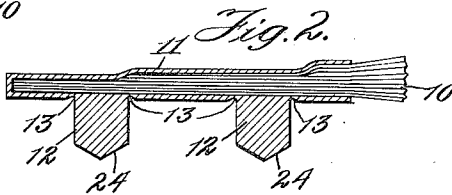
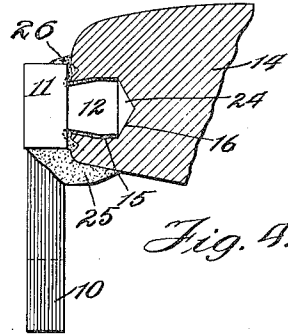
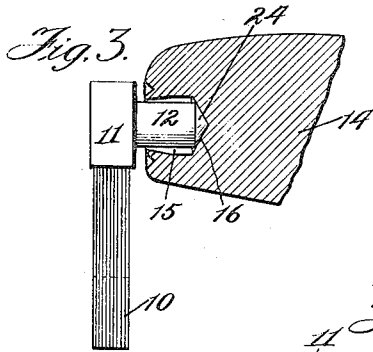
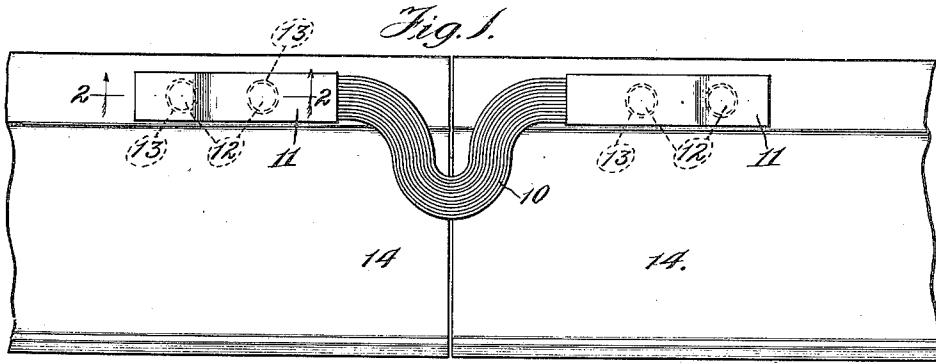


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RAIL BOND.  
APPLICATION FILED DEC. 15, 1905.

995,685.

Patented June 20, 1911.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

GEORGE W. KNOX, OF CHICAGO, ILLINOIS.

## RAIL-BOND.

995,685.

Specification of Letters Patent. Patented June 20, 1911.

Application filed December 15, 1905. Serial No. 291,835.

*To all whom it may concern:*

Be it known that I, GEORGE W. KNOX, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Rail-Bonds, of which the following is a full, clear, and exact specification.

This invention relates to improvements in rail bonds and method of securing the same, and the object of the same is to construct an improved bond of this character which is provided with means by which the same may be positively and rigidly secured to the rail.

A further object is to construct an improved bond which is provided with a portion adapted to be inserted into a cavity in the rail, so that they engage each other in such a manner as to prevent removal under an ordinary strain.

A further object is to construct an improved bond which is provided with a lateral lug adapted to be inserted into a cavity formed in the rail and secured therein by upsetting the lug.

A further object is to construct an improved bond having a lug which is adapted to be inserted into a cavity in the rail; the cavity increasing in diameter from the outside edge inward, and the lug being upset after it is inserted in the cavity to prevent accidental displacement of the bond.

A further object is to construct an improved bond provided with a lateral lug adapted to be inserted into a cavity drilled in the rail, and upset therein, the diameter of the cavity being greater at a point intermediate its ends than the diameter at the entrance thereof.

A further object is to construct an improved rail bond, provided with a projecting lug, adapted to be inserted into a cavity in the rail. The bond being provided with a lug adapted to assume any angle in relation to the body of the bond, to permit the same to enter an angular cavity, and thereby cause the terminal of the bond to form a good contact with the rail.

A further object is to construct a terminal, sheath or sleeve, provided with one or more lateral projecting lugs and into which sheath or sleeve the extremities of the body

may be inserted, and said sleeve and body being compressed to secure the same together.

A further object is to provide an improved method of securing a rail bond in position and to a rail. And a still further object is to construct an improved bond of this character which will be simple in construction, cheap to manufacture, and durable and efficient in operation.

To the attainment of these ends, and the accomplishment of other new and useful objects as will appear, the invention consists in the construction, arrangement and combination of the several parts as will be hereinafter more fully described and claimed and shown in the accompanying drawing, illustrating an example of the invention, and in which,—

Figure 1 is an elevation showing a bond, constructed according to the principles of this invention, applied to the ends of two rails. Fig. 2 is a longitudinal section on the line 2, 2 of Fig. 1. Fig. 3 is a view partially in section, showing the first step of securing the bond in place and with the lug carried by the bond inserted into a cavity in the rail. Fig. 4 is a view similar to Fig. 2, with the lug upset within the cavity, and the manner of inserting the solder. Fig. 5 is a longitudinal section of a tool, illustrating a simple manner for contracting the opening in the rail cavity to make the diameter of the outer portion of the opening smaller than the interior diameter of the cavity. Fig. 6 is a sectional view of another form of tool. Fig. 7 is a view of a modified form for accomplishing the same general result of the invention.

Referring more particularly to the drawing and in which the same reference characters designate similar parts throughout the several views, the numeral 10 designates the body of a bond constructed of any suitable material, but preferably of flexible stranded material, such as wire strips or the like; and 11 designates a sheath or sleeve composing a terminal, into which the extremities of the bond are inserted. This sheath, sleeve, or terminal is compressed upon the extremities of the bond, preferably while hot, and in any suitable manner, so that the two will be firmly secured together.

The sheath, sleeve, or terminal, 11, may be of any desired shape, and constructed of any suitable material, but preferably copper, and coated with tin or any other material  
 5 suitable for the purpose, to protect the same and prevent oxidation. The coating may be applied by dipping or in any well known manner, either before or after the sheath or sleeve has been applied, and secured to the  
 10 bond terminals. Suitable malleable lugs or extensions 12 project laterally from one face of the sheath, sleeve, or terminal 11, any number of which may be provided, and surrounding the base of each of the lugs or ex-  
 15 tensions 12, is a circumferential groove or depression 13, for a purpose to be hereinafter set forth.

The rail 14 is provided with a suitable number of cavities 15, located preferably in  
 20 the side of the tread and formed therein in any desired manner, but preferably by boring, and are provided with a conical base 16. These cavities are so constructed that the diameters thereof increase from the en-  
 25 trance thereof toward the base, or they may be bored with an even diameter and the material adjacent the entrance contracted so as to reduce the diameter of the cavity at that point. This may be accomplished in  
 30 any suitable manner, but a simple manner for so accomplishing this result and illustrating the invention will be described.

In Fig. 5 of the drawing the numeral 17 designates a tool having an enlarged portion  
 35 or head 18, with a reduced central projecting and preferably tapering portion or shank 19, which latter is provided with a conical extremity 20, conforming in contour with the conical base 16 of the cavities or  
 40 apertures 15 in the rails 14. Surrounding the base of the shank or projection 19 is a conical depression 21, and the periphery of the enlargement or head 18 is beveled toward the shank or projection as at 22, to  
 45 form a cutting edge 23.

After the cavities 15 have been drilled or otherwise formed in the rail, the shank or projection 19 of the tool 17 is inserted there-  
 50 in, and said shank or projection is of a length sufficient to permit the cutting edge 23 to rest against the face of the rail surrounding the cavity. The end of the tool 17 is then struck with sufficient force as to cause the cutting edge to enter the face of the rail,  
 55 and the tapering walls formed by the edges 21 and 23 will contract the metal surrounding the apertures or cavities 15 or draw the same toward the shank or projection 19. The conical end 20 will engage the conical  
 60 base 16 of the apertures or cavities 15, and thus not only prevent the tool from being driven in too far, but will serve as a means for centering the tool. The tool may then be easily removed, as the diameter of the  
 65 shank or projection 19 is slightly less than

the diameter of the contracted portion of the aperture. The rail bond is then applied by inserting the lug 12 into the cavity 15, said  
 lug being of a diameter slightly smaller than the diameter of the contracted portion of the  
 70 cavity, and with its conical extremity 24 resting against the conical base 16 of the aperture 15 and which extremity coöperates with the recess 16 for centering the lug within the cavity, as shown in Fig. 3 of the  
 75 drawing.

The sheath or sleeve 11, or the terminal of the bond is given a sudden blow or compressed directly in line with the extensions  
 or lugs 12. The extremity thereof bearing  
 80 against the bottom of the cavity, and said extension or lug 12 being of a soft material, such as copper or the like, will be upset by the blow, and the material will be crowded  
 85 out, within the aperture and between the contracted opening and the base thereof, so as to conform to the shape thereof and almost completely fill the same, which as  
 will be seen in Fig. 4, will hold the bond  
 90 terminal firmly in place to resist all mechanical strain and prevent the same from becoming loose from jarring, caused by the hammering of the wheels of a car on the  
 ends of the rails, the expansion or contraction of the rails, or from any other cause.  
 95 After the extension or lug 12 has been thus upset within the cavity 15, any suitable plastic material, such as putty or clay 25, may be applied to the rail and bond terminal in  
 100 such a manner as to bridge the crevice or opening formed between the base of the bond terminal and the face of the rail. Solder or any other suitable molten material 26 may be  
 105 then poured between the face of the rail 14 and the upper edge of the bond terminal 11, as shown in Fig. 4, which will flow around the extension or lug and completely fill the  
 110 small space left between said lug 12 and the wall of the cavity 15, and will also fill the space between the adjacent faces of the rail  
 115 and bond terminal as well as the cavity formed in the face of the rail by the tool, to contract the opening of the said cavity, thus hermetically sealing the bond terminal within the cavity. The material 25 may then be  
 120 removed or allowed to remain. This is immaterial, as it will finally drop off of its own accord.

Should the cavities 15 be formed or drilled in the rail at any angle other than at a right  
 125 angle thereto, the circular depression 13 surrounding the base of the lug or extension 12, will permit the lug or extension to be bent at any desired or necessary angle in relation to the sheath or sleeve 11. This may be accomplished by slightly tapping the lug or  
 130 extension before inserting the same into the cavity, or the extremity thereof may be inserted into the opening of the cavity, and a single blow exerted upon the sheath or

sleeve 11, at a point in a direct line with the lug or extension, will cause the latter to first follow and be directed by the walls of the cavity to the angle of inclination thereof and then be upset, when the extremity of the lug or extension contacts with the bottom of the said cavity.

The grooves or depressions 13 permit the lugs or extensions to be readily adjusted to any desired angle in relation to the sheath or sleeve, without distorting the latter in the slightest degree.

The modified form of the invention shown in Fig. 7 accomplishes the same general result, and in this form the lug or extension 10 is provided with an expansion wedge or member 27, which latter may be held in position against the end of the lug or extension 12 in any suitable manner. The free extremity of said wedge or member 27, is preferably conical to permit the same to enter the conical depression 16 of the cavity 15 in the rail, so as to properly center the same.

In the form of tool illustrated in Fig. 6, the outer wall 18 of the head is preferably straight to prevent crowding the material of the rail in both directions.

While there is shown and described a single simple means for contracting the opening of the cavity 15, it is not desired to be limited to this specific manner, as any desired means may be employed. The diameter of the opening may also be increased in any manner, such as by an expansion bit or by an under-reamer, or in any other manner suitable for the purpose. It is also to be understood that any number of lugs or extensions may be employed, or the lugs or extensions may be formed directly on or integral with the terminals of the bond, and many other changes may be made without departing from the spirit of the invention.

What is claimed as new is:

1. In a device of the class described, the combination of a rail provided with a cavity, 45 a bond, and a projection carried by one face thereof, said bond being provided with a circumferential depression in its face surrounding the base of the projection whereby the angle of the projection may be varied 50 in relation to the bond to permit the same to be properly seated within the cavity.

2. In a device of the class described, the combination of a rail provided with a bottomed cavity, a bond, a projection carried 55 by one face thereof, said bond being provided, with a circumferential depression in its face surrounding the base of the projection whereby the angle of the projection may be varied in relation to the bond to permit the same to be properly seated within 60 the cavity, and an expansion element carried by the end of the projection and cooperating with the bottom of the cavity for expanding the projection. 65

3. In a device of the class described, the combination of a rail having a cavity provided with an end wall, a bond, a lateral projection carried by the face thereof to be inserted into and upset within the cavity, an expansion element carried by the end of the projection and cooperating with the said end wall for expanding the projection, and solder between the adjacent faces of the bond and rail, entering the cavity and surrounding 70 the projection. 75

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 12th day of December A. D. 1905.

GEO. W. KNOX.

Witnesses:

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J. H. JOCHUM, Jr.