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F. H. DANIELS.

RAIL BOND.

APPLICATION FILED JUNE 8, 1903.

Fig. 1.

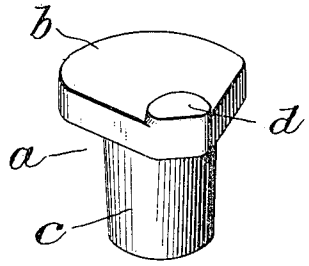


Fig. 2.

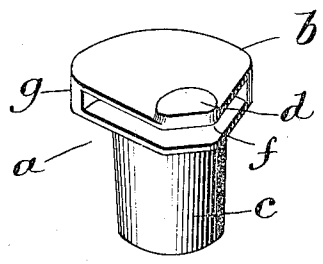


Fig. 3.

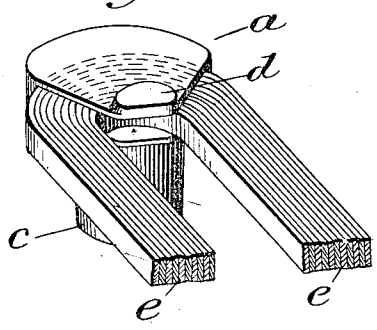


Fig. 4.

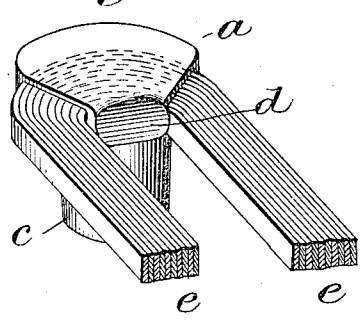
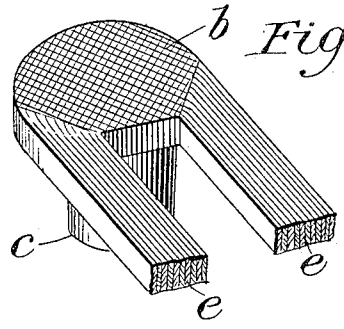


Fig. 5.



Witnesses:

J. M. Wrenn

E. C. Schuermann.

Inventor:

F. H. Daniels,

By his attys.

Pennie Goodsborough

UNITED STATES PATENT OFFICE.

FRED H. DANIELS, OF WORCESTER, MASSACHUSETTS.

RAIL-BOND.

No. 831,776. Specification of Letters Patent. Patented Sept. 25, 1906.

Application filed June 8, 1903. Serial No. 160,498.

To all whom it may concern:

Be it known that I, FRED H. DANIELS, a citizen of the United States, residing at Worcester, county of Worcester, State of Massachusetts, have invented certain new and useful Improvements in Rail-Bonds; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to that type of rail-bonds or similar electrical conductors where in the process of manufacture the terminals are made separate from the connecting-strands and the strands are welded to the heads of the terminals by pressure, so as to unite the parts integrally into one homogeneous structure. In this type of bonds or conductors it is especially desirable that the strands connecting the terminals should be entirely inclosed within the head, instead of merely seated in an open-topped groove in the same, so that in the last step of the operation, which is the forging or welding of the strands and head together, there should be part of the metal of the head completely surrounding the strands on all sides. An important advantage of such a construction resides in the fact that in the completed article there is no part of the metal of the strands exposed where they connect to the head, there being a layer of the metal of the head above and below the strands as well as around the side edges.

The present invention presents a new conductor or bond where the head of the terminal is provided with a recess or opening passing through it, said recess being closed on all sides and open only at the ends and the connecting-strands passing entirely through the recess of the head, so as to be completely inclosed therein and integrally united to the head by pressure.

The invention consists in the improved article, as will be hereinafter fully described, and specifically pointed out in the claims.

In the accompanying drawings, Figure 1 represents in perspective one of the terminals of a rail-bond made in accordance with the invention, the formation of this terminal constituting the first step in the method. Fig. 2 is a similar view of the terminal, indicating the second step in the manufacture—namely, the formation of the slot or recess to receive the connecting-strands. Fig. 3 is a perspective view showing the terminal slotted as in Fig. 2 and having the connecting-strands inserted in the recess formed by the slot. Fig. 4 is a view similar to Fig. 3, but indicating a further step in the manufacture—namely, the closing down of the part of the head which overhangs the inner side of the strands, so as to inclose the strands on all sides; and Fig. 5 is a view similar to Figs. 3 and 4, but indicating the completed terminal and a portion of the connecting-strands after the final step in the manufacture.

Referring to these views, *a* denotes the terminal of a bond, such as above described. It is made, preferably, in the form illustrated in Fig. 1, with an enlarged flattened head *b* of oblong or generally triangular shape and having a cylindrical plug *c*. It may be cast or forged and is here shown as a drop-forging having an upstanding lug *d* on top of the head at the apex of the triangle, which the contour of the head forms. Instead of making the head triangular in outline it may be oblong or of any other shape that will permit a slot to be cut therein deeper than the width of the connecting-strands. Connection between this terminal and the corresponding terminal at the other end of the bond (which is not herein shown) is preferably made by a two-ply series of connecting-strands *e*, which are in the form of flat ribbons laid sidewise together and bent and wound in a manner which is now well known in this class of devices.

After the formation of the terminal a recess is formed in its head by cutting a slot *f* in the head parallel to its upper surface and transverse to the plug *c*. The slot is cut in the head from the side toward the apex of the triangle formed by the shape of the head. It preferably extends past the axial line of the plug and is open at practically three sides of the head, as shown in Figs. 2 and 3, leaving, however, a layer of the metal of the head on top of the slot and a layer under the slot next to the plug, said upper and lower parts or layers being joined together by the outer edge *g* of the head, which is not cut away. After bending and winding the connecting-strands *e* in the usual manner the end of the two-ply connection thus formed is inserted in the recess formed by the slot *f* in the head of the terminal, leaving the apex side of the head and the plug *d* overhanging the inner side of the connecting-strands at the end where they are bent around, as shown in

Fig. 3. After positioning the connecting-strands in the recess of the head, as thus described, the overhanging end of the upper part of the head having the plug *d* is forced down on the inner side of the bend in the connecting-strands, so as to close the entrance to the slot *f* and completely encircle the strands at the bend, as illustrated in Fig. 3. This may be done in any sort of a press or drop or even by hand, and thereafter the terminal, with the strands inclosed in the recess, is preferably heated to a suitable welding temperature and is next placed in any suitable die-press, when the final step in the manufacture is performed—namely, welding the strands integrally in the closed recess in the head by pressure.

Fig. 5 illustrates one terminal of a completed rail-bond constructed in accordance with the invention. The head *b* of the terminal is preferably cross-lined or milled, as indicated in the figure, the object of this being twofold—namely, first, the milling of the dies which form the head prevents the undue lateral expansion of the metal, and, second, the head of the terminal in the completed bond is given a neat finish and an ornamental appearance. The construction of the bond being as above described, it is to be noted that the recess into which the strands fit is not cast or forged in the head, but is formed therein by cutting away the metal of the head. This manner of forming the recess is a distinct advantage in that it leaves the interior walls of the recess with a clean bright surface, which unites more readily with the surface of the connecting-strands. It is, moreover, to be noted that the cutting of the slot in the head below the surface provides for the complete inclosure of the connecting-strands by the metal of the head, there being one layer of this metal above the strands, a layer below the strands, and also portions of the metal formed by the side wall *g* and the lug *d* on either side of the strands. Thus in making the bond the bend at the ends of the strands is inclosed on three sides by the metal of the head, and after the closing of the open end of the slot *f* by pressing down the lug *d* on the fourth side of the strands the latter are completely encircled and surrounded on all four sides by the metal of the head before the last step in the manufacture—namely, the welding of the strands and head together—is effected. The result of this operation is that a more complete union and absolute weld of the metal of the head and the connecting-strands is effected, and no part of the connecting-strands where they join the head is exposed. Although, as above described, the terminal is preferably heated before the final weld, it is to be understood that this step in the manufacture may be effected without the application of heat, if desired; also, that a flux may or may not be employed, as is preferred.

Having thus described my invention, what I claim, and desire to secure, is—

1. A terminal for rail-bonds, consisting of a plug having a substantially flat enlarged head, with a transverse slot formed edgewise therein from one side so as to divide the head into solid cap and base portions, with an intervening slot between opening only at the edges of the head, and a lug on the upper side of the edge of the cap overhanging the open side of the slot.

2. A rail-bond, comprising a loop-shaped connector formed of strands or ribbons, and a terminal having a plug and an enlarged substantially flat head, said head having a transverse slot cut edgewise therein from one side so as to divide the head into solid cap and base portions, and the edge of the cap overhanging the open side of the slot being provided with a lug on its upper side, whereby the loop of the connector may be inserted edgewise in the slot of the head and integrally united with the head by drop-forging, so that the lug will inclose the inner side of the loop of the connector.

In testimony whereof I affix my signature in presence of two witnesses.

FRED H. DANIELS.

Witnesses:
SARAH A. WEBB,
H. M. LATHAM.