F. H. DANIELS & C. R. STURDEVANT.

RAIL BOND.

APPLICATION FILED DEC. 1, 1906.

900,488. **Patented Oct. 6, 1908.**

Fig. 1.

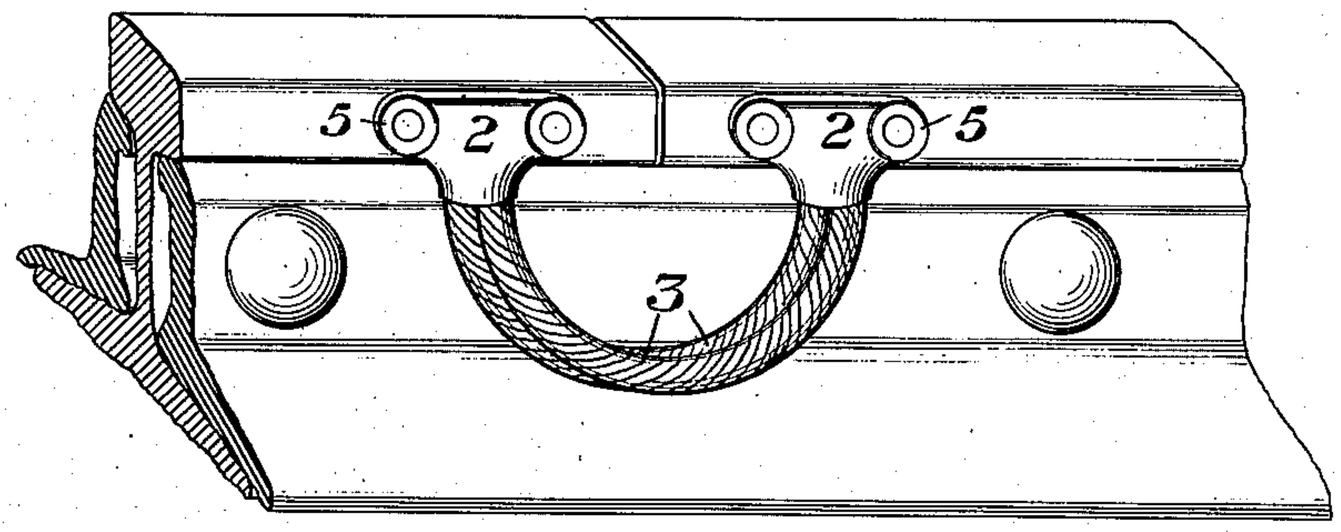


Fig. 2.

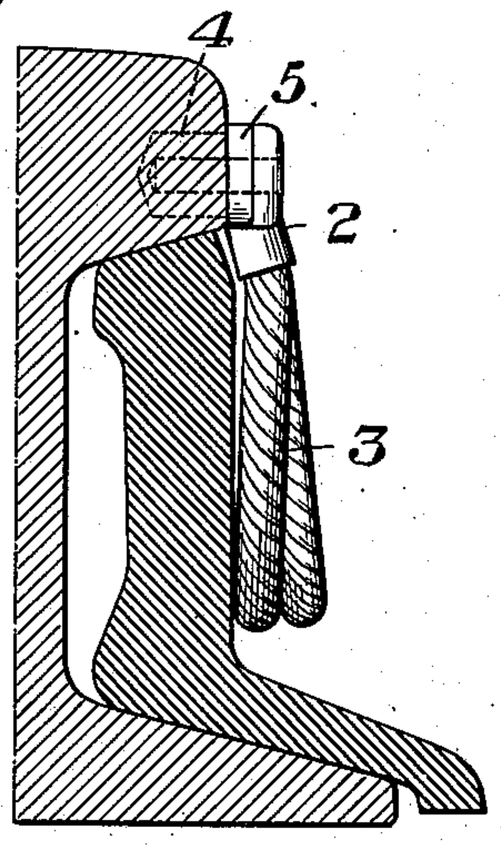


Fig. 3.

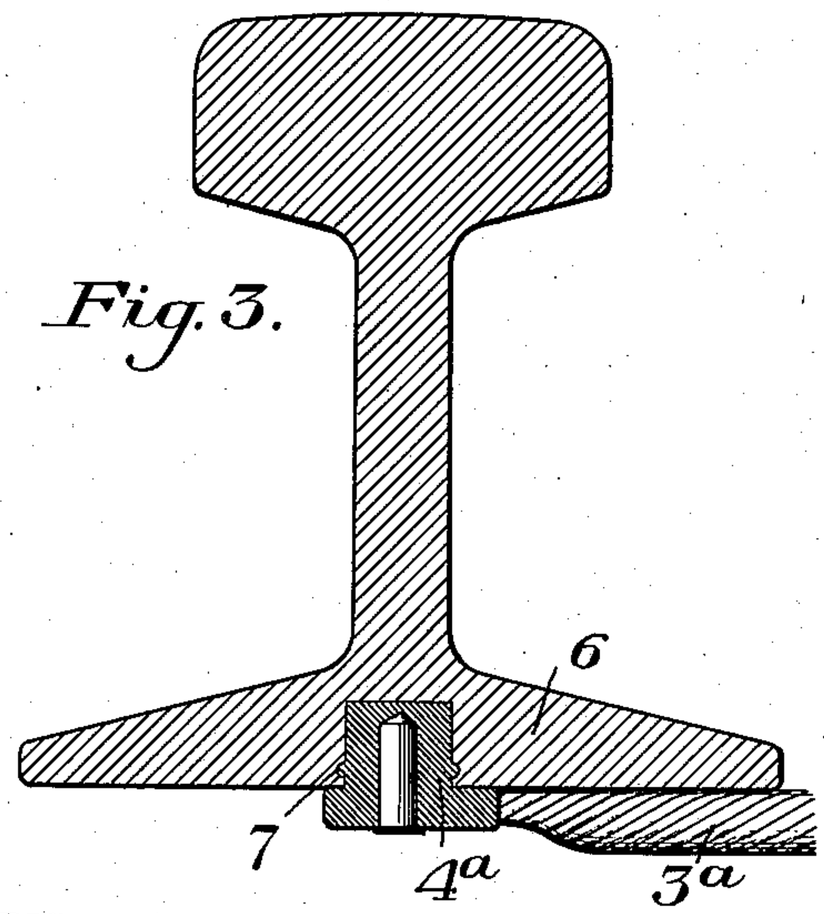
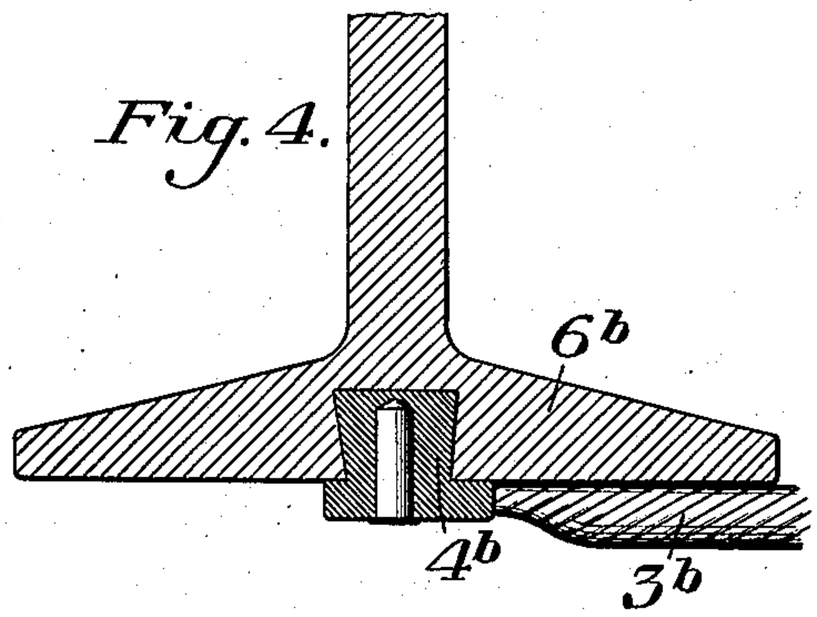


Fig. 4.



WITNESSES

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UNITED STATES PATENT OFFICE.

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RAIL-BOND.

No. 900,488. Specification of Letters Patent. Patented Oct. 6, 1908.

Application filed December 1, 1906. Serial No. 345,899.

To all whom it may concern:

Be it known that we, FRED H. DANIELS, of Worcester, Worcester county, Massachusetts, and CHARLES R. STURDEVANT, of Worcester, Worcester county, Massachusetts, have invented a new and useful Improvement in Rail-Bonds, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view showing the ends of rails provided with our improved bond; Fig. 2 is a cross-section of the rail showing the stud in dotted lines; and Figs. 3 and 4 are cross-sections of rails showing modified forms and arrangements of the bond.

Our invention relates to the class of rail bonds, and is designed to provide an improved structure and arrangement of the bond which will provide for increased contact pressure, increased area of contact, and anchoring of the stud in position.

In the drawings, referring to the form of Figs. 1 and 2, 2, 2 represent the copper heads of the bond connected by the conducting cables 3. Each head is shown as provided with two studs 4 of copper or suitable conducting material, such studs being provided with a cavity extending inwardly for the major portion of the length of the stud and preferably nearly its entire length. The bottomed holes in the heads of the rails are formed of a suitable size to neatly receive the studs.

After the studs are positioned in the holes, a steel expanding tool or pin is driven into the cavity in each stud, thus forcing the copper against the wall and bottom of the hole and obtaining intimate contact. As the cavity in the rail is bottomed, it prevents the flow of copper in one direction when the pin is driven into the terminal, thus giving a very intense contact pressure. By drilling or otherwise forming the hole to within about a sixteenth of an inch to the bottom of the stud and not entirely through it, we also gain in the amount of contact area in tubular stud work. We also preferably thread, score or enlarge the wall of the hole in the rail in the rear of the outlet, so that the stud will be anchored and the contact area and contact pressure increased. Thus, in Fig. 3, we show the bottomed holes as formed in the base 6 of the rail with a groove 7 cut in the wall of the hole back of its entrance. Otherwise, the stud and bond construction is substantially the same as in the form of Figs. 1 and 2, 4^a being the stud and 3^a the flexible cable.

In Fig. 4 we show a form similar to that of Fig. 3, except that the hole for the stud is flared inwardly, being of gradually increasing diameter from the entrance. In this case 6^b is the base of the rail, 4^b the stud, and 3^b the connecting cable.

In all the forms, we may employ one of any number of studs for each terminal of the bond, thus increasing the contact area to any desired amount, each being independent of the others electrically.

The advantages of our invention result from the use of the bottomed cavity in the stud in connection with the bottomed hole in the rail. The bottom of the hole in the rail prevents the flow of copper in one direction, and enables us to obtain a greater contact pressure than with studs having a hole completely through them. By drilling or otherwise forming the hole in the stud so as to leave a bottom formed by the end portion of the stud, we obtain an increase in contact area equal to the area of this end portion. By threading or enlarging the wall of the hole in the rail back of the entrance, the stud is not only anchored and the contact area increased, but the contact pressure may also be increased, since the portions having the enlarged area tend to prevent backward flow of the metal so that an increased pressure may be obtained.

The bottomed hole may be formed in any desired part of the rail, the number and form of the studs may be varied, and other variations may be made without departing from our invention.

We claim:—

1. A rail having a hole with a closed bottom, a terminal stud expanded within the hole and provided with a longitudinal recess opening through the outer end of the stud and terminating short of the opposite end thereof, and an expanding pin driven into the recess, the bottom wall of the hole protecting the stud and also forming an anvil or backing therefor.

2. A rail having a hole provided with a closed bottom and an annular groove or recess in the wall of the hole, a terminal stud

expanded within the groove of the hole and provided with a longitudinal recess opening through the outer end of the stud and terminating short of the inner end thereof, and an expanding pin driven into the recess, the bottom wall of the hole protecting the stud and also forming an anvil or backing therefor.

In testimony whereof, we have hereunto set our hands.

FRED H. DANIELS.
CHARLES R. STURDEVANT.

Witnesses:
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A. F. BACKLIN.