(No Model.)

H. P. WELLMAN.

RAIL BOND OR CONNECTION.

No. 562,055 Patented June 16, 1896.

Fig. 1

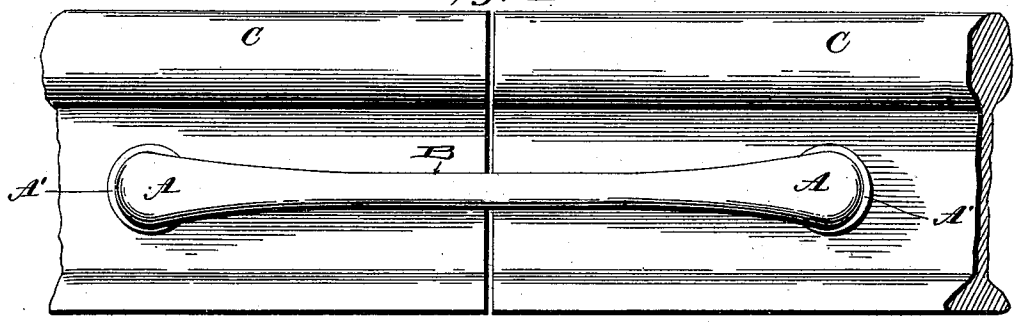


Fig. 2.

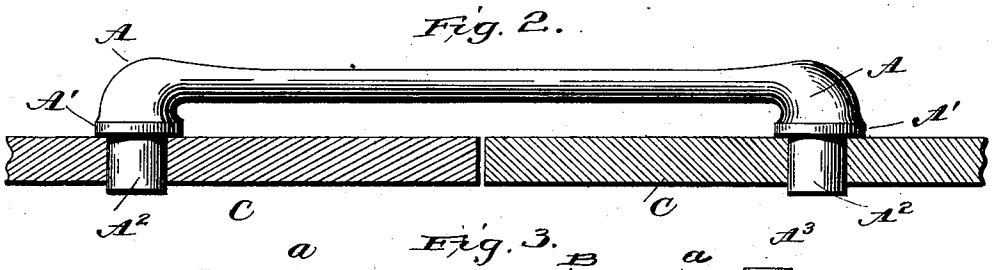


Fig. 3.

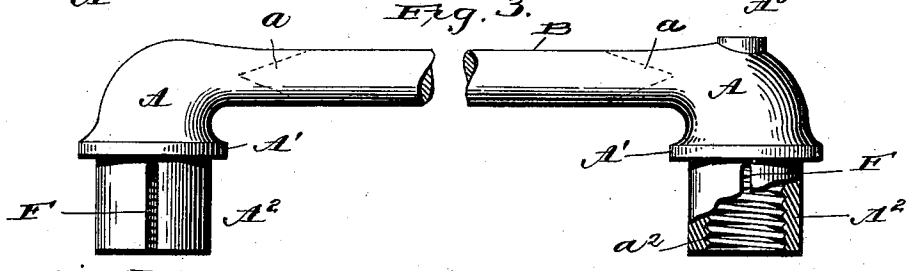


Fig. 5.

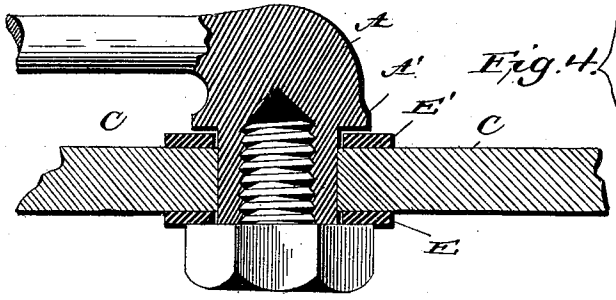
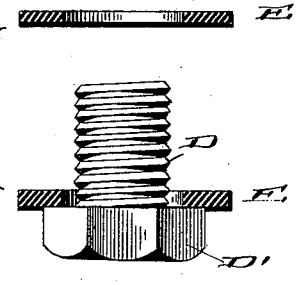


Fig. 4.



Witnesses:
Henry Hills.
L. C. Hills.

Inventor:
Harlan P. Wellman,
by E. B. Stocking
Atty.

ANDREW B. GRAHAM, PHOTO-LITHO. WASHINGTON, D.C.

UNITED STATES PATENT OFFICE.

HARLAN P. WELLMAN, OF CATLETTSBURG, KENTUCKY, ASSIGNOR OF ONE-HALF TO JAMES TRIMBLE, OF SAME PLACE.

RAIL BOND OR CONNECTION.

SPECIFICATION forming part of Letters Patent No. 562,055, dated June 16, 1896.

Application filed July 9, 1895. Serial No. 555,372. (No model.)

To all whom it may concern:

Be it known that I, HARLAN P. WELLMAN, a citizen of the United States, residing at Catlettsburg, in the county of Boyd, State of Kentucky, have invented certain new and useful Improvements in Rail Bonds or Connections, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to certain new and useful improvements in rail bonds or connections for electrical conductors, railway-tracks, and the like.

It is well known to electrical engineers and others that there is a resistance loss connected with a bolted, screwed, clamped, or swaged connection between a copper bond-wire and the iron or steel rail to which it is connected, and it is also a well-known fact that said loss is due to the thermo-electric difference between the copper bond-wire and the rails, and this is greatly aggravated by the entrance of moisture at the juncture of the bond-wire and rail, which sets up an electrolytic action, which sooner or later entirely destroys the current-conductive properties required of the bond-wire.

The object of the present invention is to provide a bond-wire or connection which will overcome these objections and at the same time be readily applied, cheap in its construction, and durable and efficient in its operation.

I either forge, drop-forge, cast, or stamp iron or steel terminals for connection with the rails and electrically weld them to a copper bar, rod, or connection of the desired length with a gradual welding or fusion of the one metal into the other so there will be no exact junction of the two metals, and which I have found to materially decrease the above-mentioned thermo-electric loss and also provide massive and strong ends or terminals for connecting the bond-wire to the rails. As the resistance of iron and steel is greatly in excess of that of copper it is evident that in order to have a bond uniform throughout its entire length the iron or steel terminals should have a cross-sectional area relatively proportioned to the ratio of resistance of the terminals to the copper connection. Various means may be provided for attaching the terminals or ends to the rail-sections.

Other objects and advantages of the invention will hereinafter appear, and the novel features thereof will be particularly pointed out in the appended claims.

The invention is clearly illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this specification, and in which—

Figure 1 is a side elevation of the adjacent ends of two rails connected by my improved bond or connection. Fig. 2 is a horizontal section through the rails with the connection in plan. Fig. 3 is an enlarged view in plan with portions broken away and parts in section. Fig. 4 is a view of the retaining-bolt with the washers in cross-section, these parts being shown in their proper position relatively to the terminal or end seen in Fig. 3. Fig. 5 is an enlarged detail in section with portions broken away, showing the terminal secured to the rail.

Like letters of reference indicate like parts throughout the several views.

Referring now to the details of the drawings by letter, A designates the iron or steel terminals or ends, and B is the copper center, rod, bar, or connection electrically welded to the ends or terminals A A at points a, as indicated by dotted lines in Fig. 3, the union being the gradual welding or fusion of the one metal into the other, as indicated by said dotted lines, so there will be no exact junction of the two metals.

Various ways or methods may be employed for securing the terminals of the bond-wire or connection to the rails C C. In Fig. 2 the terminals are shown with flanges or collars or shoulders A′, adapted to bear against the rails, as seen in Figs. 1 and 2, and the portions A^2 beyond said flanges or shoulders, after being passed through suitable openings in the webs of the rails, may be secured in position in any suitable manner, as by a stud-bolt and lock-washer and nut, or other means, but in Fig. 3 I have shown these portions A^2 as provided with the screw-threaded openings a^2 for the reception of the cap-bolt D, the shank of which is threaded to engage the said threaded opening and provided with a head

or nut D′, fitted to receive a wrench or other tool, by which it may be screwed up securely in place, it being of course understood that the portion A^2 is passed through the opening in the web of the rail and the cap-bolt applied from the other side. A washer E may be applied between the head of the bolt and the rail, as indicated in Figs. 4 and 5, which washer will form a suitable area of contact between the bond-wire and the rail, and, if desired, an additional washer E′ may be employed, which is placed between the opposite side of the rail and the flange or shoulder A′ of the terminal A.

By providing the portions A^2 of the ends or terminals with the slits or slots F, and making the bolt slightly larger in diameter than the threaded hole in said portion, it is evident that when the bolt is screwed into place the said portions will be forced or expanded outward, and thus brought into closer contact with the walls of the opening in the rail in which the said portions are located.

Modifications in detail may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages. For instance, the end or terminal A may be provided with a lug or enlargement A^3, as seen in Fig. 3, to aid in the driving of the bond-wire terminal into the opening provided therefor in the rail. The washers E E′, either or both, may sometimes be omitted, if preferred.

I do not claim "a bond-wire terminal having a screw-threaded opening for the reception of its retaining-bolt and lengthwise slotted and means to enter and expand said opening," as I believe that I am not the first inventor thereof.

What I claim as new is—

1. As an improved article of manufacture a bond-wire or connection having iron or steel terminals and a copper bar or connection electrically welded thereto at its opposite ends, substantially as specified.

2. A bond-wire or connection consisting of iron or steel terminals, and a copper rod or bar joining the same and electrically welded thereto with a gradual welding or fusion of the one metal into the other, substantially as specified.

3. A bond-wire terminal of iron or steel joined to a copper bar and having a screw-threaded opening for the reception of its retaining-bolt, substantially as specified.

4. The combination with the iron or steel terminals having threaded and slotted portions, of a copper rod or bar electrically welded to and connecting said terminals, and a bolt of greater diameter than said threaded opening and adapted to expand the portion in which said opening is formed, substantially as specified.

5. The combination with a bond-wire terminal having a portion screw-threaded and lengthwise slotted and formed with a flange or shoulder, of a cap-bolt of greater diameter than said threaded opening, and a washer surrounding said threaded portion and adapted to bear against the rail, substantially as specified.

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

HARLAN P. WELLMAN.

Witnesses:
GUS H. HAMPTON,
C. K. WAITS.