(No Model.)

J. H. BICKFORD.

ELECTRIC CONNECTION.

No. 454,794. Patented June 23, 1891.

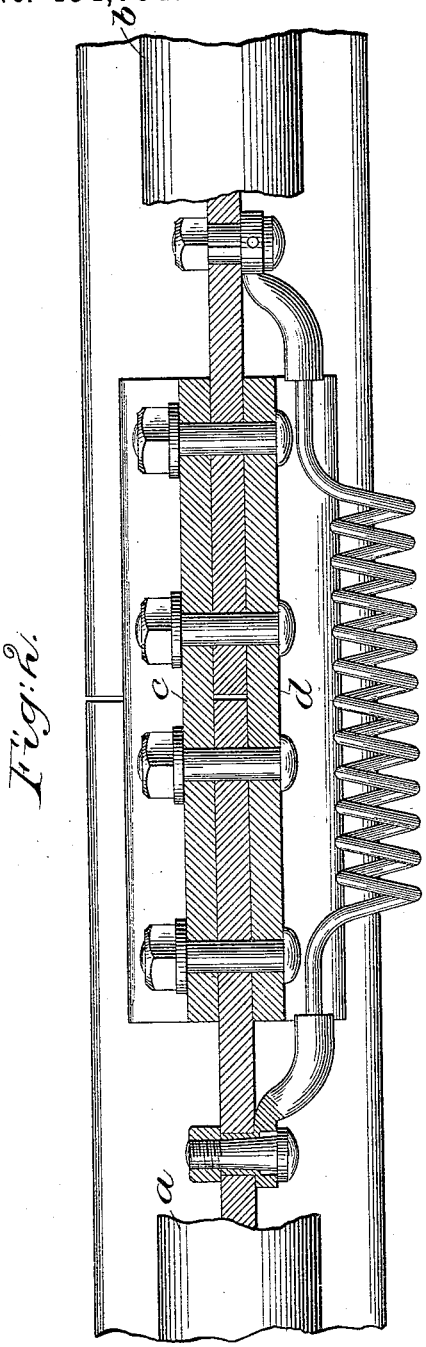

Fig. 2.

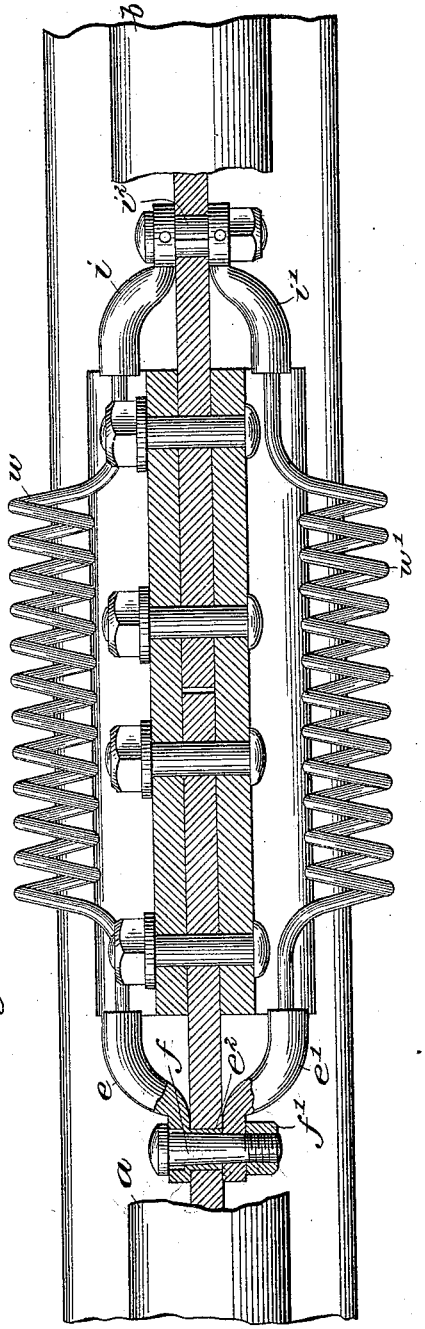

Fig. 1.

Witnesses.
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UNITED STATES PATENT OFFICE.

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ELECTRIC CONNECTION.

SPECIFICATION forming part of Letters Patent No. 454,794, dated June 23, 1891.

Application filed March 6, 1891. Serial No. 383,946. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. BICKFORD, of Salem, county of Essex, State of Massachusetts, have invented an Improvement in Bonds or Electric Connections for Railway-Rails, of of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

Prior to this invention railway-rails have been connected together by a bond or connection to insure a good electric connection, that said rails may be used as an electric circuit. The bond or electric connection commonly used consisted of a piece of wire of suitable length connected to the adjacent ends of the rails by rivets passing through the webs of the rails.

It frequently happens that the shanks of the rivets do not snugly fit the holes made to receive them, and a bad contact is the result.

This invention has for its object to construct a bond or electric connection whereby a good contact is insured.

My invention comprehends the employment of terminals having holes through them, and bolts or equivalents by which they are or may be connected to the adjacent ends of the rails, and a wire or wires connecting said terminals. The terminals preferably have in addition to the bolt-receiving holes a concentric slitted projection which is expanded by the tapering shanks of the bolts.

Figure 1 shows in plan view and partial section a bond or electric connection for railway-rails embodying this invention; and Fig. 2, a modification to be referred to.

The rails *a b* and the fish-plates *c d* and bolts by which they are attached to the rails are all of usual construction. Two terminals, herein shown as arms *e e'*, are located one at each side of the rail *a*, being bent, as shown, to extend outwardly a distance more than equal to the thickness of the fish-plates. The terminal *e* has a hole through it at one end, and concentric with said hole a slitted annular projection e^2, which snugly fits the hole made through the web of the rail *a*. The hole through the end of the terminal *e* is reamed out or counterbored for a portion of its length, and the remaining portion, which passes through the projection e^2, is made tapering, as shown. A bolt *f*, having a tapering shank, is driven through the hole in the terminal *e* and its annular projection, as shown in Fig. 1, said tapering shank causing the slitted annular projection e^2 to expand and bear more firmly against the interior of the hole in the web of the rail to thereby insure a perfect electric connection. The terminal *e'* has a hole through it at its end which receives the end of the shank of the bolt *f*, and a nut *f'* is placed on the bolt in any usual manner to bind the parts together. The hole through the terminal *e'* is also slightly tapering, as shown.

The pair of terminals *i i'* are connected to the opposite rail in substantially the same manner, and are constructed in substantially the same way as the terminals *e e'*, and the terminals *e i* and terminals *e' i'*, respectively, are connected by wires, as *w w'*. The bolts *f* are driven into the tapering holes which receive them by heavy hammers or sledges.

Referring to Fig. 2, but one terminal, as *e*, is shown, it having a slitted annular projection internally tapered. In this latter instance a single bond is represented instead of a double bond, as shown in Fig. 1.

I claim—

1. A bond or electric connection for railway-rails, composed of two terminals with holes through them, concentric annular projections and bolts for attaching said terminals to the rails, and a wire connecting the terminals, substantially as described.

2. A bond or electric connection for railway-rails, composed of two terminals with holes through them, concentric slitted annular projections and bolts for attaching said terminals to the rails, and a wire connecting the terminals, substantially as described.

3. A bond or electric connection for railway-rails, composed of two arms or terminals having holes through them, and concentric annular projections tapering internally, as shown, bolts with tapering shanks and nuts thereon, by which said arms or terminals are con-

nected to the adjacent ends of the rails, and a wire connecting the said arms or terminals, substantially as described.

4. A bond or connection for railway-rails, composed of two bent arms, as *e i*, having the slitted annular projections e^2 i^2, tapering internally, as shown, the bolts with tapering shanks and nuts thereon, by which said arms are connected to the adjacent ends of the rails, and the wire, as *w*, connecting the said bent arms, and the arms *e' i'*, also having tapering holes therethrough and arranged on the tapering shanks of the bolts and the wire, as *w*, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN H. BICKFORD.

Witnesses:
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