

(No Model.)

S. D. FIELD.

ELECTRICAL CONNECTOR FOR RAILWAY TRACK CIRCUITS.

No. 275,180.

Patented Apr. 3, 1883.

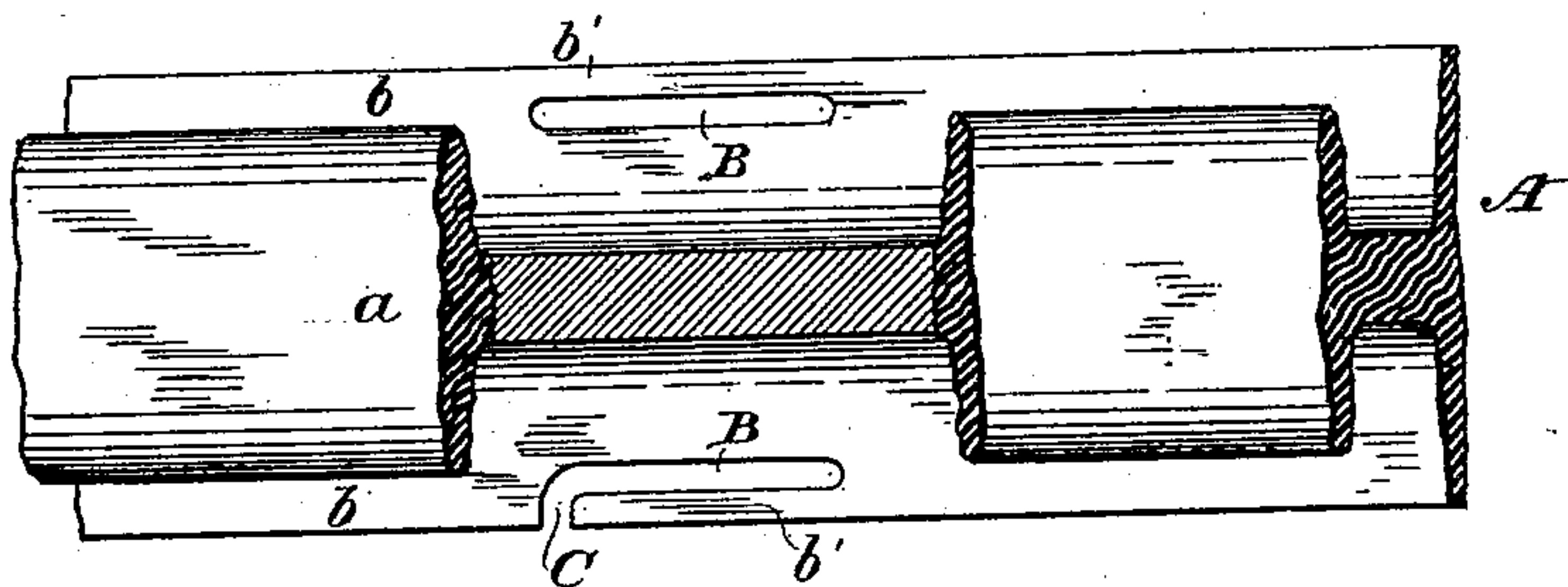


Fig. 1.

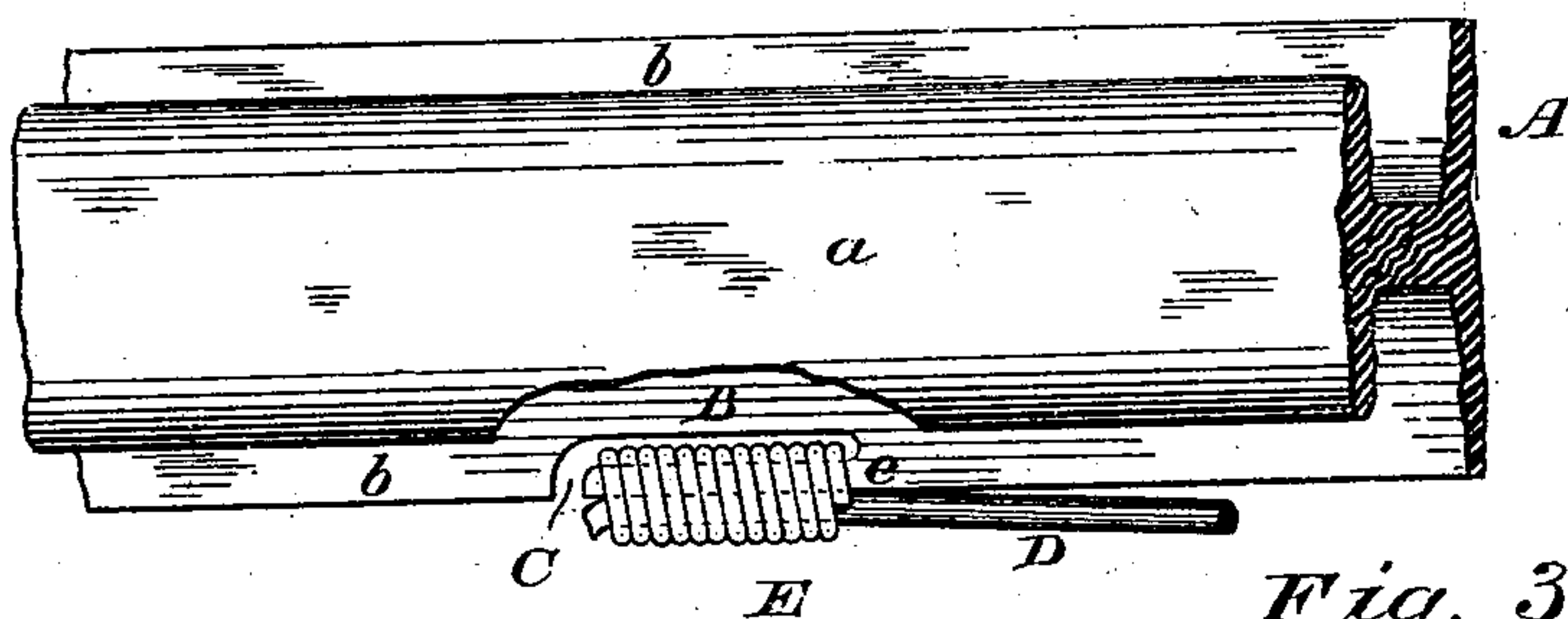


Fig. 2.

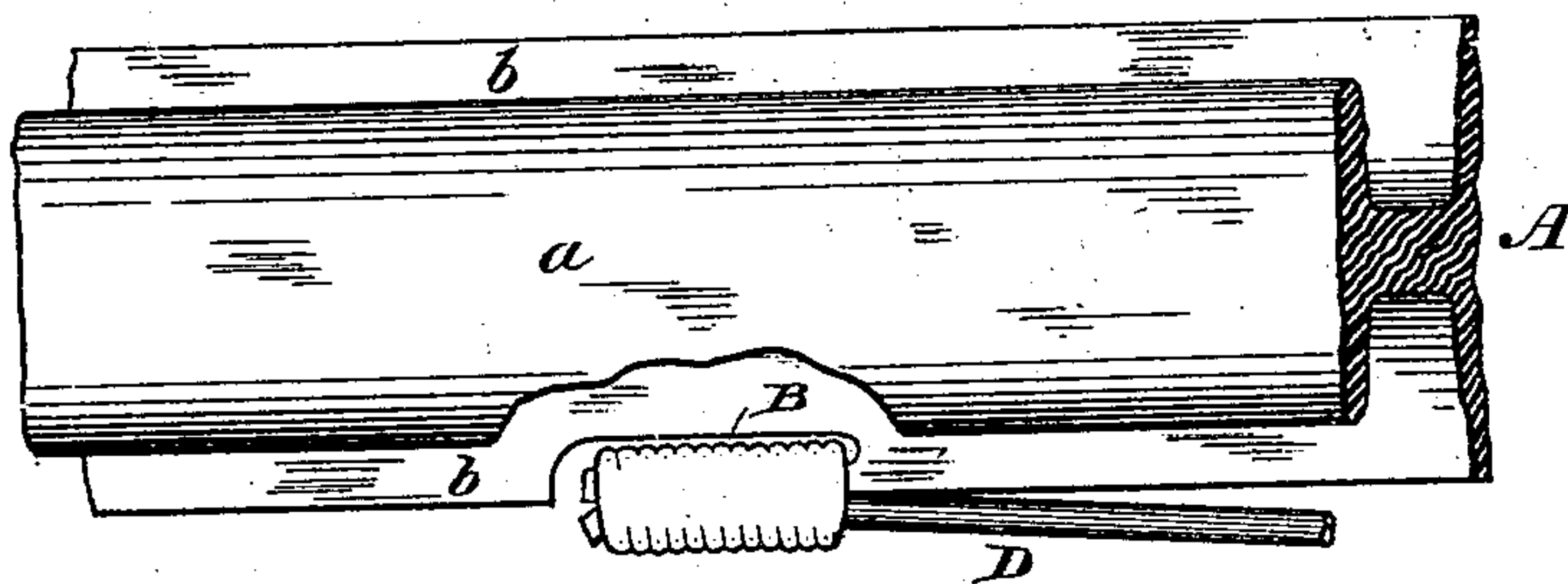


Fig. 3.

Fig. 4.

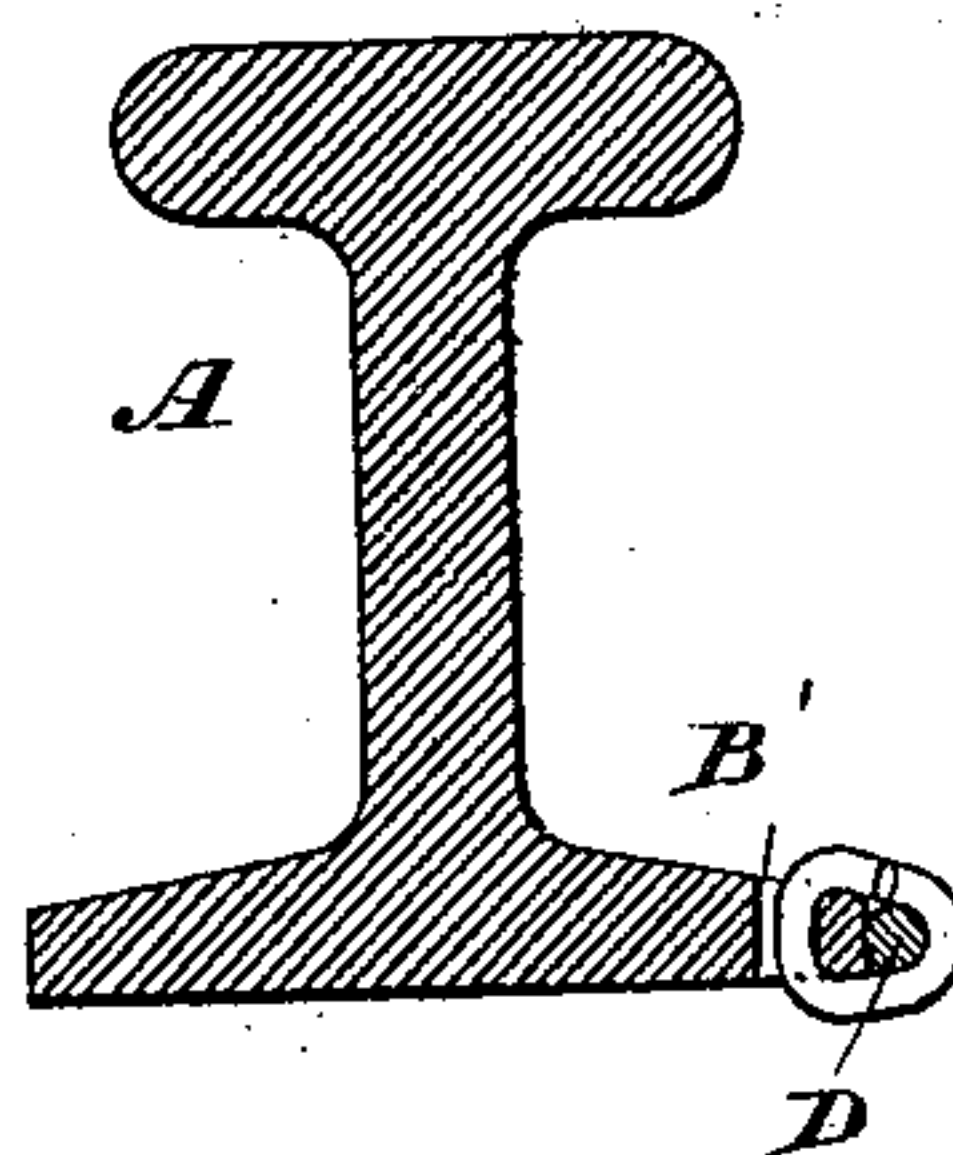
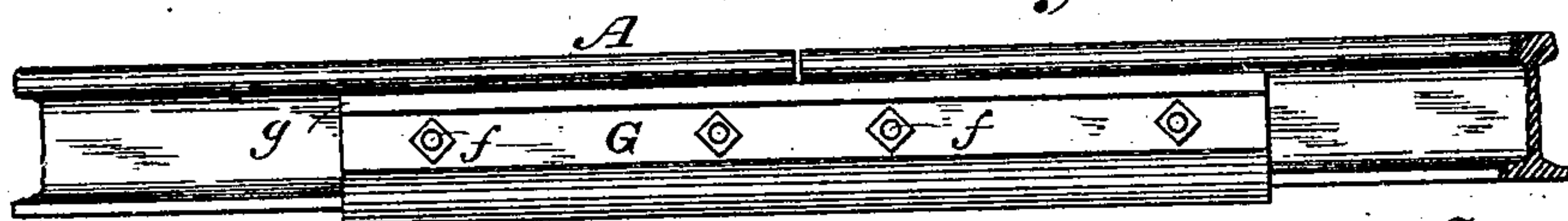


Fig. 5.



Fig. 6.

Fig. 7.



Witnesses:

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UNITED STATES PATENT OFFICE.

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ELECTRICAL CONNECTOR FOR RAILWAY-TRACK CIRCUITS.

SPECIFICATION forming part of Letters Patent No. 275,180, dated April 3, 1883.

Application filed January 16, 1882. (No model.)

To all whom it may concern:

Be it known that I, STEPHEN D. FIELD, a citizen of the United States, residing in New York, in the county and State of New York, have invented certain new and useful Improvements in Electrical Connectors for Railway-Track Circuits, of which the following is a specification.

My invention relates to a conductor for uniting separate rails of a railway-track in cases in which it is necessary to utilize a continuous line of rails for the purpose of conveying an electric current, as in the propulsion of railway-trains or the operation of automatic railway-signals by electric currents derived from a stationary electric generator. Experience has demonstrated that it is a matter of great difficulty to effect a permanent electrical connection between adjacent abutting rails of a railway-track, so as to offer an inappreciable resistance to the passage of an electric current. The metallic fish bars or plates which are ordinarily used to clamp the ends of the rails and maintain them in alignment with each other, and which are usually secured thereto by means of bolts and nuts, constitute an exceedingly unreliable and inefficient medium for conducting the electric currents. After exposure to the moisture of the atmosphere for a short time a coating of oxide of iron is formed, which substance gradually accumulates between the contiguous surfaces of the rails and fish-plates. This oxide is an exceedingly poor conductor of electricity, and hence its presence between the conducting-surfaces seriously impairs, even if it does not destroy, the conductivity of the joint as a whole. The occurrence of such abnormal resistances at the rail-joints has been found to be one of the most serious obstacles to the successful employment of the rails of the railway-track as conductors for the purpose of propelling moving trains by electricity, actuating automatic signals, and other like purposes.

My invention consists in establishing a permanent electric connection between independent rails by partially separating an integral portion of the flange of each rail from the main body thereof, so as to form a projection or finger, and in uniting the extremities of a spe-

cial conductor of suitable length with the partially-detached portions or fingers of the respective rail-flanges by means of a helical wrapping of wire, thus forming a joint which is preferably rendered permanent and indestructible by subsequent brazing or soldering.

My invention also consists in certain details of construction, which will be hereinafter more fully set forth.

In the accompanying drawings, Figure 1 is a plan view of a portion of an ordinary track-rail, showing the manner in which a portion of the edge of the flange is partially separated from the main body. Fig. 2 is a like view illustrating the manner in which the connecting-conductor is attached to the finger or partially-separated portion of the flange. Fig. 3 represents the joint after having been brazed or soldered. Fig. 4 is a transverse section of the joint thus formed. Fig. 5 is a plan view, showing two adjacent rails, together with their connecting-conductor. Fig. 6 is a side elevation, and Fig. 7 a transverse section, of the rail-joint and fish-plate, showing the mode of attachment of a guard-plate for protecting the electric conductor.

In Fig. 1, A represents a track-rail of the ordinary form, of which *a* is the head and *b* are the flanges, the configuration of the transverse section of the rail being shown in Figs. 4 and 7.

In carrying out my invention I first partially separate an integral portion of the edge of the flange *b* by forming a slot, B, therein, which may be about two inches in length, parallel to the edge of the flange, and about one-fourth of an inch distant therefrom, one of its ends being open, as shown at C, thus forming a finger, *b'*, for the convenient attachment of the connecting-conductor. This form of slot, while it does not materially diminish the strength or rigidity of the rail, materially facilitates the operation of forming the joint, as hereinafter set forth. The slot may be formed by any convenient process—such as punching, drilling, or cutting—and by means of any machinery suitable for the purpose, either before or after the rail is placed in position in the track. The rails having been laid with their abutting ends in line with each other to form the track, as

shown in Fig. 5, a metallic connecting-conductor, D, which may be formed of an iron or copper wire or rod—say about one-fourth of an inch in diameter—is secured at its ends to the detached portion of the flange of each abutting rail, which forms a finger, *b'*, as shown in Fig. 2, by placing the end of the said conductor parallel and in contact with the said finger, and then wrapping the two with a binding-wire, E, preferably commencing at the point *e* and winding or serving the same helically, passing it through the slot B at every convolution, thus binding the parts securely together for a distance of two inches, more or less, after which the projecting ends of the binding-wire may be cut off. Before binding the parts together the contact-surfaces should be carefully scraped or rubbed with emery-cloth, in order to remove all the scale and oxide therefrom, and thus insure a good conducting-connection.

The manner in which the conductor is applied to two adjacent rails will be best understood by reference to Fig. 5. The conductor D should in all cases be of a length somewhat in excess of the linear distance between its terminal points of attachment, in order to allow for the contraction and expansion of the rails when subjected to the influence of ordinary changes of temperature. This may be conveniently effected by making a loop in the wire, as shown at *d*. After the joints have been thus formed they should be carefully brazed or soldered, the molten soldering material being applied so as to completely fill the interstices between the several convolutions of the binding-wire E, and also the triangular spaces between the conductor D, the finger *b'*, and the binding-wire, so as to unite the whole in a solid mass, thus effectually preventing the entrance of moisture and the oxidation resulting therefrom, and insuring a permanent electrical connection between the two rails.

The ordinary fish-plates or splice-bars are applied to the rail-joint in the ordinary manner to secure its mechanical continuity, and this may be done either before or after the application of the electrical conductor, as most convenient. In some instances it may be necessary to protect the electrical conductor and its attachments from malicious interference or interruption. I prefer to effect this by means of a guard-plate, G, Figs. 6 and 7, which consists of a bent plate of the necessary length and breadth, attached to the bolts *f f*, by which the fish-plates *g g* are secured to the rails, which projects over the electric joints, so as to cover and protect them. The guard-plate G may, if preferred, be made in one piece with the fish-plate.

I claim as my invention—

1. A track-rail provided with a finger formed from its flange, and constituting an integral portion thereof, for the attachment of an electrical conductor, substantially as hereinbefore set forth.

2. The combination, substantially as hereinbefore set forth, of a track-rail provided with a finger formed from its flange, and constituting an integral portion thereof, and an independent electrical conductor permanently attached to said finger.

3. The combination, substantially as hereinbefore set forth, of a track-rail provided with a finger formed from its flange, and constituting an integral portion thereof, an independent electrical conductor, and a binding-wire uniting said conductor to said finger.

In testimony whereof I have hereunto subscribed my name this 11th day of January, A. D. 1882.

STEPHEN D. FIELD.

Witnesses:

MILLER C. EARL,
CHARLES A. TERRY.