(No Model.) 2 Sheets—Sheet 1.

P. RIETH.

ELECTRICAL CONNECTION.

No. 539,825. Patented May 28, 1895.

Fig. 1

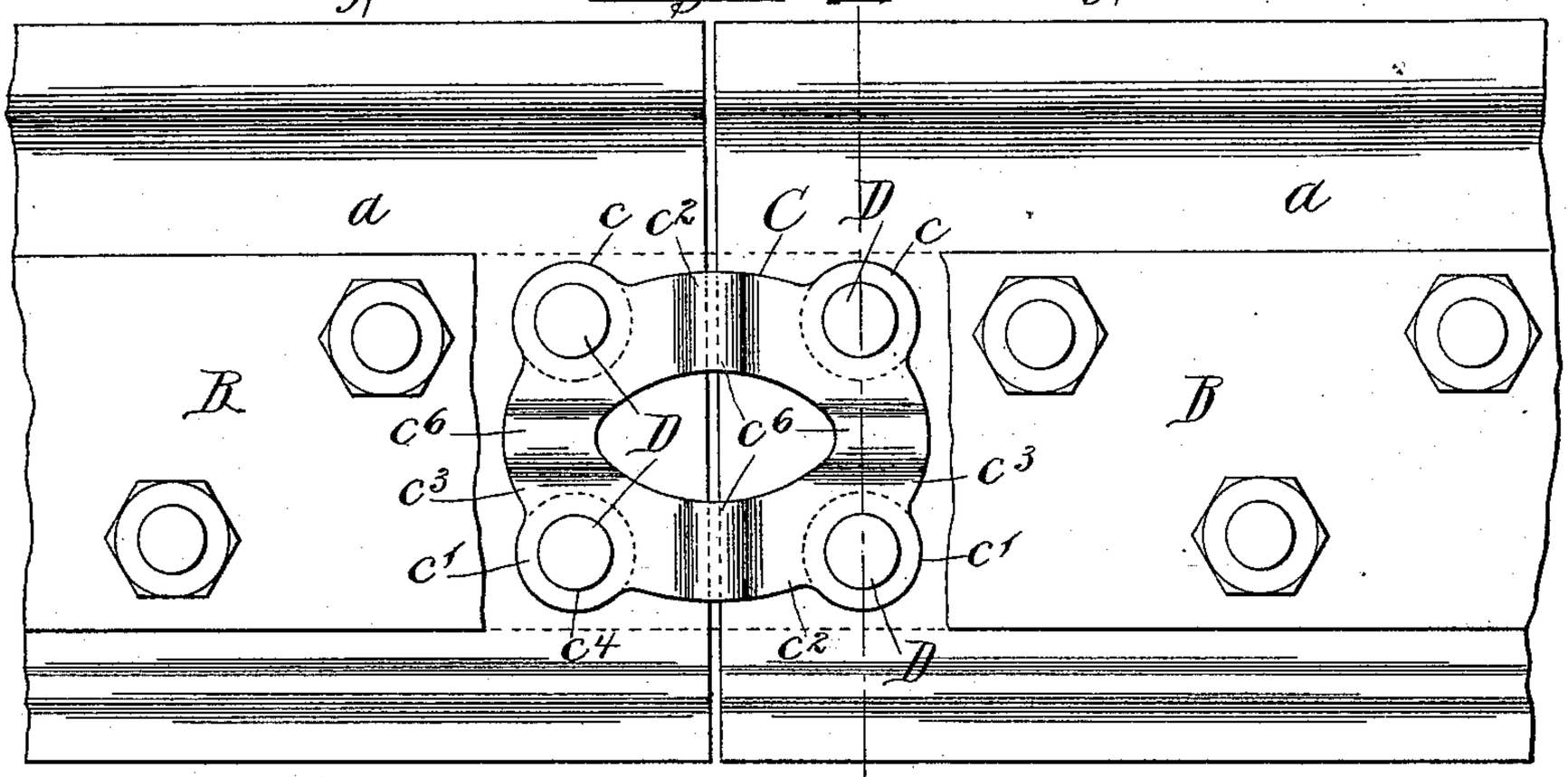
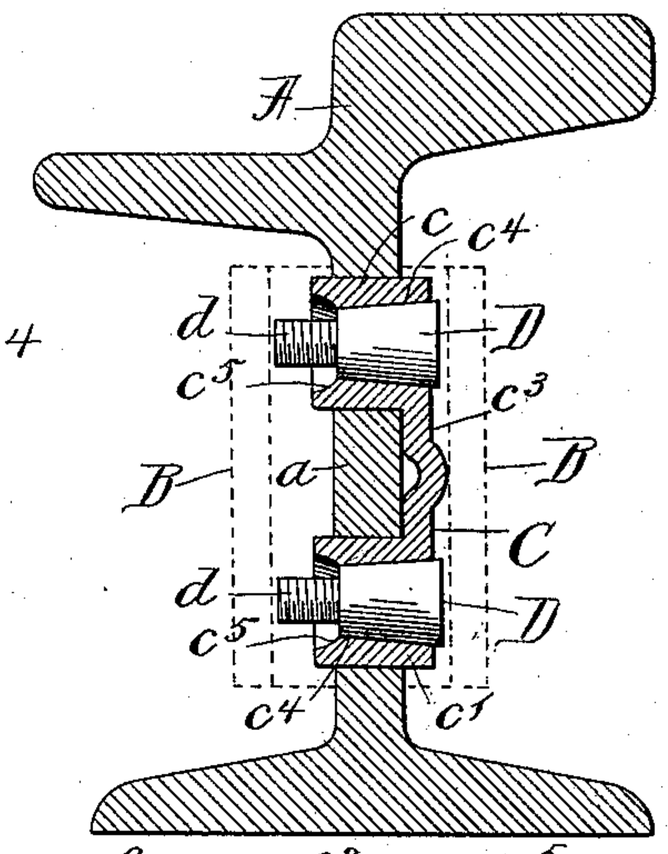


Fig. 2.

Fig. 3.



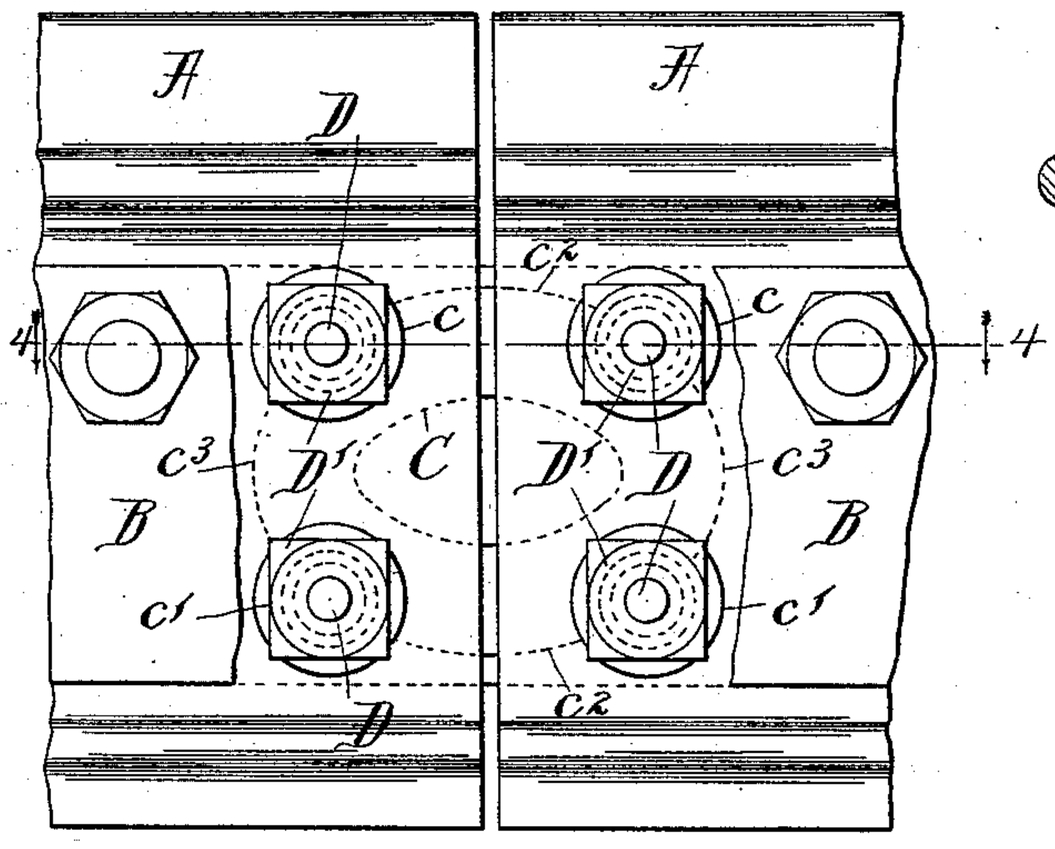


Fig 4.

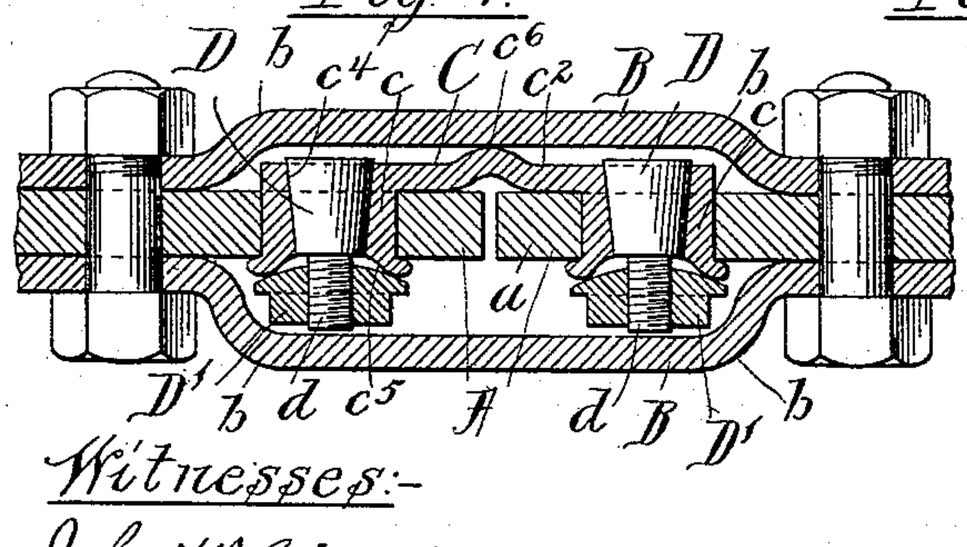
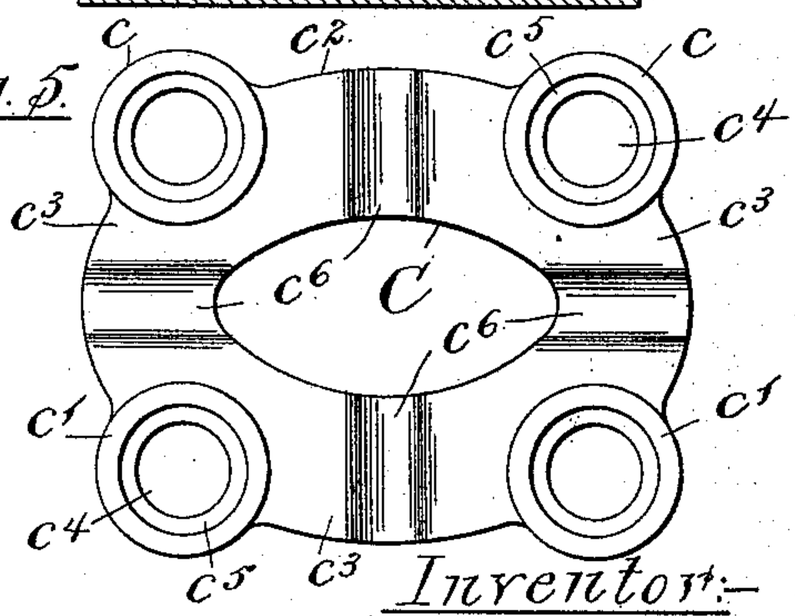


Fig. 5.



Witnesses:-
John W. Adams.
Clinton Hamlink

Inventor:-
Peter Rieth.
by: Dayton, Cooke & Brownell his Att'ys.

(No Model.) 2 Sheets—Sheet 2.

P. RIETH.

ELECTRICAL CONNECTION.

No. 539,825. Patented May 28, 1895.

Fig. 6.

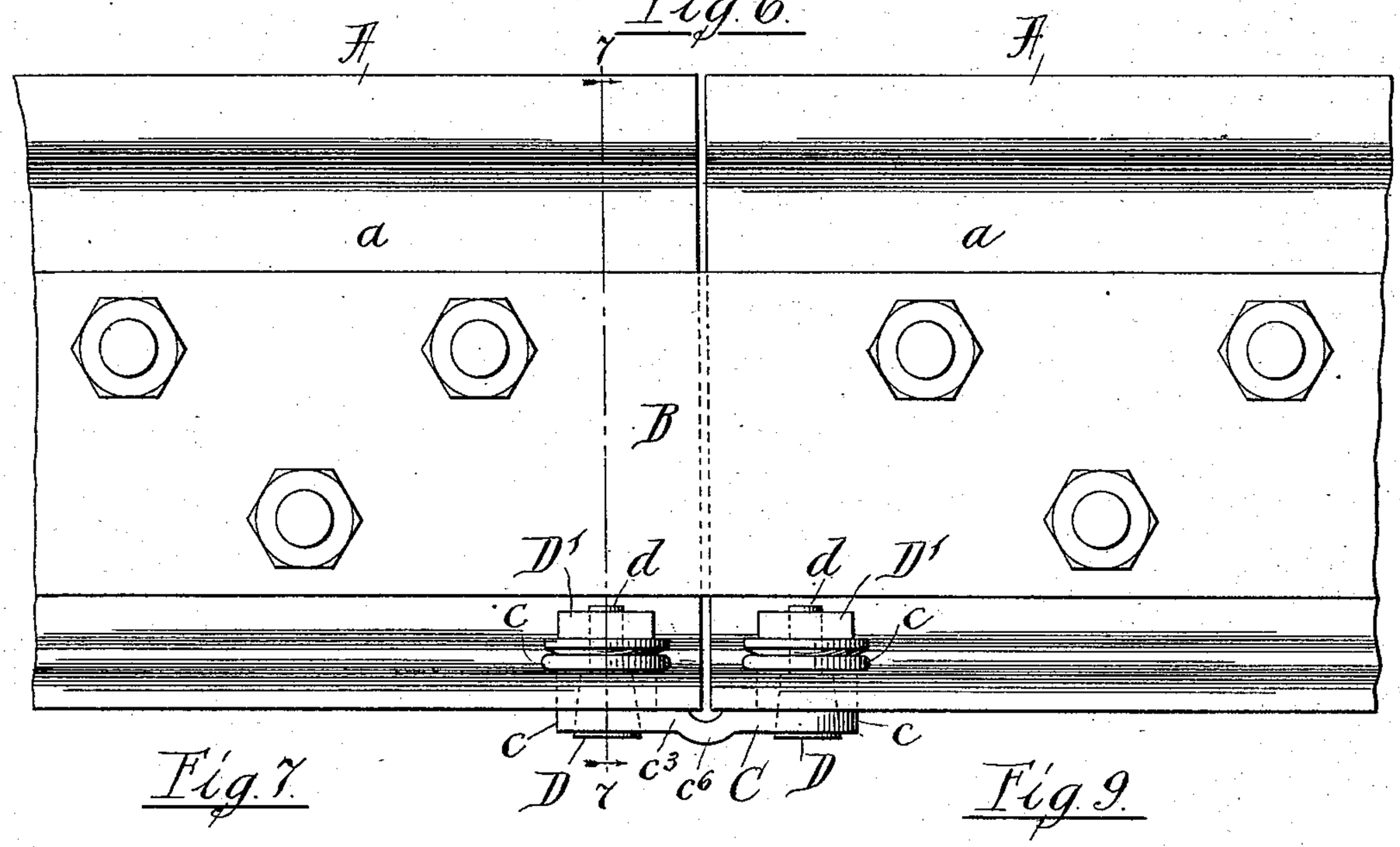


Fig. 7.

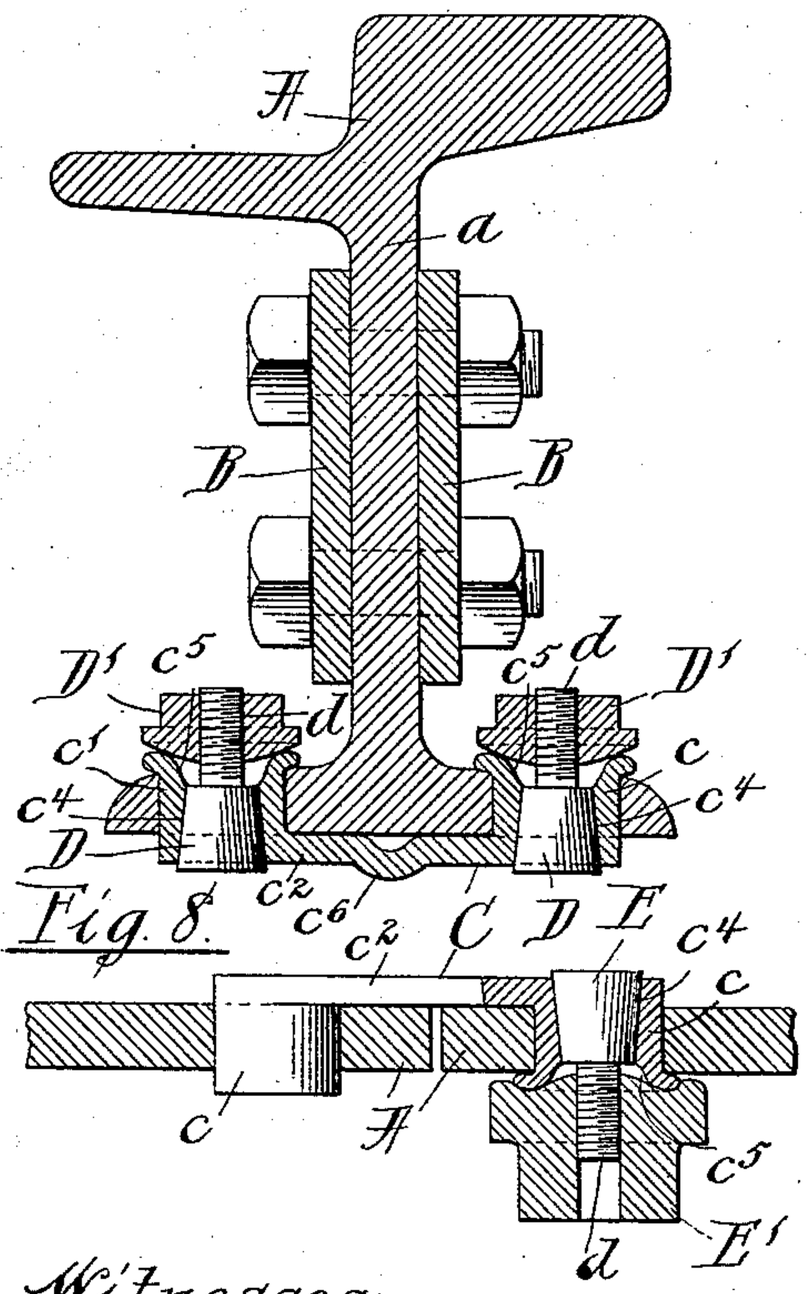


Fig. 8.

Fig. 9.

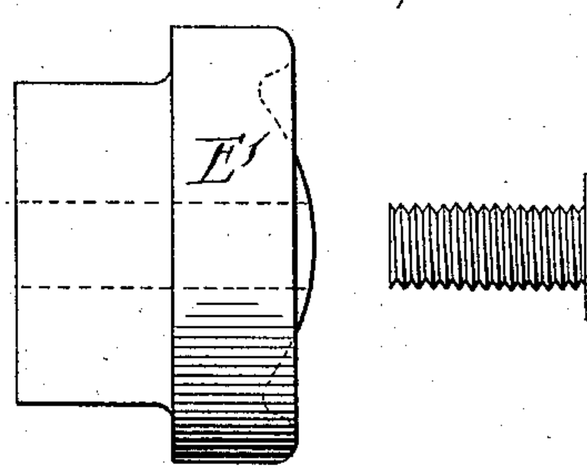
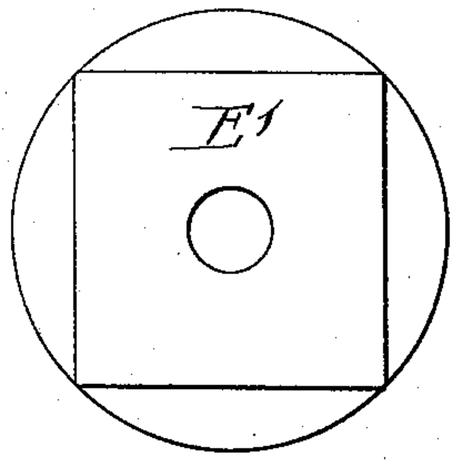


Fig. 10.



Witnesses:-
John W. Adams.
Clinton Hamlink

Inventor:-
Peter Rieth.
by:- Dayton, Cooke & Brown
his Atty's.

UNITED STATES PATENT OFFICE.

PETER RIETH, OF CHICAGO, ILLINOIS.

ELECTRICAL CONNECTION.

SPECIFICATION forming part of Letters Patent No. 539,825, dated May 28, 1895.

Application filed February 28, 1895. Serial No. 540,010. (No model.)

To all whom it may concern:

Be it known that I, PETER RIETH, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Electrical Connectors; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in electrical connectors for electrically connecting railway rails, or the like, of that class commonly known as "rail bonds."

Among the objects of the invention are to provide an improved construction in devices of the character referred to, to provide a device which may be more readily and cheaply manufactured, and when applied to afford a more certain, perfect and durable electrical connection than is attained with the bonds now commonly in use, and also to provide a device which is susceptible of application to the rails in a variety of different ways under varying circumstances.

To the above and other ends, the invention consists in the matters hereinafter described and more particularly pointed out in the appended claims.

The invention may be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of the adjacent ends of two railway-rails equipped with my invention, a part of the fish-plate being broken away to expose the bond. Fig. 2 is a similar view of the reverse side of the rails. Fig. 3 is a transverse vertical section taken on line 3 3 of Fig. 1. Fig. 4 is a horizontal section taken on line 4 4 of Fig. 2. Fig. 5 is an inner face view of the bond in its form before application to the rails. Fig. 6 is a side elevation of the ends of two adjacent rails, showing the bond applied to the under sides thereof. Fig. 7 is a transverse section taken on line 7 7 of Fig. 6. Fig. 8 is a sectional view showing the manner in which the terminals may be swaged into place within the rail. Fig. 9 is a detail side elevation of the swaging device shown in Fig. 8. Fig. 10 is a plan view of the same.

Referring to said drawings A A designate the adjacent ends of two track rails of common construction, which may obviously be those of either a street, general transportation, or other railway; those herein shown being of the form commonly used in street railways.

B B designate the ordinary connecting fish-plates and C the rail bond, usually constructed of copper. In the present instance the bond is shown as applied to the rails beneath or behind the fish-plates, the latter being bent outwardly between their central bolts, as at *b b*, to accommodate the said bond.

Referring more particularly to the construction of the bond proper, the latter is herein shown as comprising four terminals in the form of tubular or hollow plugs *c c c' c'* severally open at both ends and connected in pairs by means of two longitudinal bars or rods c^2 c^2 and also united by means of transverse bars c^3 c^3, thus constituting in effect two rail bonds arranged parallel with each other and integrally united by the said bars c^3 c^3. The hollow plug section *c c'* are of cylindrical exterior form and integrally united with the connecting bars c^2 and c^3 at their ends so as to project at right angles to the latter and in the same direction; the united ends of the plug sections being preferably although not necessarily, flush with the outer surface of the bars and of a length somewhat greater than the thickness of that part of the rail to which they are designed to be applied (in this instance the vertical web *a* of the rail) exclusive of the thickness of the connecting bars c^2 c^3. The bore or aperture c^4 through each hollow plug is not accurately cylindrical but is somewhat conical or tapered from the outer or connected ends of the plugs to the opposite ends, as indicated clearly in sectional Figs. 3 and 4. The smaller end of the bore of each plug is also enlarged for a short distance inward from the end, preferably and as herein shown, by recessing it in the form of a concave or dished countersink c^5; the object being to reduce the thickness of the end of the tubular plug for the purpose of facilitating its expansion, as hereinafter described. Preferably each bar or connector c^2 or c^3 will be provided at a point between its ends with a

bend c^6 adapting the bar to yield in the expansion or contraction of the rails A A.

The application of the bond to the rails, as thus constructed is as follows: Suitably spaced holes having been provided in the adjacent ends of the rails of proper size to receive the tubular plugs $c\ c'$ snugly therein, the bond is placed in position with the ends of the plugs protruding through and slightly beyond the rail web, as shown in Fig. 3. A suitable tool is next used to expand or swage the walls of the plugs out into perfect contact with the surrounding metal of the rail and also to swage or crimp over the protruding ends of the plugs upon the outer face of the rail into substantially the form shown in Fig. 4. After having been thus applied and the terminals each properly swaged or otherwise seated within the rail, tapered or conical bolts D provided at their smaller ends with screw-threaded shanks *d*, are desirably inserted through the terminals and convexed faced nuts D′ applied and screwed up firmly against the end of the terminals. Obviously this swaging or forming of the hollow plugs so as to insure their proper seating in the rails may be performed in various ways and with different kinds of tools, but I have found a very satisfactory means of accomplishing this object to consist in the devices shown in Fig. 9, in which E is a hardened steel conical expanding mandrel of substantially the same form as one of the bolts D referred to, and similarly screw-threaded at its smaller end, in connection with a swaging die E′ which is tapped to fit the threaded end of the said expanding mandrel and is turned up by means of any suitable wrench. The engaging face of the die or swaging device E′ is suitably convexed at its center and recurved at its margin so as to force the end of the tubular terminal radially outward and over against the face of the web into the form shown. By the use of these tools in the manner described the expanding of the plug into perfect electrical contact with the rails and the swaging of the protruding end of the plug so as to secure it to the rail, are accomplished simultaneously and rapidly. While, when thus expanded within and secured to the rail, the tubular plugs of the bond have little liability to loosen, I deem it preferable to employ the permanent conical bolts and nuts D D′, since they tend to retain the metal of the plugs in its expanded form and moreover, afford continually present means for tightening the plugs to the rail whenever they do, in fact, become loosened.

The making of the bond double and connected by integral transverse bars which are of sufficient cross-sectional area to themselves serve as conductors between the pair of plugs is a feature of importance since by this construction the certainty of connection is augmented. Moreover, the bars c^2 and c^3 being of unequal length, by making one or the other pair of bars horizontal it may fit rails having the holes at greater or less distance apart.

In Figs. 6 and 7 the bond is shown as applied to the bottom of the rails, thus avoiding interference with the fish-plates. This position of the bond has been found in practice to be a very desirable one, and in such case the double form of the device shown is of special advantage in adapting it to fit rails of different sizes or forms, since, by selecting the bars which shall be transverse to the rails, the holes can be made through the proper thickness of the tapering flanges.

It will be obvious that the connecting portions or bars of the bond need not be separated by the central opening or space between them, shown in the drawings, and which gives these connections literally the form of bars, but may be made in the form of a continuous plate or in any other desired and suitable form.

It will be seen from the above description that I have produced an extremely practical device and one which combines many novel and desirable features. The very large area of metal of the bond and the manner in which it is brought into perfect electrical contact with the rails, combined with the large carrying capacity of the connecting bars insures a "full capacity" bond, or one which will transmit the current from one rail to the other without more resistance than that encountered in passing through an equal length of solid rail.

It will of course be understood that certain features of my invention will be embodied in a bond having a single pair of terminals connected by a bar or plate, and that the double form has the additional advantages above pointed out.

I claim as my invention—

1. An electrical connector for track rails or the like said connector having cylindrical terminals in the form of tubes provided with tapered conical bores open at both ends, and an electrical conductor integrally uniting said terminals; the length of each tubular terminal being greater than the thickness of the body within which it is to be secured so as to project at that end having the smaller end of the bore, whereby said projecting end may be swaged outwardly, and the tube expanded by a drift, substantially as described.

2. An electrical rail connector having terminals in the form of tubes open at both ends, each having its bore tapered inwardly from one of its ends, and a connecting bar or plate integrally united with said tubes adjacent to the ends thereof and extending at right angles to the axes of the terminals, whereby said connector acts as a head for each terminal to limit its insertion within the rail; the length of each tubular terminal being greater than the thickness of the body within which it is to be secured, whereby, when inserted through said body, the pro-

jecting tubular end may be swaged over outwardly to form a retaining flange, substantially as set forth.

3. The combination with the adjacent ends of two track-rails, of an electrical connector uniting said rails, which comprises cylindrical tubular terminals open at both ends and having conical bores, said tubes occupying and protruding through apertures in said rails and each having its protruding end swaged outwardly into the form of an annular flange resting against the rail body and its body expanded into intimate contact with the rail, conical or tapered bolts extending through said terminals, convex faced nuts upon the ends of said bolts, and a conductor connecting said terminals, substantially as described.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

PETER RIETH.

Witnesses:

ALBERT H. GRAVES,

WILLIAM L. HALL.