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PATENTED FEB. 13, 1906.

B. G. BRAINE.

ELECTRICALLY CONDUCTIVE RAIL JOINT AND BOND THEREFOR.

APPLICATION FILED APR 11, 1904.

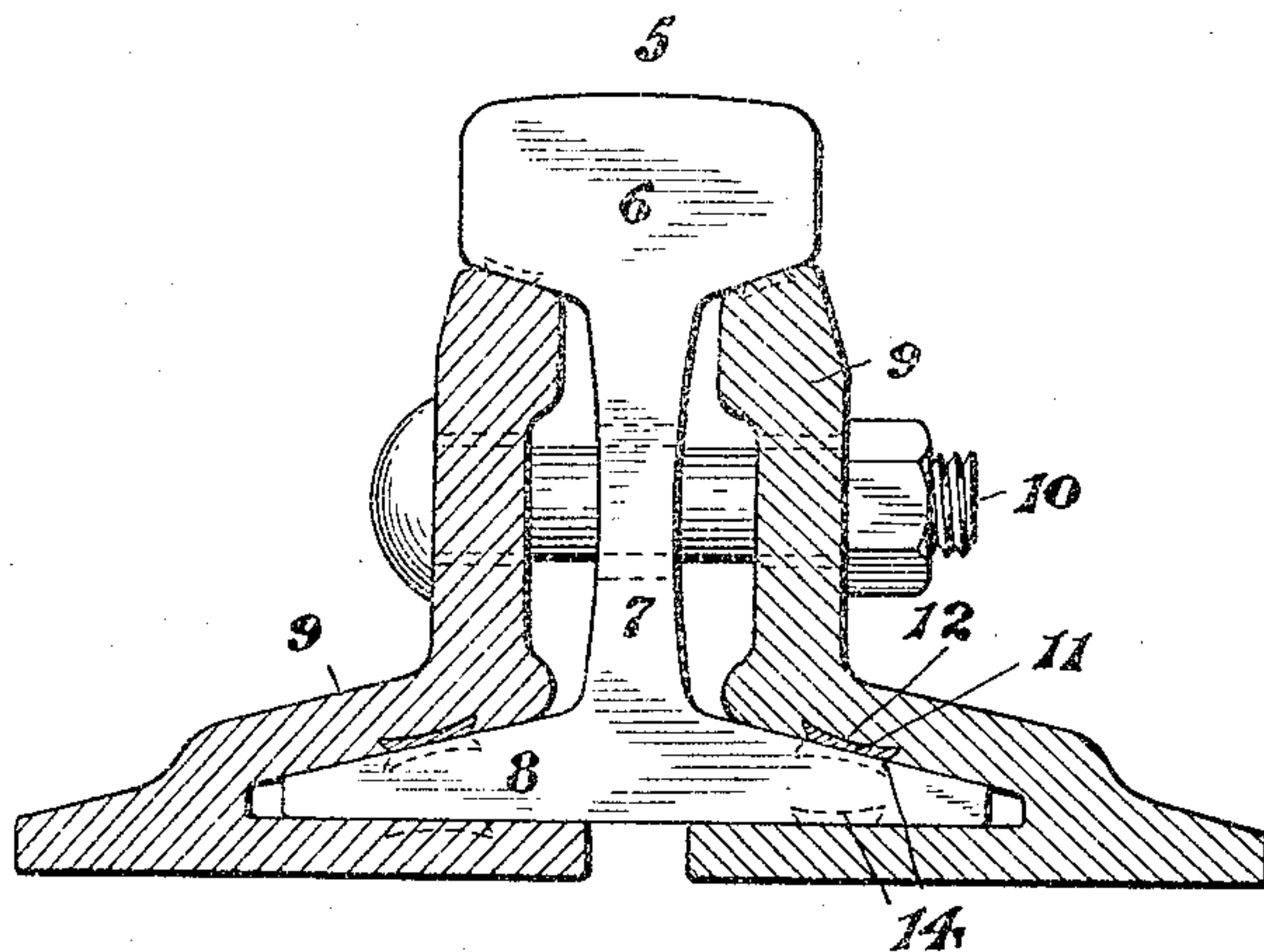


Fig. 1.

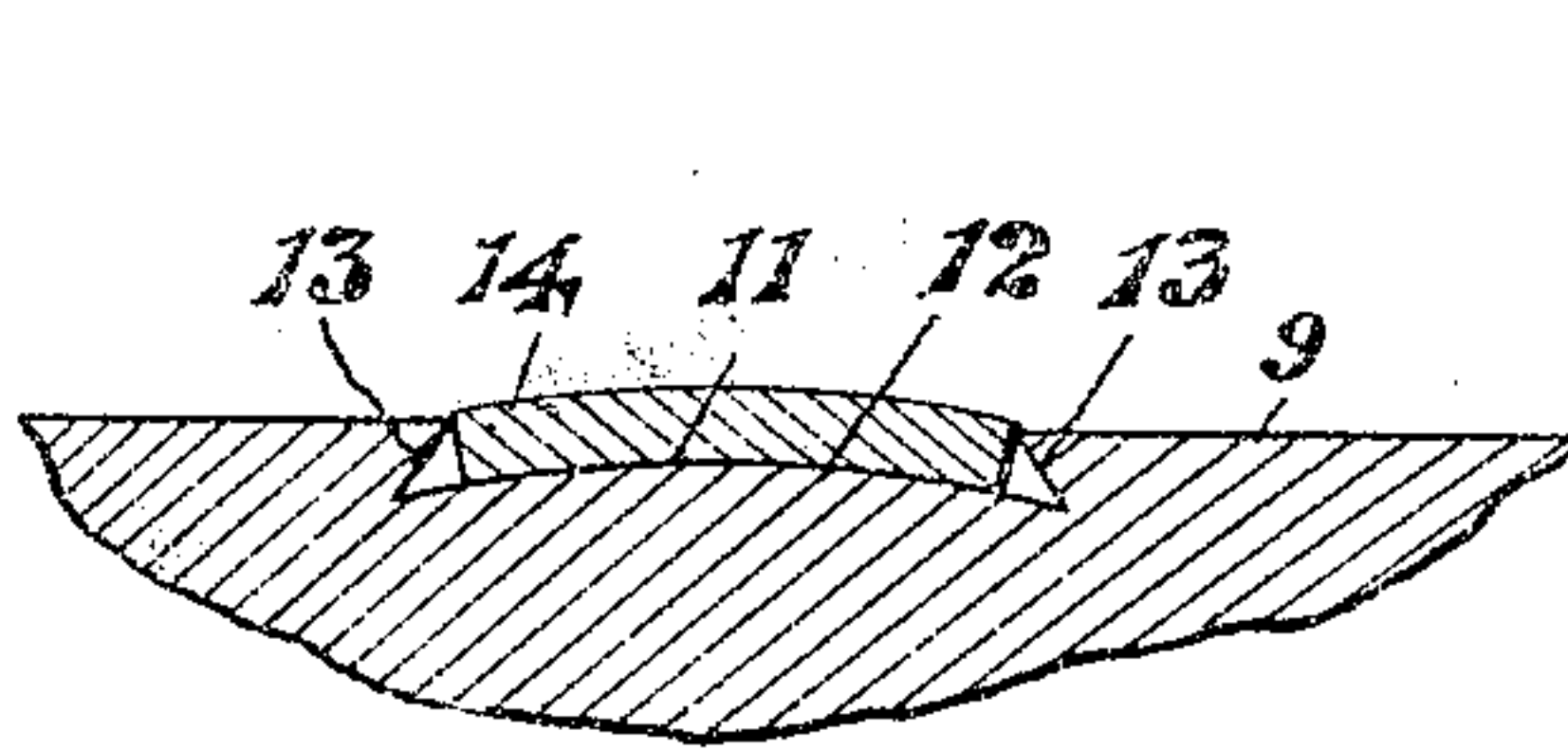


Fig. 2.

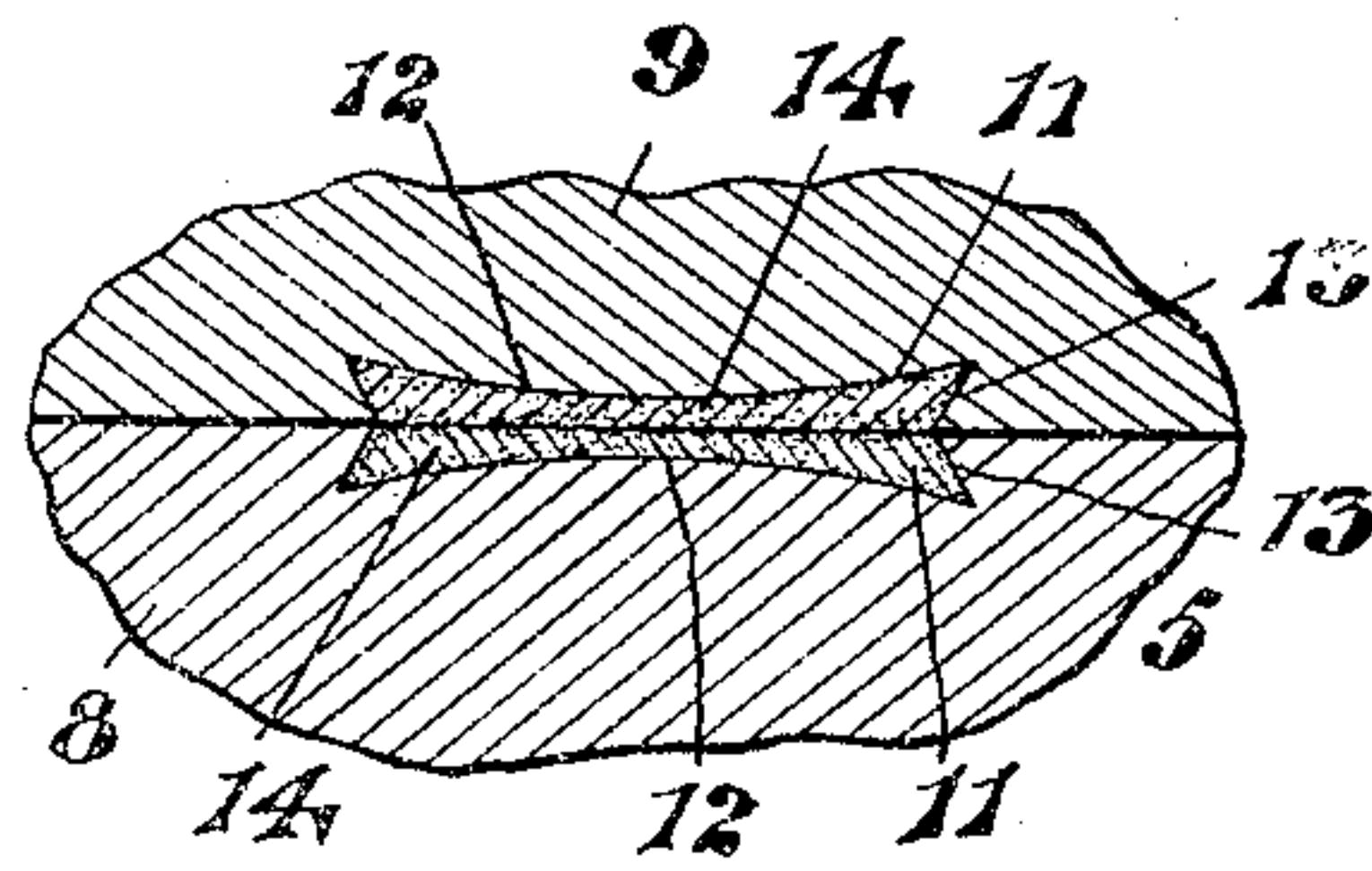


Fig. 3.

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ELECTRICALLY-CONDUCTIVE RAIL-JOINT AND BOND THEREFOR.

No. 812,781.

Specification of Letters Patent.

Patented Feb. 13, 1906.

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To all whom it may concern:

Be it known that I, BANCROFT G. BRAINE, a citizen of the United States, residing at New York, in the borough of Brooklyn and State of New York, have invented certain new and useful Improvements in Electrically-Conductive Rail-Joints and Bonds Therefor; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to numerals of reference marked thereon, which form a part of this specification.

The objects of this invention are to secure a more perfect and durable electrical bond between two contiguous rails of a railroad, whereby there will be secured a more free and open flow of the electrical current to or from the motor of an electric car or for other purposes; to reduce the cost of construction, and to secure other advantages and results, some of which may be referred to hereinafter in connection with the description of the working parts.

The invention consists in the improved electrically-conductive rail-joint, in the arrangements and combinations of parts of the same, and in the method and means of electrically bonding the said rails, all substantially as will be hereinafter set forth, and finally embraced in the clauses of the claim.

Referring to the accompanying drawings, in which like numerals of reference indicate corresponding parts in each of the several figures, Figure 1 is a transverse section of a rail-joint, taken transversely through the joint between the rail ends; and Figs. 2 and 3 are sectional details on an enlarged scale, showing the invention more clearly.

In said drawings, 5 indicates one of two contiguous or aligned rails of a railway, the rail 5 having the head 6, over and on which the cars travel, the web 7, and the flange 8 of any usual construction. 9 9 indicate the splice or angle bars, and 10 the bolts for joining said rails and bars, the particular variety of connecting bar or plate shown in the drawings being what is commonly known as the "continuous" plate or connection.

To enable the ordinary angle or splice bar to serve as a conductor of the electric current

from one rail to the next more satisfactorily and more effectually prevent the disarrangement of the inserted contact metal and to effect a closer contact of the splice-bar and rail with the inserted piece or strip, I insert in recesses in the splice-bar and also preferably in the rail a plate or strip which is thicker than the depth of the recess in which it is inserted, so that when the splice-bar is bolted the strip of metal, which is softer than the steel of which the rails and splice-bar are composed, will be compressed and afterward by the pressure of the trains running thereover, so as to effect a close contact of the inserted piece with the said rail and splice-bar. The recesses are formed so that when pressure is brought to bear on the splice-bar and inserted plate or piece the projecting metal of the inserted plate will flow laterally against the side walls of the recess, thereby effecting a close contact of said walls and conducting to a more perfect electrical conductivity and to prevent moisture from entering between to produce an oxid or other non-conductive or imperfectly-conductive layer. With these ends in view at suitable points in the rail 5 and in the connecting-plates 9 the same are recessed or grooved, as at 11, lengthwise of the rail and plates. The grooves are comparatively wide and shallow, and the bottoms of the said grooves are convexed, as at 12, so that the depth of the grooves at their centers is less than at the side walls. The opposite side walls 13 of the grooves are recessed or undercut, as shown more clearly in Figs. 2 and 3. Within the said grooves 11 are arranged conductive plates 14, which are preferably of copper, aluminium, zinc, or similar material, a comparatively soft metal of high conductivity being preferred, such as copper or zinc, which will conform itself under pressure to the walls of the grooves. Said strips are of about the width of the grooves and of a thickness about equal to the depth of the deeper parts of said grooves. To secure the best conductivity, I prefer to form the grooves 11 and arrange the conductive strips so that the strip in the rail will lie opposite the strip in the connecting-plate, the strips lying face to face and in contact one with the other, as shown in Fig. 3. The conductive strips of metal on being inserted are in the form of flat sheets of somewhat greater

thickness than the depth of the centers of said grooves, as above indicated. When the connecting-plates and rails are brought together, on screwing up the bolts direct pressure is brought to bear upon the soft-metal sheets. The convex surfaces pressing hard against the soft metal force said metal to flow laterally, so that it enters into the undercut grooves at the sides, at the same time flowing into very intimate contact with the contiguous metal, the joints being thereby very thoroughly closed and the inflow of liquid or moisture into said joints prevented. Thereby the oxidation, which tends to produce a partial insulation of the current and retard the flow thereof, is avoided.

By bringing the two inserted strips of the contiguous rails into contact with the common inserted strip of the connecting-plate I secure a more perfect electrical bond, contact, or union of the rails, and because of the undercut side walls the bonding-plates are secured in place and held in place permanently, and thus no destruction or preliminary removal of electrical bonding is necessary when rearranging the rails or the road-bed.

The operation of the device in conducting the electrical fluid is as is common in railroad-bonds, except in that the bond is made more perfect and complete by the bolting of the connecting-plates against the rails.

Having thus described the invention, what I claim as new is—

1. The combination with the rails and splice-bar, the latter having grooves with opposite undercut walls, of conductive plates inserted in said grooves, and projecting at

their opposite edges against the undercut side walls, substantially as set forth.

2. The combination with the grooved rails and grooved splice-bars, the grooves of the rails and connecting-plates having convex bottoms and undercut side walls, of plates arranged in said grooves and facing one another, the said plates when pressed into place being thin at the centers of the convexities and thicker at the side walls, substantially as set forth.

3. In a rail-joint, the rail splice-bar having a longitudinal groove therein which has a convex bottom and undercut side walls, substantially as set forth.

4. In a rail-joint, the combination with a rail having a base-flange, of splice-bars having bearings against said flange, said splice-bars having grooves which are provided with centrally-convex bottoms and undercut side walls, and electrically-conductive plates arranged in said grooves and extending over the said convex bottoms from one undercut side wall to the opposite undercut side wall.

5. In a rail-joint the combination with a rail having a base-flange, of splice-bars having bearings against said base-flange, said splice-bars having a longitudinal groove which is provided with undercut side walls adapted to receive and hold projecting electrically-conductive plates.

In testimony that I claim the foregoing I have hereunto set my hand this 7th day of April, 1904.

BANCROFT G. BRAINE.

Witnesses:

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