

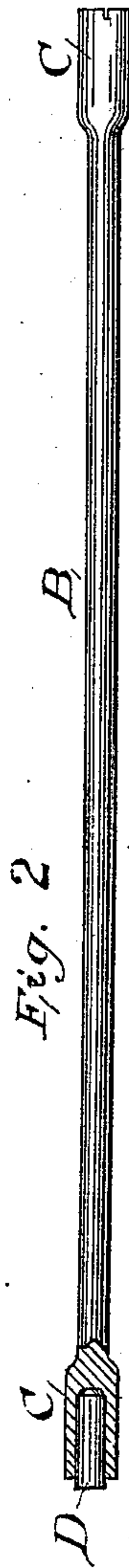
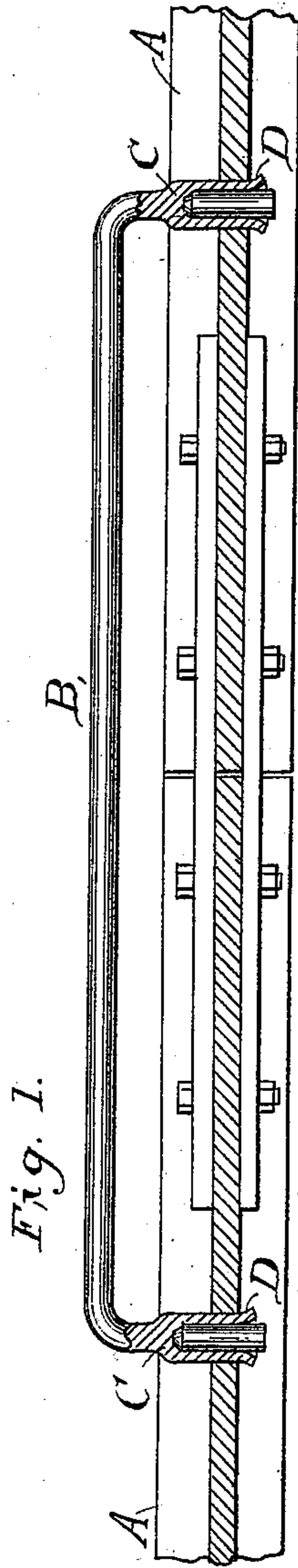
(No Model.)

H. R. KEITHLEY.

RAIL BOND CONNECTOR FOR ELECTRIC RAILWAYS.

No. 512,711.

Patented Jan. 16, 1894.



Witnesses
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UNITED STATES PATENT OFFICE.

HERBERT R. KEITHLEY, OF CHICAGO, ILLINOIS.

RAIL-BOND CONNECTOR FOR ELECTRIC RAILWAYS.

SPECIFICATION forming part of Letters Patent No. 512,711, dated January 16, 1894.

Application filed February 27, 1893. Serial No. 463,962. (No model.)

To all whom it may concern:

Be it known that I, HERBERT R. KEITHLEY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Rail-Bond or Connector for Electrical Conductors, of which the following is a specification.

My invention relates to certain improvements in a connector for connecting a bond wire into an electric railway-rail or other electrical conductor, and the objects of my invention are, first, to provide a connector than can be forged or welded on the end of a rod or wire thus making the bond-wire and connector into one solid piece of metal; second, to provide a connector that can be wedged so firmly in a hole in a railway-rail that the vibration at the rail-joint, caused by traffic, will not loosen said connector in the rail; third, to provide a connector that can be wedged so firmly in a hole made for the purpose in a conductor, that every point on the surface of the connector, within the hole, can be wedged into such solid contact with the surface of said hole that there will not be a particle of space left in the joint that will admit air or moisture; fourth, to provide a connector for connecting a copper wire or rod into an iron or steel rail or other conductor, that will bring an area of copper surface into solid contact with the iron or steel, equivalent to seven times the cross sectional area of the copper wire or rod, thus making such a large contact surface in the joint, between the two metals, that there will be no resistance to the passage of an electric current through the joint, from iron to copper and from copper to iron. I attain these objects by means of the bond-wire and connector illustrated in the accompanying drawings, in which—

Figure 1, shows a bond-wire connected into the adjacent ends of two rails; the top part of the rails being cut away in order to show a longitudinal section of the two connectors which connect the bond-wire into the rails. Fig. 2, is a view of a bond-wire showing two tubular or thimble-shaped connectors forged or welded to its ends. The connector on the left end has a drift pin inserted, and is cut lengthwise so as to show a longitudinal section, and the connector on the right shows a

perfect view of the tubular or thimble-shaped connector. Fig. 3, shows a drift pin which is used for wedging a connector into a hole in a rail or other conductor.

Similar letters refer to similar parts throughout the several views.

The bond-wire, B, has tubular or thimble-shaped connectors, C, C, forged or welded on its ends. These connectors are inserted into close fitting holes made for the purpose in the ends of the rails, A, A, Fig. 1. And the drift pins, D, D, which are made larger than the openings in the tubular connectors, C, C are driven into said connectors to expand them and wedge them securely in the holes in the rails.

The drift pins, D, when driven into the small openings in the connectors, C, C, expand them and wedge their surfaces into rigid contact with the surfaces of the holes in the rails, A, A, thus filling up every particle of space with solid metal and making a joint that will exclude all air and moisture. And it is evident that by excluding all air and moisture from a joint it is rendered almost absolutely proof against corrosion and electrolytic action which rapidly destroy the metal in an imperfect joint, such as is usually made by means of a rivet or channel pin in bonding rails. By tapping out the hole in a rail with a taper tap just large enough to cut a shallow thread, and then wedging the connector, C, into the hole with a drift pin, D, a joint can be made that will never be loosened by the vibration at the rail joint caused by traffic.

If the tubular or thimble-shaped connector, C, is composed of copper it can be made so much larger than the bond-wire, B, that it will bring a surface into solid contact with the iron rail, A, equal in area to seven times the cross sectional area of the bond-wire, B, thus eliminating all resistance from the joint, to the passage of an electric current through it. For the ratio of the resistance of iron and copper being as seven to one a copper conductor when connected into an iron conductor should have a surface in solid contact with the iron, equivalent to seven times its own cross sectional area, in order to eliminate resistance from the joint.

The bond-wire can be manufactured at a

very low cost by forging the tubular or thimble-shaped connectors on the ends of a rod or wire in an electrical forging machine made for the purpose, or by forging out the connectors, or cutting them out of a heavy pipe, and then welding or shrinking them onto the ends of a rod or wire, thus making the bond-wire and connectors into one solid piece of metal, as shown in Fig. 2.

- 10 This bond-wire may have the tubular connectors on its ends, sawed or notched in order to spread or clinch them when inserted through a hole in a rail, and thus prevent them from driving back, when the drift pin
15 is driven into said connectors, as shown in Figs. 1 and 2.

The drift pin may be a small metallic pin as shown by Fig. 3, or it may be made in the shape of a hand-tool or punch, and used to
20 expand the tubular or thimble-shaped con-

necter and then withdrawn leaving the hole in the tubular connector open.

I claim as my invention and desire to secure by Letters Patent—

A rail bond or connector for electric conductors composed of a rod, bar or wire having tubular or thimble-shaped terminals and secured to electric conductors by having the tubular or thimble-shaped terminals permanently expanded by stretching or swaging of the metal composing them into contact with
30 holes in the conductors, substantially as described.

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

HERBERT R. KEITHLEY.

Witnesses:

C. CLARENCE POOLE,
M. K. BOWEN.