No. 822,168. PATENTED MAY 29, 1906.

E. W. VOGEL.

CHANNEL PIN.

APPLICATION FILED JULY 27, 1905.

Fig. 1.

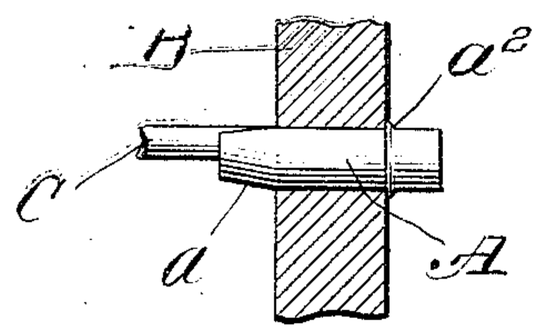


Fig. 2.

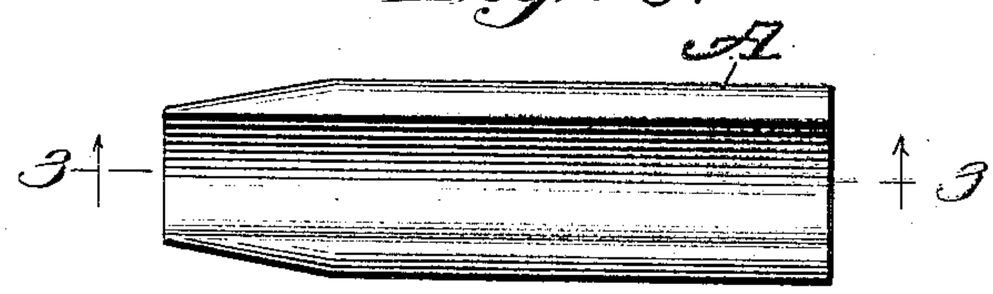


Fig. 3.

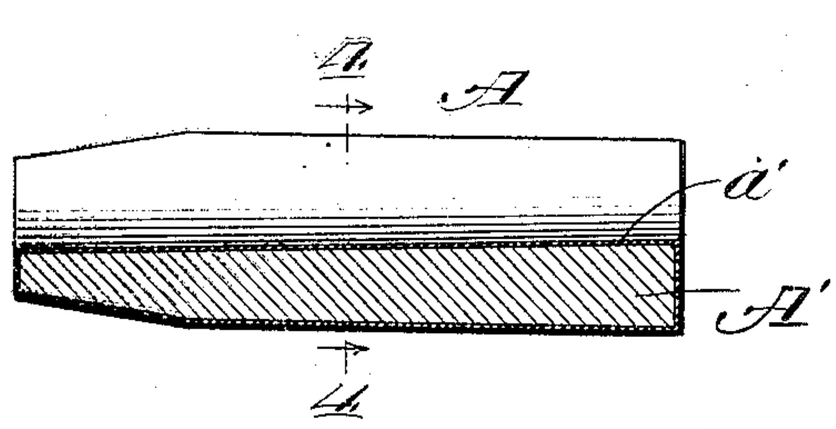
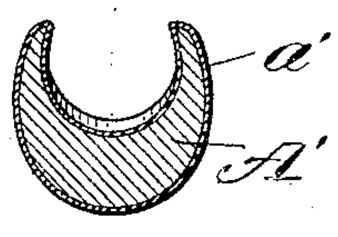


Fig. 4.



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UNITED STATES PATENT OFFICE.

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CHANNEL-PIN.

No. 822,168. Specification of Letters Patent. Patented May 29, 1906.

Application filed July 27, 1905. Serial No. 271,414.

To all whom it may concern:

Be it known that I, EUGENE W. VOGEL, a citizen of the United States, residing at Chicago, county of Cook, State of Illinois, have invented a certain new and useful Improvement in Channel-Pins; and I 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 pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates in general to improvements in electric connectors for uniting a wire or other small electric conductor to a larger conductor, and more particularly to a bonding-pin for securing a wire within a hole formed in a railroad-rail.

In connecting small electrical conductors to relatively large conductors it is customary to retain the ends of the small conductor in holes formed in a large conductor by means of wedge-shaped pins. In the art of railroad-signaling, for instance, the ends of adjoining rails are electrically connected by wire bonds inserted in holes in the rails and secured therein by channel-pins. The channel-pins are usually copper-coated, while the bond employed is ordinarily galvanized wire. The use of copper-coated channel-pins is objectionable for several reasons.

First. An imperfect electrical connection is formed between the bonding-wire and pins, owing to the portions adjacent the ends of the galvanized bonding-wire being rough and the pins being so hard that the rough points on the wire cannot be embedded therein.

Second. A poor electrical connection is formed between the rail and the pins, as the pins are so hard that when driven they do not completely fill the holes in the rails, and hence do not evenly contact with the walls of the holes.

Third. The ends of the bonding-wire deteriorate through electrolysis and break off. The copper on the pins and the zinc on the wires occupy different positions in the contact or galvanic series and constitute minute batteries when subjected to the moisture in the atmosphere and to salt-water drippings from refrigerating-cars, thereby soon eating off the ends of the bonds.

Fourth. The steel body portion of the pins rust through the copper coating when exposed to moisture, thereby rendering the pins useless. The pins are marketed in bags, and it is a frequent occurrence for entire bags of pins to be ruined by rust, it being impossible to remove the rust without also removing the copper coating.

The primary object of my invention is to provide a channel-pin which will form when driven into the holes in the rails a perfect electrical connection both with the ends of the bond and with the rails, thereby reducing the resistance in the track-circuits.

A further object of my invention is to provide a channel-pin having its surface which engages the bonding-wire of approximately the same contact potential as that of the portion of the wire with which it contacts.

A further object of my invention is to provide a channel-pin which will not deteriorate by rusting when exposed to the atmosphere.

A further object of my invention is to provide a channel-pin for uniting electrical conductors which will be simple in construction, inexpensive in manufacture, and durable and efficient in use.

My invention, generally described, consists of a channel-pin for uniting bonds to rails having a covering of tin or other soft metal of approximately the same contact potential as that of the portion of the bonding-wire which it engages.

My invention will be more fully described hereinafter with reference to the accompanying drawings, in which the same is illustrated as embodied in a convenient and practical form, and in which—

Figure 1 is a detail sectional view showing the channel-pin uniting the ends of a bonding-wire to a rail; Fig. 2, an enlarged plan view of the pin; Fig. 3, a sectional view on line 3 3, Fig. 2; Fig. 4, a sectional view on line 4 4, Fig. 3.

The same reference characters are used to designate the same parts in the several figures of the drawings.

Reference-letter A indicates a channel-pin adapted to surround the end of a bonding-wire C and tightly secure the same within a hole in the web of a rail B. The channel-pin is placed around the end of the bonding-wire, which is usually galvanized wire, and then driven into the hole in the web of the rail.

The channel-pin is composed of substantially U-shaped steel A′, one end *a* of which is tapered, so as to facilitate the insertion thereof in the holes in the rail-web. A channel-pin of the shape illustrated and described is well known in the art and forms in itself no part of my invention.

My invention consists in covering a bonding-pin—such, for instance, as a channel-pin—with a thick covering of soft metal, such as tin. The pin may be coated with tin in any suitable manner—such, for instance, as by the electroplating process.

The coating of tin on the convex portion of the channel-pin insures a uniform electrical connection between the pin and the rail inasmuch as the tin is so soft that when the pin is driven into the rail any unevenness in contact between the pin and the wall around the hole will result in portions of the tin being sheared off, as indicated at a^2, Fig. 1, so that the entire convex surface of the pin will be in contact with the metal around the hole in the rail.

The coating of tin on the concave surface of the pin permits the rough projections on the galvanized bonding-wire to be embedded therein as the pin is driven into the rail, thereby resulting in uniform contact between the bonding-wire and the entire concave surface of the pin. The coating of tin which engages the end of the bonding-wire is of approximately the same contact potential as the zinc on the galvanized bonding-wire, and consequently neither moisture of the atmosphere nor salt-water drippings from refrigerating-cars will cause the end of the bonding-wire to be eaten away, as is the case when the channel-pin is coated with copper or any other metal occupying a different position in the contact or galvanic series from the galvanized wire.

The coating of tin prevents the steel body portion of the pin rusting, and should any rust form on the tin coating it may be readily removed without injuring the tin coating.

While I have referred to tin specifically as the preferable metal to be used in coating the channel-pins, yet it is evident that my invention is not limited thereto, but includes a channel-pin coated with a soft metal of such thickness that the bonding-wire will be embedded therein and the convex surface will shear off when the pin is driven, thereby effecting a perfect electrical contact both between the pin and bonding-wire and between the pin and the rail. It is also obvious that in lieu of tin other soft metals might be used of approximately the same contact potential as that of the bonding-wire.

The phrase "approximately the same contact potential" is used in the specification and claims to designate metals occupying substantially the same position in the contact or galvanic series as distinguished from metals occupying positions so remote in the contact or galvanic series as to produce such galvanic action as would deteriorate the metals.

Having now fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A channel-pin for electrically securing a small conductor within a hole in a large conductor, comprising a body portion having a concave surface coated with a soft metal of a thickness to have embedded therein the engaged surface of the small conductor.

2. A channel-pin for electrically securing a small conductor within a hole in a large conductor, comprising a body portion, a concave surface, and a metal coating of approximately the same contact potential as the engaged surface of the small conductor.

3. A channel-pin for electrically securing a small conductor within a hole in a large conductor comprising a body portion, a concave surface, and a soft-metal coating of approximately the same contact potential as the engaged surface of the small conductor and of a thickness to have embedded therein the engaged surface of the small conductor.

4. A bonding-pin for electrically uniting conductors comprising a body portion covered with a coating of tin.

5. A channel-pin for electrically securing a small conductor within a hole in a larger conductor comprising a body portion having a concave surface coated with tin.

6. A channel-pin for electrically securing a small conductor within a hole in a large conductor, comprising a body portion having a convex surface coated with tin.

In testimony whereof I sign this specification in the presence of two witnesses

EUGENE W. VOGEL.

Witnesses:
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