

No. 697,890.

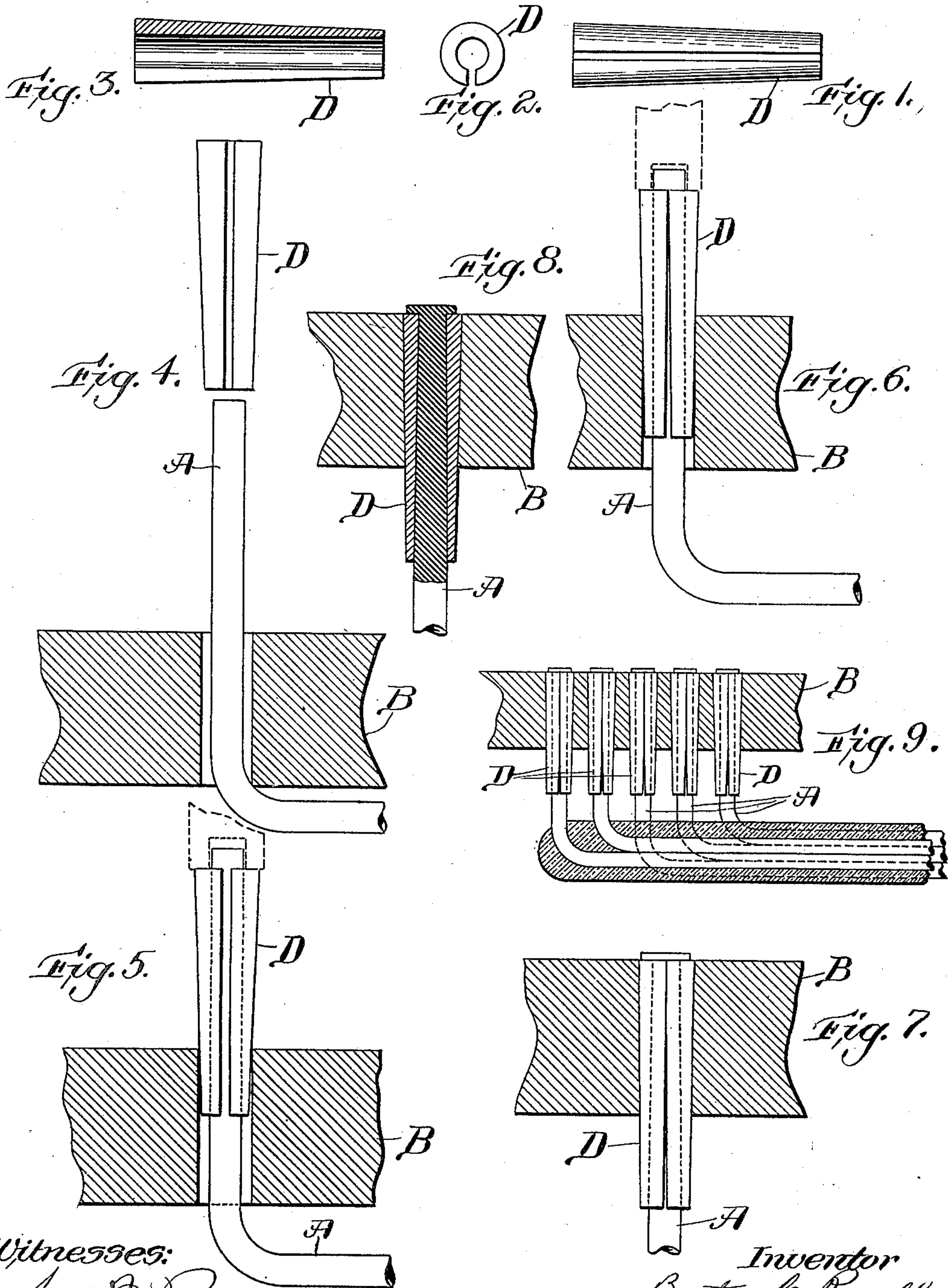
Patented Apr. 15, 1902.

B. C. ROWELL.

RAIL BOND.

(Application filed July 21, 1900.)

(No Model.)



Witnesses:

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UNITED STATES PATENT OFFICE.

BENTON C. ROWELL, OF CHICAGO, ILLINOIS.

RAIL-BOND.

SPECIFICATION forming part of Letters Patent No. 697,890, dated April 15, 1902.

Application filed July 21, 1900. Serial No. 24,364. (No model.)

To all whom it may concern:

Be it known that I, BENTON C. ROWELL, of Chicago, in the county of Cook and State of Illinois, have invented an Improved Rail-Bond, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figures 1, 2, and 3 are views of the sleeve which is the main feature of my invention. Fig. 4 shows the position of the parts when the workman is about to apply the bond by hand. Fig. 5 shows the position of the parts after the workman has applied the bond by hand and is ready to use the set and light hammer. Fig. 6 shows the bond as applied by the set and small hammer. Figs. 7 and 8 show the bond fully applied. Fig. 9 is a modification described below.

My invention is a rail-bond composed of a wire A or other conductor of electricity held to the rail B by means of a peculiar sleeve D, which has the following properties: First, it is of metal, such as iron or steel, hard enough to stand the blows of a hammer used to drive the sleeve into the hole in the rail; second, it tapers from end to end, and its smaller end is so much less in diameter than the hole in the rail that the sleeve can be easily inserted not only far enough to sustain the sleeve in place, but also to make it easy for the workman to get the end of the wire conductor through the hole in the rail and into the sleeve, as will be plain from Fig. 4, which shows the positions of the conductor A, rail B, and sleeve D as the workman is about to cover the end of the conductor A with the sleeve D; third, it has a cylindrical bore just a little greater in diameter than the diameter of the end of the conductor A, which fits loosely in and nearly fills the sleeve D, and, lastly, it is slotted along one side, the slot being wide enough to enable the sleeve to close upon and grip the end of the conductor with sufficient force to prevent even a capillary film of fluid from entering between the conductor A and the interior of the sleeve D, while the constriction of the rail B is such that a like film cannot enter between the exterior of the sleeve and the surrounding metal of the rail B.

The main advantages of my rail-bond are that it is applied very quickly and by work-

men who need no special training. A grip is obtained all around the wire with no shearing strain and without injury to the wire, no matter how hard the sleeve is driven, and the intimacy of contact of the inner surface of the sleeve with the wire and the outer surface of the sleeve with the rail is so complete as to exclude moisture. Indeed, I have soaked a short piece of iron (representing the web of a rail) with one of my sleeves driven into a hole through the iron, after inserting a conductor-wire in the sleeve, in acid for two days and then sawed through the bond lengthwise of the sleeve and could not detect with a powerful glass any appearance of rust or moisture, and it was also impossible to find any sign of imperfection in the joint between the outer surface of the sleeve and the web in which it was driven or between the inner surface of the sleeve and the conductor-wire.

In practice I make the inner diameter of sleeve D about one-thousandth of an inch greater than the diameter of the ends of the bond-wire A and the outer diameter of the sleeve D at its large end about one-sixteenth of an inch larger than the hole bored in the web of the rail and the taper such that the sleeve D can be inserted in the hole bored in the rail about one-quarter of its length, as in Fig. 5. Then the workman uses a set (indicated by dotted lines) and a light hammer and drives sleeve D until the sleeve gets a firm grip on the conductor-wire and also is well constricted by the rail, as in Fig. 6. Then another workman with a larger hammer drives the sleeve home, upsetting the end of the conductor-wire, which protrudes slightly from the sleeve. Three workmen are usually employed, the first drilling holes in the rail, the second inserts the sleeve and conductor-wire and uses the set and light hammer, and the third uses the larger hammer to drive the sleeve home. This insures that the surface of the bore in the rail shall be free from rust or dirt. I also plate the sleeves with a thin film of copper to insure freedom from rust. The slot is completely closed when the sleeve is driven home, except near the small end, and even there the opening is scarcely visible. There seems to be no sign of any fin from the conductor-wire entering the slot; but it is difficult to

say whether such a fin is formed or not, for the surfaces in contact seem to be cold-welded, including the sides of the slot, for the greater part of its length, as well as the ends
5 of the conductor and sleeve and the sleeve and web.

The web of the rail is in some cases too thin to give the desired area of contact between the outer surface of the sleeve and the
10 inner surface of the bore, and in those cases I solder other wires to the bond and use a sleeve for each additional wire, as shown in Fig. 9, thereby obtaining any desired area of contact between the sleeve and the web, for
15 the effective area of contact is the area of contact between one sleeve and the web multiplied by the number of sleeves used.

I am aware of the patents to Wheeler, No. 449,721, dated April 7, 1891; to Benson, No. 20 568,713, dated September 29, 1896, and to Orcutt, No. 434,943, dated August 26, 1890, and disclaim all shown in them. The driving-head and the two jaws of Wheeler's sleeve cause the outer ends of the jaws to grip and cut into the
25 conductor and prevent the uncut head from gripping the conductor, the result being that that part of the conductor in the tapered part of the Wheeler sleeve becomes a conical frustum connected by its small end with the
30 body of the conductor. The sleeve of Orcutt, whether in two parts or one, operates first to cut into the conductor, much like Wheeler's, producing the same conical frustum on that part of the conductor within the small end of
35 the sleeve. Benson's sleeve is a practical improvement on Wheeler and Orcutt, inasmuch as it makes that part of the conductor within the Orcutt sleeve a conical frustum connected by its large end with the conductor; but to
40 do this Orcutt's sleeve must be driven into the web of the rail from the conductor side of that web and must have a flanged head so

thick that the inner or head end cannot cut into the conductor.

My sleeve grips the conductor more severely 45 at its larger end than at its smaller end, and therefore that part of the conductor within the whole length of my sleeve is made a conical frustum, connected to the conductor by its large end or base, for when my sleeve is 50 driven with the heavy hammer the slot is prevented from wholly closing at the small end by the resistance of the conductor, but is wholly closed at the large end, thereby changing the bore of my sleeve from a cylinder to 55 a frustum of a cone, with its large end on that side of the web from which the conductor extends, and also compressing all that part of the conductor within the bore of my sleeve with enormous force, but decreasing toward 60 the small end of my sleeve—that is, at its maximum at the large end and minimum at the small end of my sleeve—and my sleeve itself is constricted with enormous force by the bore into which it is driven, that force 65 being at the minimum at the small end and at the maximum at the large end. There is nothing resembling this result in either Wheeler, Orcutt, or Benson.

What I claim as my invention is— 70

In a rail-bond a headless sleeve of hard metal tapered from end to end with its smaller end of smaller diameter and its larger end of greater diameter than the bore into which the sleeve is to be driven, having a cylindrical 75 bore of slightly greater diameter than that of the conducting-wire, and slotted from end to end, all substantially as and for the purposes specified.

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Witnesses:

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