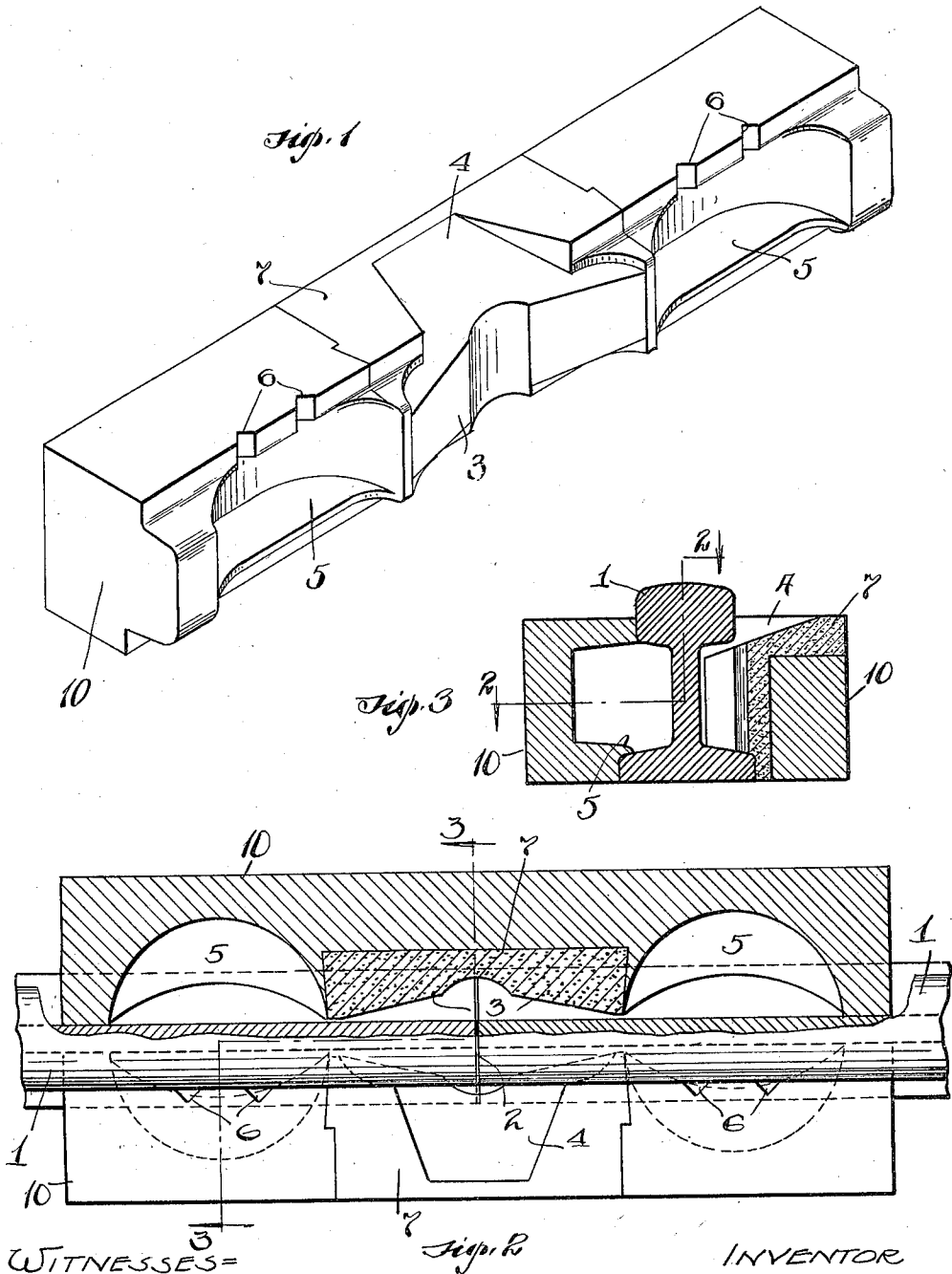


W. E. HUBER.
 APPARATUS FOR BONDING RAILS AND THE LIKE.
 APPLICATION FILED DEC. 7, 1916.

1,312,401.

Patented Aug. 5, 1919.

2 SHEETS—SHEET 1.



WITNESSES=
 O. M. Kappeler
 Thos. H. Fay

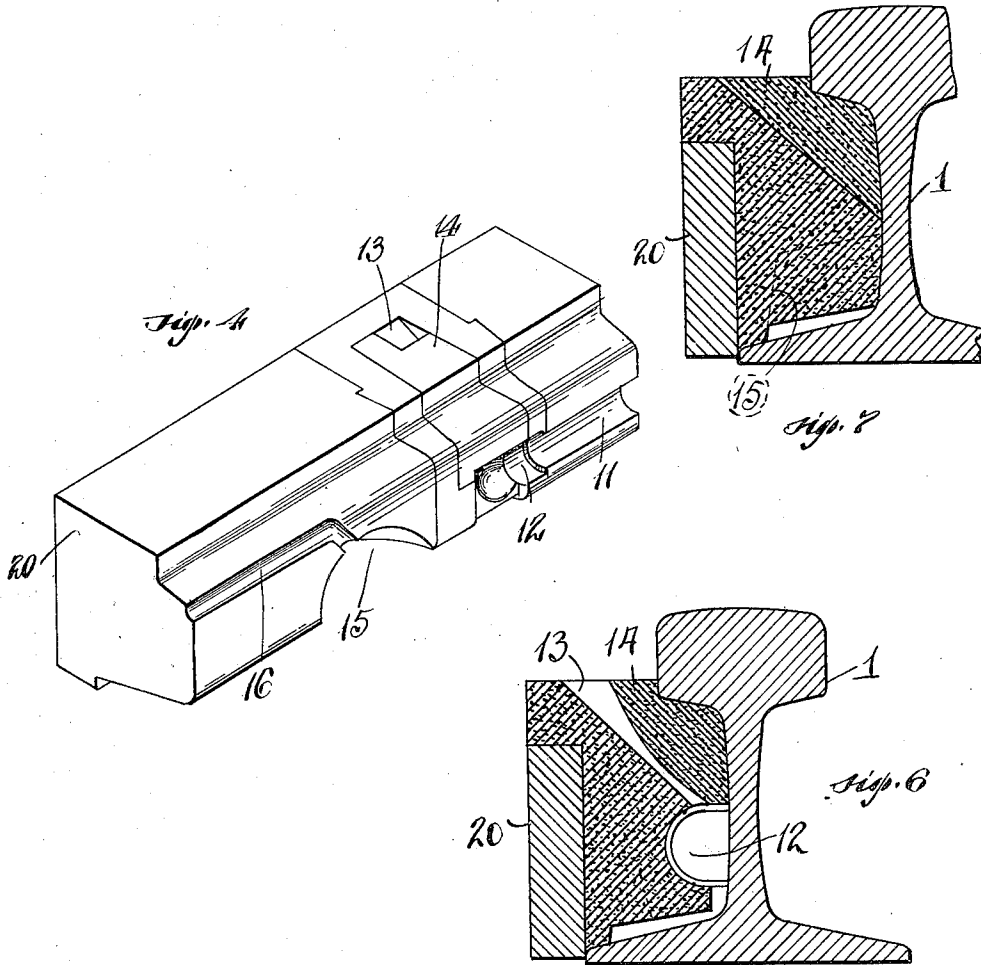
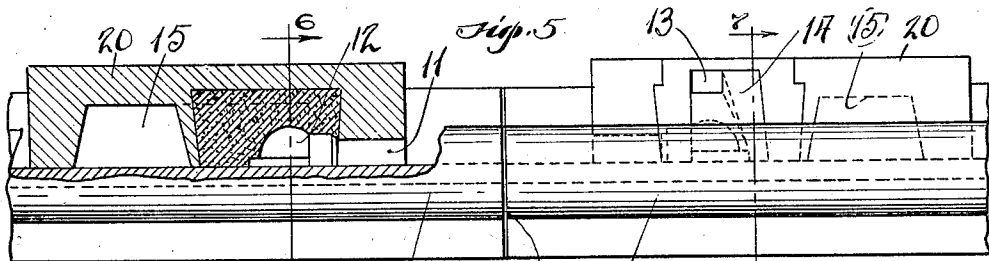
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UNITED STATES PATENT OFFICE.

WILLIAM E. HUBER, OF EAST CLEVELAND, OHIO, ASSIGNOR TO THE ELECTRIC RAILWAY IMPROVEMENT COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

APPARATUS FOR BONDING RAILS AND THE LIKE.

1,312,401.

Specification of Letters Patent.

Patented Aug. 5, 1919.

Application filed December 7, 1916. Serial No. 135,632.

To all whom it may concern:

Be it known that I, WILLIAM E. HUBER, a citizen of the United States, and a resident of East Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Apparatus for Bonding Rails and the like, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The subject of the present invention is an electric rail splice. In bonding the return circuit and positive feeders consisting of the rails on electric roads, it is, in most cases, impossible to use a rigid connection between the rail ends and therefore flexible connectors in the form of the so-called bonds, consisting of cables of flexible wires, have been used for this purpose. Flexibility is an essential of such a connection under the ordinary circumstances in order to allow for the expansion and contraction of the rails under temperature changes. In subway construction, however, where temperature changes are relatively small, and on third rail feeders which are mounted on insulators and are usually free to slide in said insulators, I have conceived the idea of forming a solid connection between the abutting rail ends. The present invention is intended for this purpose and has been designed to provide a homogeneous juncture between the rail ends, which may be accomplished as above stated or by homogeneously joining a conductor at each end to the contiguous ends of the rail. To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain means and one mode of carrying out the invention, such disclosed means and mode illustrating, however, but one of various ways in which the principle of the invention may be used.

In said annexed drawings:—

Figure 1 is a view in perspective of a mold used in carrying out my improved process; Fig. 2 is a plan view, partially in section showing two abutting rail ends, on either side of which are placed molds of the

character shown in Fig. 1; Fig. 3 is a transverse section on the line 3—3 in Fig. 2; Fig. 4 is a view similar to Fig. 1 but showing a modified form of the mold for use in joining a previously formed conductor to a rail; Fig. 5 is a plan view, partially in section showing two abutting rail ends against which are placed two of the molds of the character shown in Fig. 4; Fig. 6 is a section on the line 6—6 in Fig. 5; and Fig. 7 is a similar section on the line 7—7 in Fig. 5.

In Fig. 2 there are shown two adjacent rails 1 having their ends in abutment, and it will be understood that in case the ends of the rails are not in contact when it is desired to apply the connection, then a thin sheet 2 of asbestos or similar material softer than the adjacent rails may be slipped between the same to form a continuous surface against which a mold may be placed. In order to form the connection between the rail ends I place a mold 10 against the two abutting rail ends, such mold being provided with a main body portion having a recess 3 open at its top and connecting with a pouring sprue 4 at its top. The form of the chamber or recess 3 can best be seen from Fig. 1, and it will be noticed that the pouring sprue is of substantially the same width as the recess, the recess being of course of the desired shape of the completed connection between the rail ends. At either end this recess opens into an adjacent chamber or recess 5 constituting an overflow reservoir for any excess of molten metal which may be poured into the main recess lying between these two spaced overflow chambers. Each of the latter is provided with vents or air openings 6 at its top as indicated.

The molten metal is poured into the recess 3, and at first runs out of this recess into the overflow chambers at either side, thus contacting and heating the surfaces of the rail ends and bringing the same to high temperature so that as the metal accumulates in the chamber 3 the rail ends are at a temperature adapting them to be fused with the molten metal and to be homogeneously joined thereto. In this method of joining the adjacent rail ends the molten metal is used to preliminarily heat the rails to the desired temperature, the last step be-

ing the retaining of a desired body of the molten metal against such preliminarily heated portions of the rails, thus effecting a homogeneous union between the two.

5 When the mold is removed the excess metal in the overflow chambers may be cut through at the point of connection to the metal in the main chamber, and can then be removed from the rail, and when this metal is so

10 removed the homogeneity of the union of the metal closely adjacent to the main body can be seen, thus furnishing an indication of the thoroughness of the union between the main body of the metal and the rail

15 ends. The metal may be melted in any desired manner and in any suitable kind of apparatus, such for example as a coke, kerosene or electrical furnace, and it has been found that a joint formed in this man-

20 ner is stronger at the point of union between the copper and the iron of the rail than is the copper itself, copper being of course the usual metal employed for this purpose.

The main or central chamber or recess in

25 the mold is preferably formed in the side of a removable member 7 which is preferably slidably inserted in a suitable recess in the side of the main body of the mold, which is preferably iron or some similar heat-con-

30 ducting material. This removable member is preferably formed of a heat-insulating material, such for example as carbon, graphite or the like, and in this way the body of metal in the main chamber is main-

35 tained at a relatively high temperature, while the metal in the overflow recesses is cooled, by reason of the radiation of the heat therefrom, and thus does not homogeneously join the metal of the rail, and can be more

40 readily removed. Furthermore, in this manner the cost of the mold can be reduced and its life increased, as should the main chamber become worn it can be readily removed and a new member inserted, thus providing

45 a clearly cut chamber or mold proper at all times.

In some cases it is desirable to attach a previously formed conductor at the ends to abutting rail ends, and a mold for carrying

50 out the present process in this connection is shown in Figs. 4 to 7. Such a mold 20 is provided with a lateral recess or slot 11 in which the end of the bond terminal or conductor may be inserted, the terminal por-

55 tion of such conductor being received in the recess 12 about which there is a certain amount of space for the pouring of the molten metal. This molten metal may be poured onto the terminal through a pouring

60 sprue 13 in which is provided a removable member 14 closing off the greater part of the pouring sprue and forming a practically closed chamber about the terminal of the conductor. Located adjacent to the conduc-

65 tor receiving chamber in the mold is an over-

flow chamber or recess 15 into which the excess metal flows beneath the member 14 and the central part of the mold, and which is connected with the atmosphere by means of a vent 16.

In use two molds of this type will be used, one for either end of the conductor, and these molds will be placed as shown in Fig. 5. The lateral slots will be formed to receive snugly the conductors and thus prevent the escape of metal through this slot, and the action will be seen to be substantially as in the process in which the molds already described are used, namely, molten metal is poured into the main molding cham-

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ber over the surface of the rail which is to be connected, and in this case also over the terminal which is to be attached to the rail, thus heating these metals to a high temperature when a certain amount of molten metal is retained in such chamber for the purpose of constituting the connection between the bond terminal and the rail.

My improved method of forming an electric rail splice, together with the apparatus for carrying out the same, are a considerable improvement by reason of their convenience, and operate to afford an extremely close and intimate juncture between the connecting metal and the rail ends, although if neces-

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sary the bond or connection can be removed by cutting the same from the rail, whereas were the rail ends welded together there would be considerable difficulty met with in severing the ends of the adjacent rails in case of a wreck, when it might be necessary to remove one or more lengths of rail. The preferred metal for forming the union is, of course, copper, as to use iron would be to make a very bulky joint whereas copper

strips of the cross sectional area indicated, approximate a conductivity equal to that of the rail.

Other forms may be employed embodying the features of my invention instead of the one here explained, change being made in the form or construction, provided the elements stated by any of the following claims or the equivalent of such stated elements be employed, whether produced by my preferred method or by others embodying steps equivalent to those stated in the following claims.

I therefore particularly point out and distinctly claim as my invention:—

1. Means for forming a rigid conductor across contiguous faces of two abutting rail ends comprising a mold having a lateral recess therein, an entrance sprue in the top of said mold leading to such recess, said mold having other lateral recesses disposed at either side of such first-named recess, egress sprues connecting such first-named recess with such other recesses thereby constituting the latter overflow reservoirs, said

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mold having air vents leading from such other recesses.

2. Means for forming a rigid conductor across contiguous faces of two abutting rail ends comprising a mold having spaced lateral recesses therein, and a member removably mounted in said mold intermediate such recesses, said member having a recess therein and egress sprues connecting the same with such spaced recesses, thereby constituting the latter overflow reservoirs.

3. Means for forming a rigid conductor across contiguous faces of two abutting rail ends comprising a mold having spaced lateral recesses therein, and a member removably mounted in said mold intermediate such recesses, said member having a recess therein and egress sprues connecting the same with such spaced recesses, thereby constituting the latter overflow reservoirs, said mold having air vents leading from such spaced recesses.

4. Means for forming a rigid conductor across contiguous faces of two abutting rail ends comprising a mold having spaced lateral recesses therein, and an infusible member removably mounted in said mold intermediate such recesses, said member having a recess therein and egress sprues connect-

ing the same with such spaced recesses, thereby constituting the latter overflow reservoirs.

5. Means for forming a rigid conductor across contiguous faces of two abutting rail ends comprising a mold of heat conducting material having spaced lateral recesses therein; and a member of relatively poor heat conducting material mounted in said mold intermediate such recesses, said member having a recess therein and egress sprues connecting the same with such spaced recesses, thereby constituting the latter overflow reservoirs.

6. Means for forming a rigid conductor across contiguous faces of two abutting rail ends comprising an iron mold having spaced lateral recesses therein, and a carbon member mounted in said mold intermediate such recesses, said member having a recess therein and egress sprues connecting the same with such spaced recesses, thereby constituting overflow reservoirs.

Signed by me, this 6th day of December, 1916.

WILLIAM E. HUBER.

Attested by—

GERALD HOWATT,
JOHN G. KJELLGREN.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."