

No. 751,910.

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R. T. GUNN & E. C. HATHAWAY.  
COMBINED RAIL JOINT AND BOND.

APPLICATION FILED DEC. 23, 1903.

NO MODEL.

Fig. 1.

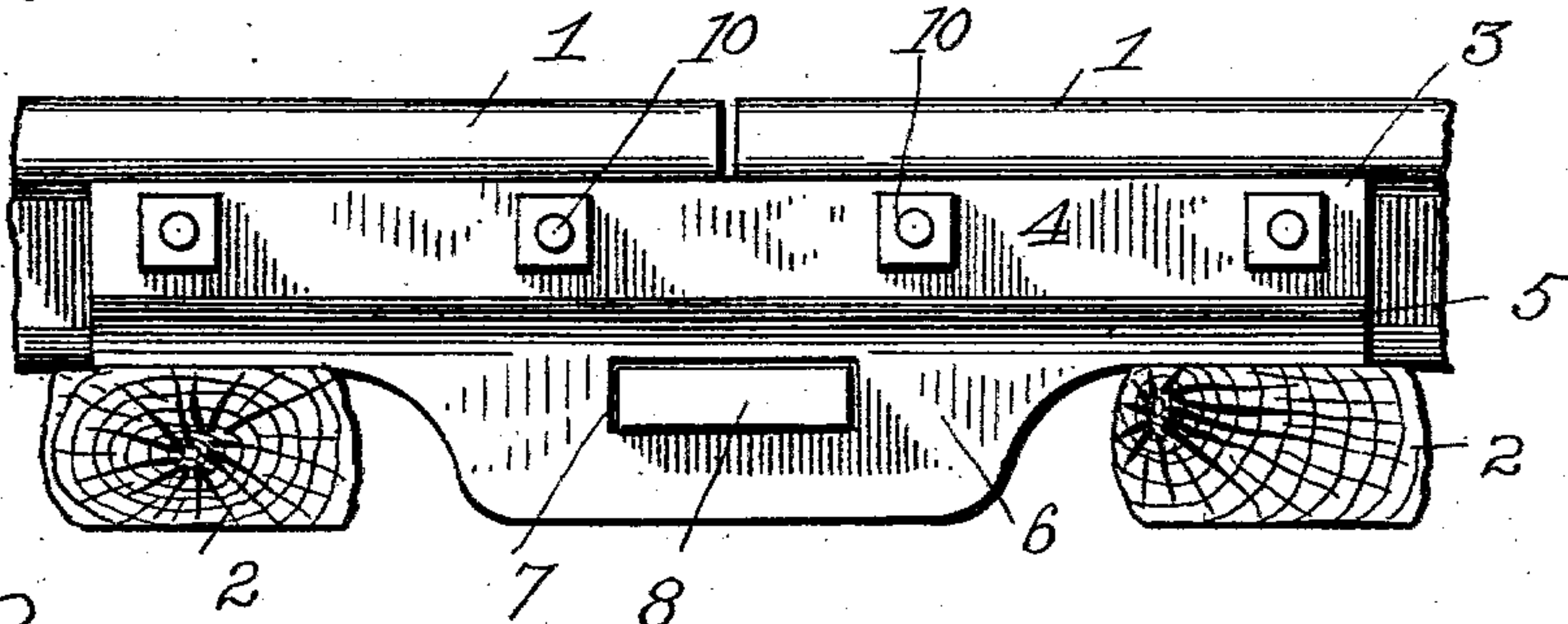


Fig. 2.

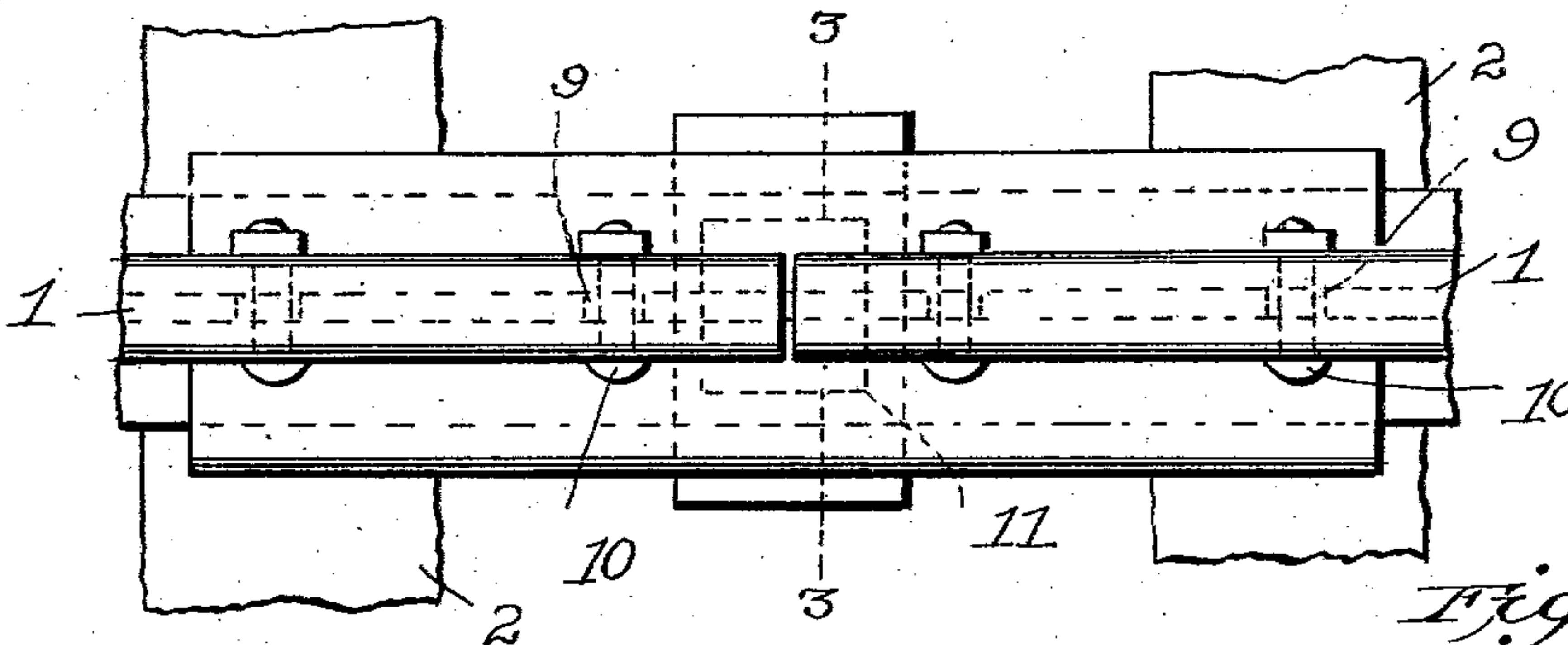


Fig. 3.

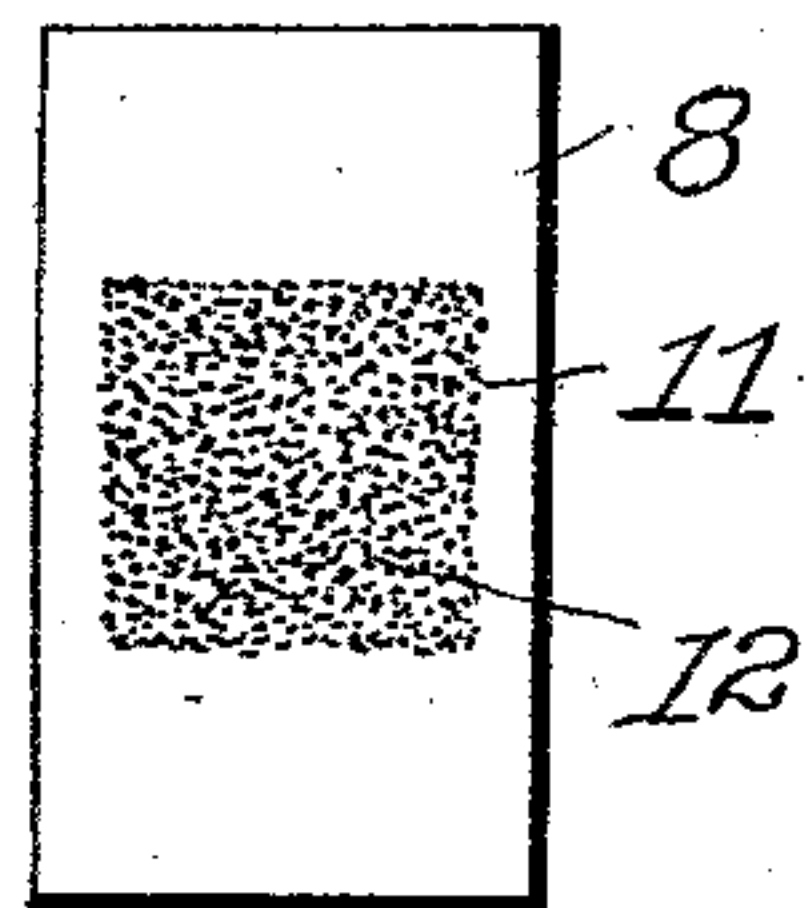
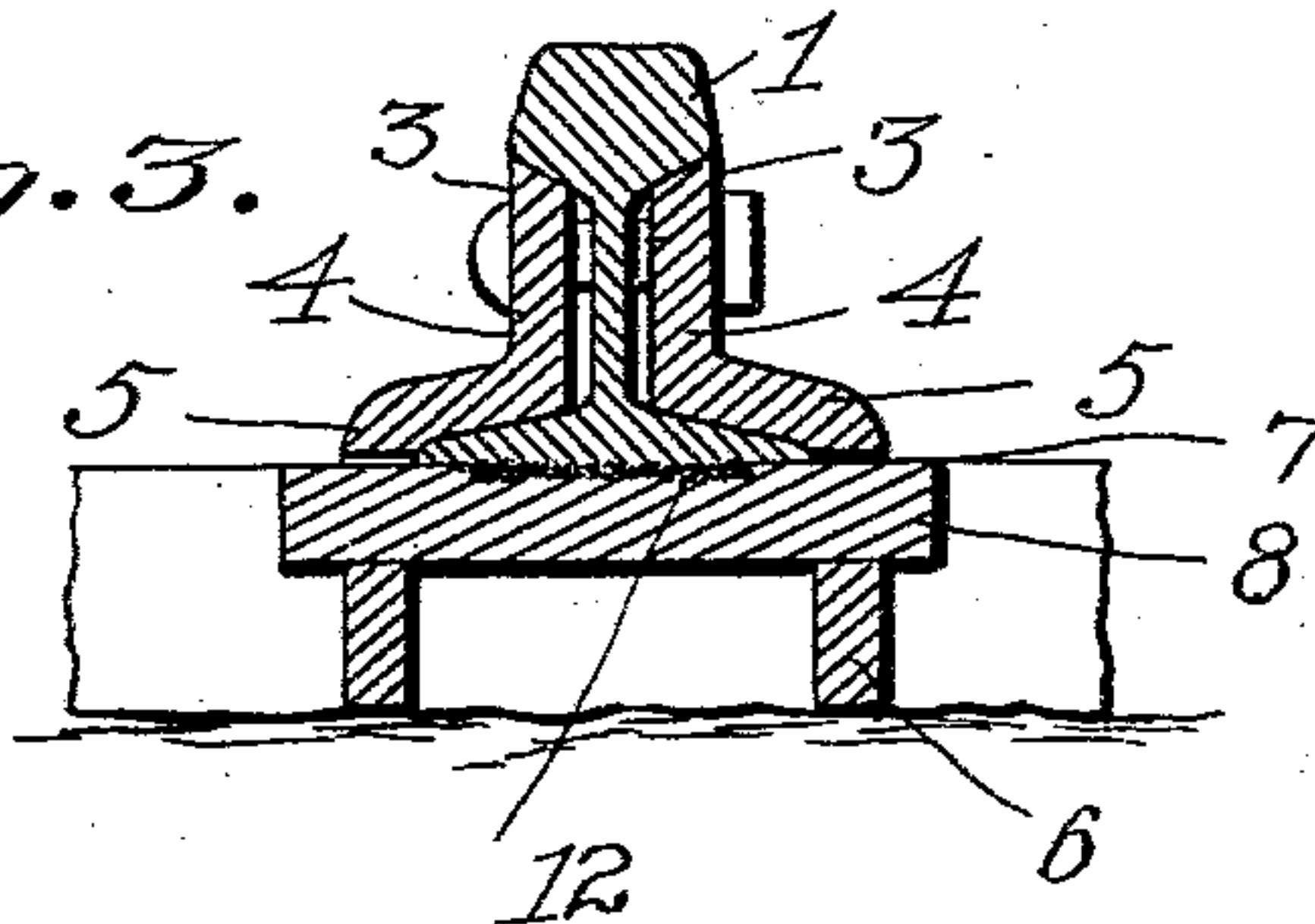


Fig. 4.

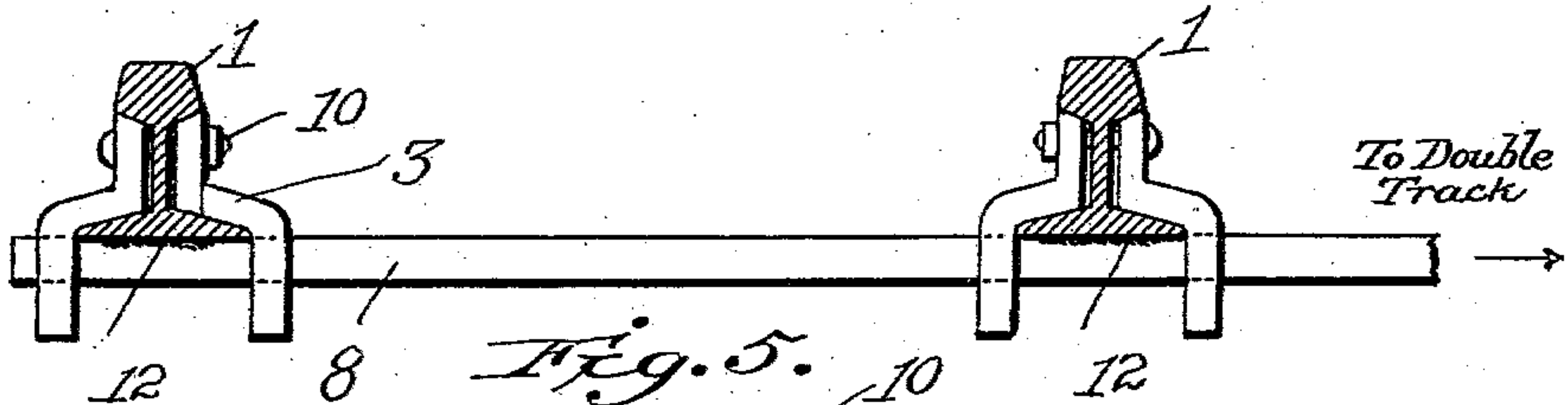
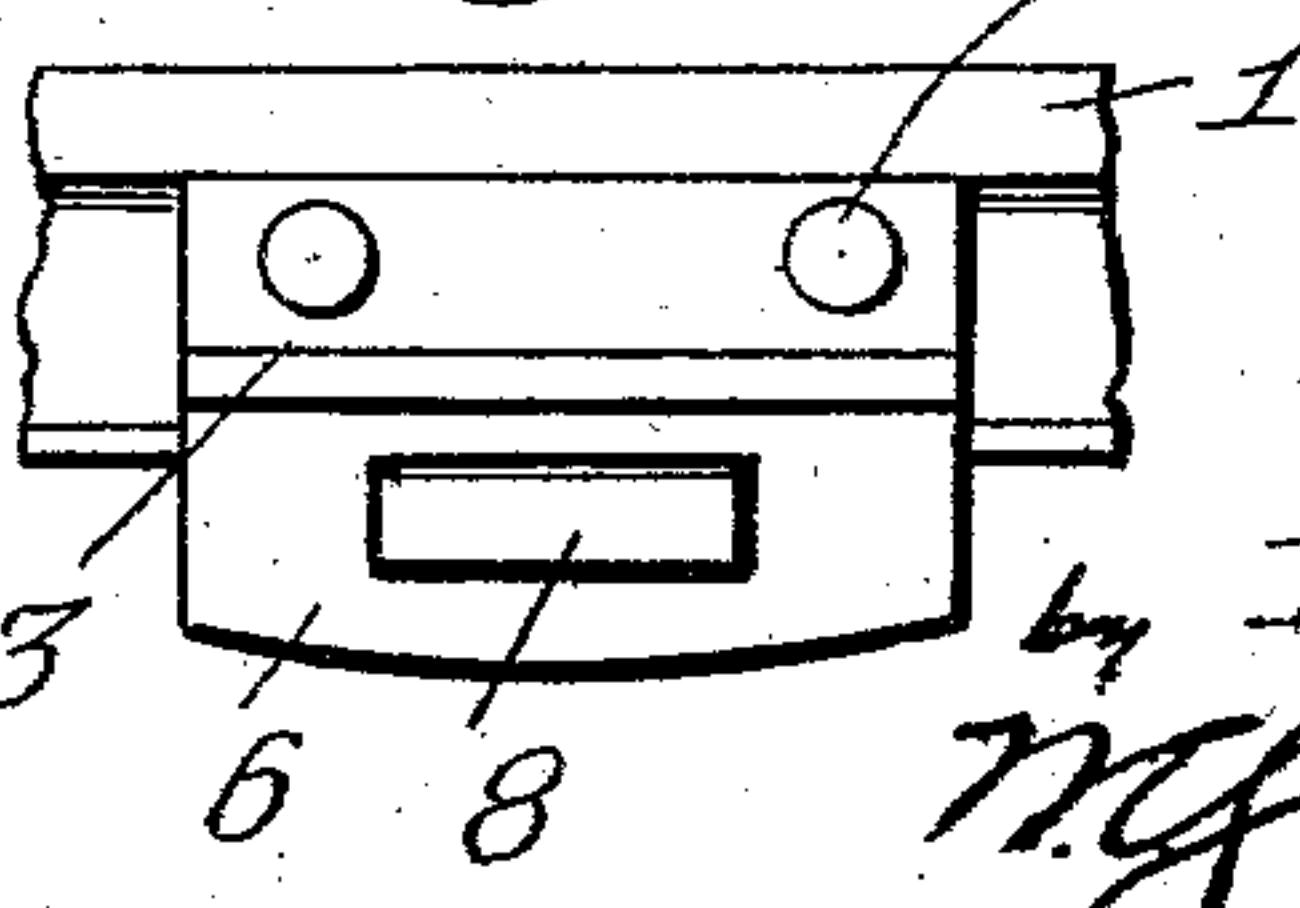


Fig. 5.



WITNESSES

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# UNITED STATES PATENT OFFICE.

ROBERT T. GUNN AND EDWIN C. HATHAWAY, OF NORFOLK, VIRGINIA.

## COMBINED RAIL JOINT AND BOND.

SPECIFICATION forming part of Letters Patent No. 751,910, dated February 9, 1904.

Application filed December 23, 1903. Serial No. 186,367. (No model.)

*To all whom it may concern:*

Be it known that we, ROBERT T. GUNN and EDWIN C. HATHAWAY, citizens of the United States, residing at Norfolk, in the county of Norfolk and State of Virginia, have invented certain new and useful Improvements in a Combined Rail Joint and Bond, of which the following is a specification.

Our invention relates to an improvement in a combined rail joint and bond of the suspension kind, and is provided with a cross-bar, key, or pin which engages the under side of the rails and at the same time forming and preserving a bond for the electric current to pass from one rail to the next without the use of extra bonding strips, wires, &c., and thereby making a cheap and quickly-applied construction hidden from view and at the same time holding the several parts rigidly together and preserving a certain amount of spring or resiliency to take the usual shock due to the running of trains over the juncture of the rails.

Our invention comprises novel features of construction and relation of parts which will be hereinafter more fully described, and specifically pointed out in the claims.

Reference is had to the accompanying drawings, forming a part of this specification, in which similar reference-numerals indicate corresponding parts throughout the several figures.

Figure 1 is a side elevation of our improved combined rail joint and bond. Fig. 2 is a plan of the same. Fig. 3 is a cross-section taken on the line 3 3 of Fig. 2. Fig. 4 is a view showing our improvement applied to bonding one track to another or one set of rails to the adjacent set of rails of a double-track system. Fig. 5 shows a side view of one of the short clamping-sections used in Fig. 4. Fig. 6 is a detail plan view of the key or cross-bar, showing the amalgam in place.

In view of the fact that electricity is being largely introduced as a motive power, in some instances replacing steam, it has now become the custom to bond or electrically connect track-rails even in constructing railways which are designed to employ steam as a motive power, as the rails in the meantime may

be used as circuits in electric signals of the block system and other similar uses.

Bonds or electrical connections for track-rails have usually been adjusted or secured in place independently of the fish-plates or angle-plates or other parts used to form the rail-joints, and in all constructions with which we are familiar the conductivity of the bonded joints depends on the care with which the parts forming the bond are cleaned before they are secured together and in the perfectness of contact secured between the copper conductors and the steel rails and the carrying capacity of the copper conductors.

The especial object of our present invention is to provide a combined rail joint and bond which may be secured in place by a single operation which will not require the changing of the forms of existing rolls used in the manufacture of the fish-plates or other parts of the combined joint and bond. Furthermore, the construction will not require the necessity of boring more holes in the web of the rail, extra bonding-strips or care in cleaning the parts of the joint or bond before they are secured together, thus doing away with the expense of employing high-salaried artisans and expensive chemicals, and which will likewise prevent oxidation of the meeting faces, thereby always preserving perfect contact between the ends of the rails and the cross-bar, key, or pin forming part of the joint and bond.

Referring to the drawings, 1 1 indicate the ends of the rails to be joined and bonded. 2 2 are the ties supporting the abutting ends of the rails, and 3 3 are fish-plates, each of which is so bent as to form fish-plate sections 4 4, which lie on each side of the rail ends, and between the head and base of the rail said rail ends are provided with openings 9 9 for the passage of securing means, as bolts 10 10.

5 5 are central and integral extensions resting on the upper sides of the bases of the rail ends.

6 6 are further extensions from the central section 5 5, which extend downwardly outside the rail-base and of such a width so as to pass between the ties 2 2. The extensions 6 6



are provided with slots or openings 7 7 for the insertion of a cross-bar or key 8. This opening or slot 7 and key 8 are so proportioned and adjusted as to have the under side of the rail-base firmly rest on the upper side of the cross-bar, as indicated in Fig. 3. The key or cross-bar is provided at its central section with a slight depression or pocket 11 sufficient in width and length to overlap the abutting ends of the rails, and in this pocket is placed a small quantity of amalgam or other electric-current-conducting paste 12.

While we have shown a depression or pocket, this is not absolutely essential to the invention, as the paste may be simply spread on the upper side of the key before inserted in the slots or keyways, and the key or cross-bar 8 may be copper-plated before being inserted, or the under side of the bases of the abutting rails may be copper-plated for two inches and used in combination with a copper-plated key or cross-bar.

The manner of assembling and securing our combined rail joint and bond in position is as follows: The cross-bar or key being copper-plated or not and provided with paste on its upper side or recess is placed under the abutting ends of the rails. Then the fish-plates are placed on each side of the rails, having the ends of the key resting in the slots or openings of the downward extensions. The bolts are then passed through the openings of the fish-plates and the web of the rails, and when the bolts are tightened the different parts will assume the positions as shown in Fig. 3 of the drawings, the key or cross-bar being firmly held in place and supporting the ends of the rails from sagging and at the same time acting as an electric bond for the current in passing from one rail to the next.

From the above it will be seen that we have formed a compact, cheap, and reliable joint and bond which cannot be tampered with or any of its parts easily stolen and at the same time preventing any oxidation of the under side of the rail-bases and upper side of the key, thereby insuring constantly a good contact between the rail ends and cross-bar or key.

Figs. 4 and 5 show our invention as applied to making an electrical connection or bond transversely between one track with the adjoining track, or, if desired, may be further extended and connect all four rails of a double-track system, and consists simply in making the cross-bar or key of such a length as to reach from the outside rail across the track to the adjoining track and having only a small patch of amalgam paste at the sections which are directly under the rail-base of each track. It is not necessary that the last construction be attached at the abutting ends of the two rails, as they may be placed intermediate the two ends of a rail, as shown in Fig. 5.

We have found by experiment in passing a current of twenty-four amperes through a combined joint and bond constructed in accordance with our invention that the voltmeter shows no drop in the voltage whatever. At one hundred amperes there is a drop of one hundredth of one volt in passing through the bond. With a current of one hundred and eighty amperes passed through a five-foot section of track including one of our combined rail joints and bonds the voltmeter indicated a drop of eleven-hundredths of one volt, clearly indicating that the joint and bond have less resistance than the same length of rail alone for the reason that the area of contact is seventeen square inches with a rail having a base of four and one-quarter inches wide, while in the usual copper-rod bond the area of contact in the bored holes is usually about one and one-half square inches.

What we claim, and desire to secure by Letters Patent, is—

1. A combined rail joint and bond consisting of two abutting rail ends, fish-plates having upper and lower flanges normally in contact with the head and base of the rail ends, fastening means passing through the said fish-plates and webs of the rail ends, a downwardly-extending section on each of the lower flanges passing below the abutting rail-bases and between the supporting-ties for the rails and provided with an opening or slot, a key supported in said slots, and a layer of electric-current-conducting paste situated between the upper side of the key and under side of the rail-bases, substantially as set forth.
2. A combined rail joint and bond consisting of the abutting rail ends, fish-plates having upper and lower flanges resting against the head and base of the rail ends, fastening means passing through the said fish-plates and webs of the rail ends, a downwardly-extending section on each of the lower flanges passing below the abutting rail-bases and between the supporting-ties for the rails and provided with an opening or slot, a key supported in said slots, and a layer of amalgam paste situated between the upper side of the key and the under side of the rail-bases, substantially as set forth.
3. A bond for electric railways and the like, consisting of a rail, plates fastened on each side of rail and having upper and lower flanges, fastening means passing through said upper flanges and web of the rail, a downwardly-extending section on each of the lower flanges passing below the rail-base and provided with an opening or slot, a key supported in said slots, and a layer of electric-current-conducting paste situated between and in intimate contact with the upper side of the key and under side of the rail-base, substantially as set forth.
4. A combined rail joint and bond consist-



ing of two abutting rail ends, fish-plates having upper and lower flanges normally in contact with the head and base of the rail ends, fastening means passing through the said fish-plates and webs of the rail ends, a downwardly-extending section on each of the lower flanges passing below the rail-bases and between the supporting-ties for the rails and provided with an opening or slot, a key having a depression on its upper side and supported in said slots, and a layer of electric-current-conducting paste in said depression and in contact with the under side of the rail-bases, substantially as set forth.

5. A combined rail joint and bond consisting of two abutting rail ends, fish-plates having upper and lower flanges normally in contact with the head and base of the rail ends, fastening means passing through the said fish-plates and webs of the rail ends, a downwardly-extending section on each of the lower flanges passing below the abutting rail-bases and between the supporting-ties for the rails and provided with an opening or slot, a copper-plated key supported in said slots and a layer of amalgam paste in contact with the upper side of the key and under side of the abutting rail-bases, substantially as set forth.

6. A combined rail joint and bond consisting of two abutting rail ends having the under side of their bases copper-plated, fish-plates having upper and lower flanges normally in contact with the head and base of the rail ends, fastening means passing through

the said fish-plates and webs of the rail ends, a downwardly-extending section on each of the lower flanges passing below the abutting rail-bases and between the supporting-ties for the rails and provided with an opening or slot, a copper-plated key supported in said slots, and in contact with the under side of the abutting rail-bases, substantially as set forth.

7. A combined rail joint and bond consisting of two abutting rail ends, fish-plates having upper and lower flanges normally in contact with the head and base of the rail ends, fastening means passing through the said fish-plates and webs of the rail ends, a downwardly-extending section on each of the lower flanges passing below the abutting rail-bases and between the supporting-ties for the rails, an opening or slot in each of the said downwardly-extending sections, a key or cross-bar supported in said openings or slots and in contact with the under side of the abutting rail-bases, and means between the upper side of the key or cross-bar and the under side of the abutting rail-bases to prevent oxidation of the contacting surfaces of said key and rail-bases, substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

ROBERT T. GUNN.

EDWIN C. HATHAWAY.

Witnesses:

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W. C. BAKER.