W. P. & S. G. THOMSON.

RAIL JOINT.

APPLICATION FILED JULY 3, 1909.

1,011,095. Patented Dec. 5, 1911.

2 SHEETS—SHEET 1.

Fig. 1. *Fig. 2.* *Fig. 3.* *Fig. 4.*

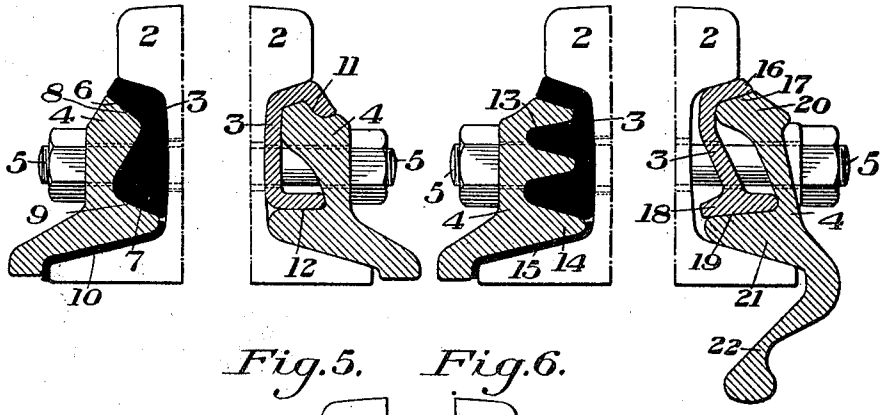


Fig. 5. *Fig. 6.*

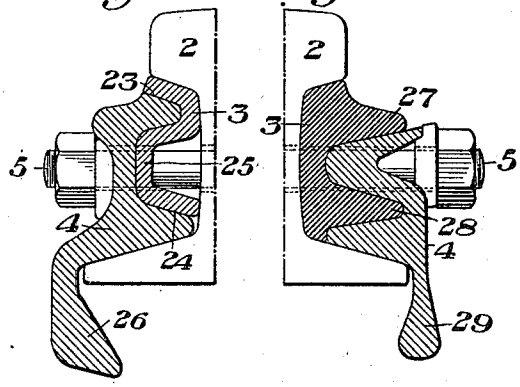
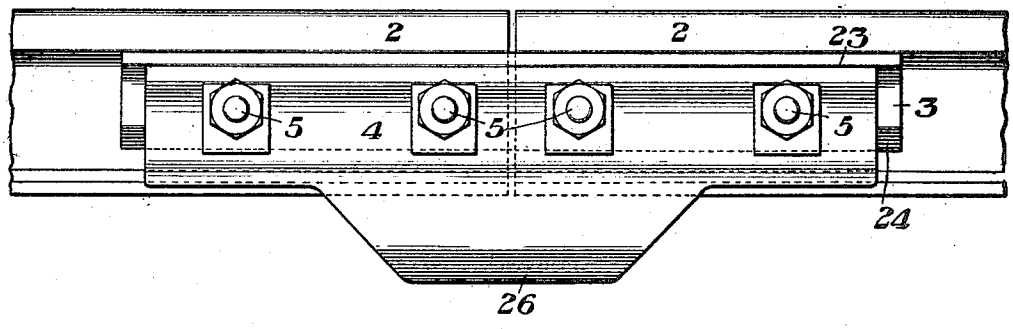


Fig. 7.



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2 SHEETS—SHEET 2.

Fig. 8.

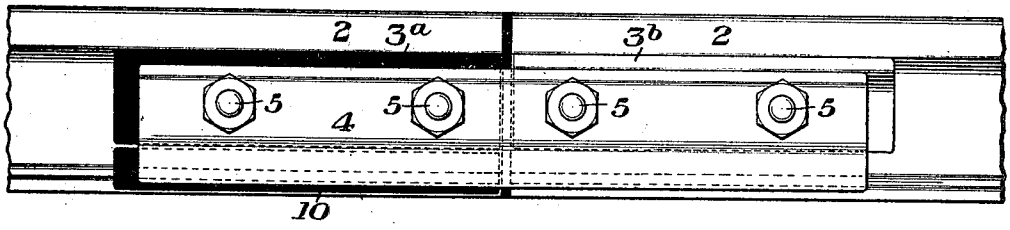


Fig. 9.

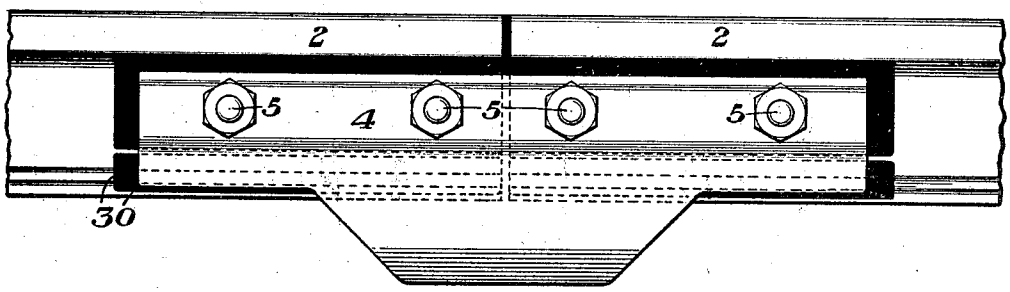
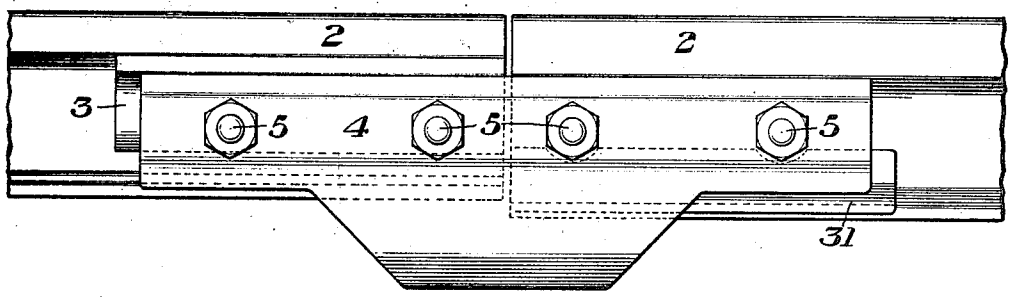


Fig. 10.



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UNITED STATES PATENT OFFICE.

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RAIL-JOINT.

1,011,095. Specification of Letters Patent. Patented Dec. 5, 1911.

Continuation of application Serial No. 469,853, filed December 29, 1908. This application filed July 3, 1909. Serial No. 505,928.

To all whom it may concern:

Be it known that we, WILLIAM P. THOMSON and SAMUEL G. THOMSON, residents of Philadelphia, Philadelphia county, Pennsylvania, have invented a new and useful Improvement in Rail-Joints, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming part of this specification, in which—

Figures 1, 2, 3, 4, 5 and 6 are sectional views showing different embodiments of our invention and Figs. 7, 8, 9 and 10 are side views showing different embodiments of the invention.

Our invention has relation to rail joints, and more particularly to rail joints of the type which employ inner and outer bars.

The object of our invention is to provide a rail joint of this character having an inner bar or plate adapted to fit the rail and which has a number of specially provided lateral bearing surfaces for the outer bar, the outer bar having portions arranged to engage such surfaces of the inner bar. This inner bar or plate may be made of insulating material, where the joint is to be an insulated joint; or it may be of steel, or of some relatively soft metal, for use in a solid joint when track circuits are not used. For joints of this character, it has been found desirable to make the splice bars, as well as the rails, of hard steel; and the tendency at the present time is to make them still harder in order to prevent wear and the flow of metal in the heads of the rails and bars. A still further reason for this increased hardness is to obtain additional stiffness. We have found under these conditions, that it is of great advantage to place, between the splice bars and the rails, inner bars or plates of soft steel, or other material relatively softer than that of the rails and outer bars, and which will largely take the wear in service, it being much cheaper to renew them than to replace the rails and outer bars. The efficiency of our inner bars to resist distortion by crushing is increased by reason of the fact that they may be so confined by the inner faces of the outer bars that the softer material is prevented to the maximum extent from being squeezed into open space in any direction. In other words the maximum resistance of the softer material to compression is obtained because of the minimum opportunity of the softer metal to flow in an unconfined direction. As these inner bearing or wearing bars are of softer material than the rails, we must naturally provide a greater bearing area in order to prevent crushing under load; and this we accomplish by multiplying the area of the horizontal bearing faces between the inner and outer bearing bars.

Our invention, as applied to a solid joint, is also of great value in a step joint in which rails of two different sections are joined and in which the bearing surfaces of the rail of smaller section need to be increased to correspond with those of the rail of larger section in order to equally distribute the wear and crushing forces. The inner bearing plates or bars may also be made of copper or other good electrical conducting material and may be used in connection with track bonding, in which case the plates or bars act as combined bearing plates and contact pieces. The bearing areas being large, prevent the crushing of the softer metal.

The exact nature of our invention will be best understood by reference to the accompanying drawings of which we have shown several different embodiments thereof and which will now be described, it being premised, however, that the forms of our invention shown are illustrative only, and that the invention is susceptible of many changes without departing from its spirit and scope, as defined in the appended claims.

In the drawings, the numeral 2, wherever seen, designates the rails, 3 the inner bars or plates, 4 the outer bars, and 5 the joint bolts.

In the form of our invention shown in Fig. 1, the inner bar or plate 3 is of insulating material and is formed with two laterally extending under bearing faces 6 and 7. The outer bar 4 has the corresponding bearing faces 8 and 9 on its inner side and is clamped tightly to the inner bar by the joint bolts, thereby forcing the inner bar or plate upwardly and inwardly against the rail head and web. A piece 10 of insulation is also used between the outer bar and the foot of the rail. The upper portion of the inner plate is shown as increasing in thickness from its outer upper edge inwardly.

In the form shown in Fig. 2, the inner

bar or plate is of metal, and is of the same thickness throughout, being bent to conform to the under side of the rail head and to the rail web, with its upper edge portion bent downwardly and outwardly to provide the under bearing surface 11, and its lower edge portion bent outwardly to form the under bearing surface 12. The outer bar has its head portion shaped to fit these under bearing surfaces as shown, thereby forming a solid joint without insulation.

In the form of the invention shown in Fig. 3, the inside bar or plate is of insulating material, with a plurality of outwardly extending longitudinal ribs or fingers 13 which extend over and engage similar ribs or fingers 14 of the outer bar. This construction provides the inner bar with three under bearing faces, each of which has an area at least as great as that of the under face of the rail head. A piece of insulation 15 is also used between the outer bar and the rail base.

Fig. 4 shows the inside bar of metal, with its upper edge portion bent outwardly, as shown at 16, to engage the under side of the rail head and to provide the under bearing surface 17. This inner bar does not contact with the rail web, but is bent outwardly away from the rail web toward its lower end which terminates in a T-head 18, the under side of which provides the under bearing surface 19. The outer bar has a head portion 20 fitting the under bearing surface 17, and also has an inwardly extending portion 21 which fits between the T-head 18 and the upper surface of the base of the rail. The outer bar is also shown as having a freely depending flange 22 extending below the base of the rail. This form of joint is also a solid joint without insulation.

Fig. 5 also shows a solid joint in which the inner bar consists of a plate of metal of substantially uniform thickness, and bent into a general S-shape or Z-shape, thus providing the two wide under bearing faces 23 and 24, with a thin upright web portion 25 through which the holes for the joint bolts are punched. The outer bar is shaped on its inner face to fit the outer surface of the inner bar, and is also shown as having a flange 26 extending below the rail base.

In the form of the invention shown in Fig. 6, the inner bar is of softer material than the outer bar and has a positive bearing against the top of the rail base as well as underneath the rail head. This inner bar has the two outwardly extending ribs or fingers 27 and 28, whose lower surfaces provide the wide under bearing surfaces for the outer bar. This outer bar is of general S-form, with a depending girder 29 to provide additional stiffness.

Fig. 7 shows a side elevation of a solid joint without insulation, and of the section shown in Fig. 5, both the inner and outer bars extending continuously across the joint and along both rail ends.

Fig. 8 shows a side elevation of an insulated joint having a separate inner bar contacting with each rail, one of these inner bars 3^a being of insulating material, as shown in Fig. 1, while the other inner bar 3^b, is of metal, as shown in Fig. 2.

Fig. 9 shows a side elevation of an insulated joint in which the inner bar has one continuous insulation, extending across the joint, a flat piece 30 of insulating material also being used between the outer bar and the rail base.

Fig. 10 shows a step joint, in which the outer bar fits the rail of larger section directly underneath its head, without the interposition of an inner bar; while an inner bar having a plurality of bearing faces such as above described is used as a filler opposite to the smaller rail in order to bring the top of the rail heads to the same level. A flat plate 31 is also shown on the top of the foot of the larger rail in order to permit the two end portions of the outer bar to be of symmetrical cross section.

An important advantage of our invention over other bars previously designed for increasing the area of the under face of the rail head, is, that we provide a safe wheel flange clearance below the lower outer corner of the rail head. Extension plates have heretofore been constructed, which extend outwardly in an almost horizontal direction from the lower outer edge of the rail head. These, however, were found to be impracticable, since worn wheel flanges strike these extensions even when rails are new and this danger becomes much greater as the rails become worn. It has been endeavored to overcome this objection by dropping the extension down and setting it out from the rail; but the amount of metal required for this purpose makes a very heavy, expensive and bulky joint, and furthermore the under bearing surface is brought down into the region of the bolt holes, or so close to the bolt holes, that a good mechanical construction cannot be obtained. Our invention also permits of the provision of a bearing immediately under the head and above the bolts. This bearing is substantially of the same area as the under side of the rail head and may even be made somewhat greater without extending outwardly beyond the rail head sufficiently to interfere with the wheel flange clearance. Another wide bearing surface is also provided by us below the bolt, leaving a relatively thin bolt portion through which bolt holes may be punched. An intermediate under bearing, as shown in Fig. 3, may also be provided in the region of the bolt holes. In this manner,

any desirable amount of bearing surface may be obtained without interfering with the wheel flange clearance, and without making the bar bulky and expensive.

While we have shown our invention as applied to T-rails, it will be obvious that it is applicable to rails of other sections.

The present application is a continuation of our Patent No. 964,338, dated September 12, 1910.

We claim—

1. In a rail joint, an inner bar or plate lying entirely above the rail base, and an outer bar, said inner bar contacting directly with the outer bar and having portions of its outer face lying in a lateral position in order to form for said outer bar at least two laterally extending underbearing faces each of which is at least substantially equal in width to an under side of the rail head.

2. In a rail joint, a bar or plate of insulating material contacting directly with the rail under the rail head and having at least two laterally extending under faces above the rail base, said under faces lying entirely free from the rail base and having a combined area at least substantially twice as great as the area of one under face of the rail head of a length equal to that of one of the under faces of the insulating material.

3. In a rail joint, a bar or plate to contact directly under the head of one rail only and having portions of its outer face lying in a lateral position in order to form at least two wide laterally extending under faces above the rail base.

4. In a rail joint, a plurality of inside bars or plates each contacting with one rail only, and an outer bar contacting directly with the inner bars, at least one of said inner bars or plates having at least two laterally extending underbearing faces above the rail base to contact directly with said outer bar.

5. In a rail joint, an inside bar or plate of insulating material contacting directly with the rail under the rail head and having at least two wide laterally extending under faces above the rail base, and another bar extending under each of said faces.

6. In a rail joint, an inside bar contacting directly with the rail and having at least two laterally extending members above the rail base and each of said members having on the under side thereof, a bearing face which to at least some extent lies directly under a portion of the rail head, and another bar extending under and contacting directly with each of said faces.

7. In a rail joint, an outer bar having at least two laterally extending upper bearing faces above the rail base, and an inner bar or plate contacting directly with the rail and having at least two laterally extending underbearing faces contacting directly with said upper bearing faces, each of which pairs of coacting faces has substantially as great breadth of contact as the adjacent under face of the rail head has with said inner bar or plate.

8. In a rail joint, an outside bar having at least two wide laterally extending upper bearing faces above the rail base, and an inner bar or plate of insulating material contacting directly with the rail under the rail head and extending over each of said faces.

9. In a rail joint, an inside bar contacting directly with the rail and having above the rail base at least two underbearing faces above the rail base, and an outside bar extending under each of said faces, at least one of which extends laterally into the recess formed by the head, web and foot of the rail and contacting directly with said inside bar.

10. In a rail joint, an inner bar or plate of insulating material lying entirely above the rail base and contacting directly with one rail only under the rail head and having its outer side provided with at least two laterally extending underbearing faces, and an outer bar having a bearing portion extending underneath and contacting directly with each of said faces.

In testimony whereof, we have hereunto set our hands.

WILLIAM P. THOMSON.
SAMUEL G. THOMSON.

Witnesses:
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McLEOD THOMSON.