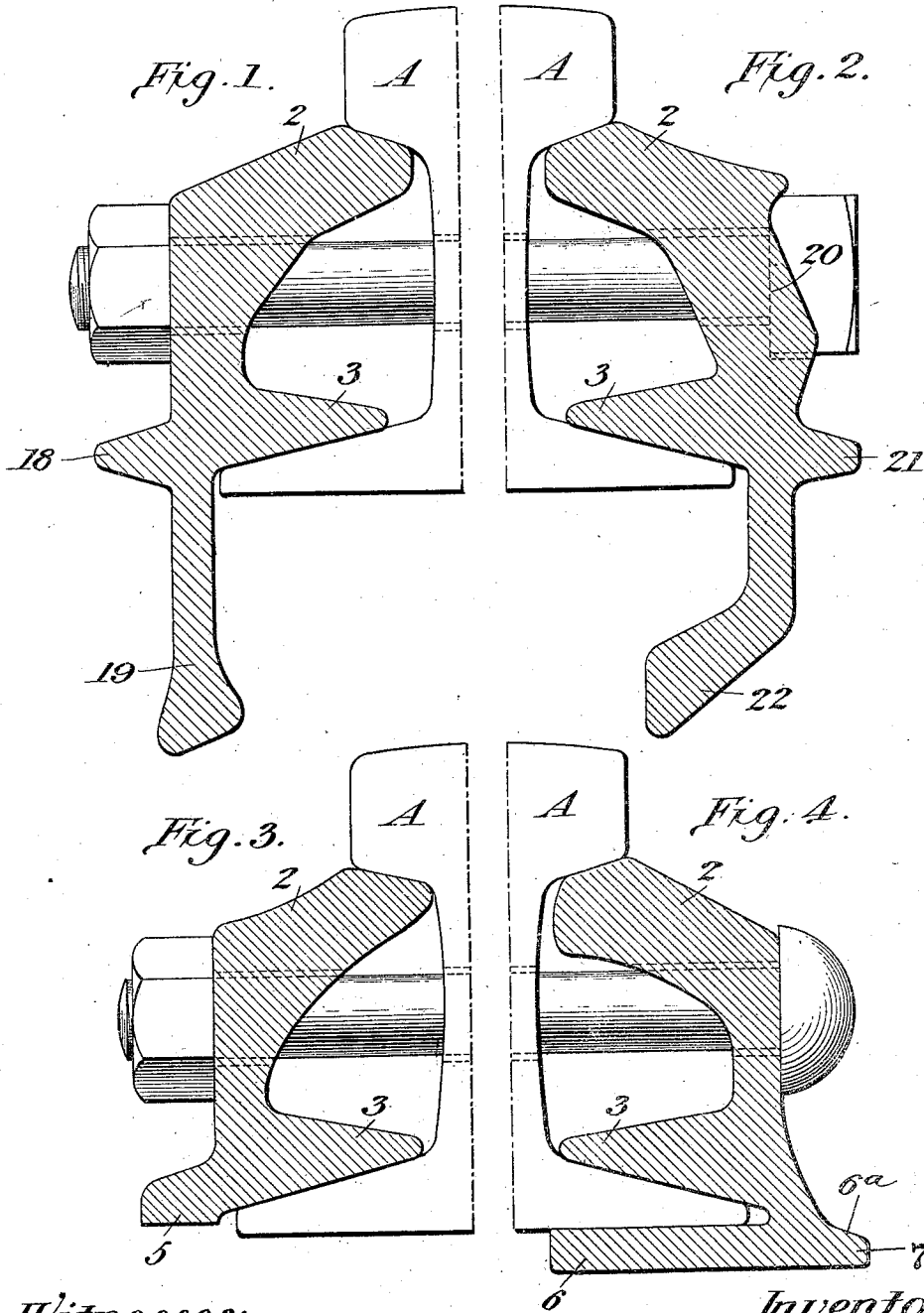


W. P. & S. G. THOMSON.
 SPLICE BAR FOR RAIL JOINTS.
 APPLICATION FILED SEPT. 17, 1907.

937,727.

Patented Oct. 19, 1909
 2 SHEETS—SHEET 1.



Witnesses:

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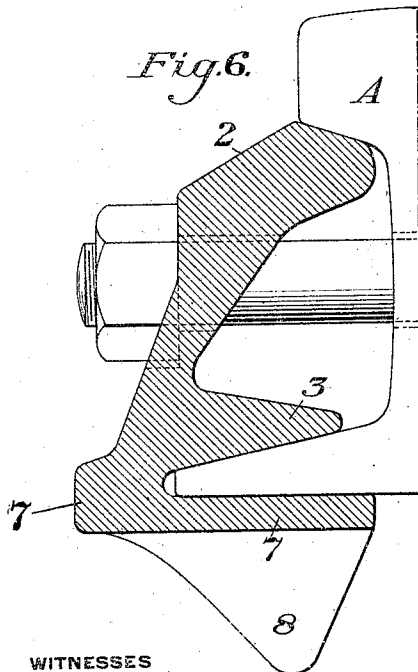
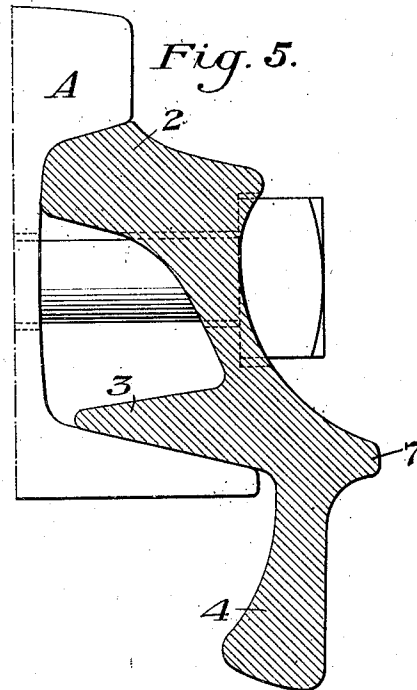
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WITNESSES

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UNITED STATES PATENT OFFICE.

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SPLICE-BAR FOR RAIL-JOINTS.

937,727.

Specification of Letters Patent.

Patented Oct. 19, 1909.

Original application filed May 11, 1907, Serial No. 373,062. Divided and this application filed September 17, 1907. Serial No. 393,367.

To all whom it may concern:

Be it known that we, WILLIAM P. THOMSON and SAMUEL G. THOMSON, both of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Splice-Bar for 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 to 6, inclusive, are sectional views illustrating different forms of our improved splice bar.

The present application is a division of our pending application Serial No. 373,062, filed May 11th, 1907.

The essential feature of the present invention consists in a splice bar having a top member and a foot member, the latter arranged to fit the upper surface of the base flange of the rail, either with or without a lower member extending below the rail base, the top member joining the foot member at a point adjacent to its outer end and adjacent to the outer edge of the rail base; the object of our invention being to provide a splice bar having very greatly increased lateral stiffness, and in which the metal is distributed at the greatest distance from the horizontal neutral axis of the bar, and in a manner to provide for a maximum strength vertically with a minimum amount of metal. To this end, the upper member of the bar is of gradually increasing thickness toward its upper end, having its least thickness at the point where it joins the foot member, and when a lower member extending below the rail base is employed, said member is also preferably of increasing thickness toward its lower end. The object and advantages of our invention will more fully hereinafter appear.

Our invention is susceptible of various modifications, and is applicable to splice bars which are in general of widely varying character provided they retain the essential features of our invention above pointed out and as set forth in the appended claims.

In the drawings, we have shown a number of these modifications, but desire it to be understood that our invention is not limited exclusively thereto. In these drawings we have shown our improved form of bars applied to tee rails, but they may be used in connection with rails of any other section.

In these drawings, the numeral 2 wherever seen designates the upper member of the bar, which has a bearing at its upper edge underneath the head A of the rail, and which in all the forms shown is of gradually increasing thickness toward its upper edge, its lower portion forming a contracted neck which joins the foot member 3. This foot member is in the form of an inwardly projecting rib of greater or less length, which is shaped to fit the upper surface of the base flange, the upper member being joined thereto at the outer end of such flange and at a point adjacent to the vertical plane of the outer edge of the rail base.

In the form of our invention shown in Fig. 1, the splice bar 2, has a rib or projection 18 at its outer side, opposite the edge of the base flange of the rail, with a vertical freely depending lower member 19 of increased thickness at its lower edge. Fig. 2 shows another form of the bar, having an upper member of somewhat different section, with a portion of its outer face displaced to form a vertical bolting face 20. This bar also has an outwardly projecting rib 21 opposite the base flange of the rail, with a depending lower member 22 which is bent inwardly underneath the base of the rail and is of increasing thickness toward its free edge.

In the form shown in Fig. 3 the lower member 4 is omitted and the foot member extends to form the flange 5, which terminates at its lower end in substantially the plane of the bottom surface of the base of the rail.

In the form shown in Fig. 4, the lower member 6 extends inwardly underneath the base flange of the rail in bearing contact therewith, the lower member being joined to the foot member by the contracted neck 6^a. Fig. 5 illustrates another form of the freely depending lower member 4, and also another member of somewhat different cross-section, as will best appear from the drawing. In each of Figs. 4, 5 and 6, the bar is provided with a spiking flange 7.

In the form shown in Fig. 6, the lower member 7 extends inwardly underneath the rail base in bearing contact therewith, and is formed with the depending portion 8.

It will be noted that in all the forms shown the upper member is of gradually increasing thickness toward its upper edge,

and is joined to the foot member 3 at the outer edge of the latter, the foot member in all forms consisting of an inwardly extending rib fitting the upper surface of the rail base.

By connecting the upper member to the foot member at its outer end, buckling of the foot member is eliminated and the lateral stiffness of the bar is very greatly increased, regardless of whether there is a lateral stiffening portion extending below the rail base or not. This will be clearly apparent from Fig. 1, from which it will be seen that the entire bar has just as great lateral stiffness above the rail base as would be present in a bar of the usual angle form whose top member should be near the web of the rail, and which had a depending flange directed inwardly under the base of the rail to secure additional lateral stiffness. In fact, the construction herein described secures the greatest possible amount of lateral stiffness above the rail base in a manner to resist in a horizontal direction any tendency of the rail ends to move out of alinement.

Where an inwardly extending portion below the rail base is relied upon for lateral stiffness, this stiffness is so far below the head of the rail that torsional strains are necessarily set up in the bar above the rail base, for the reason that lateral strains on the rail are generated by the wheel flanges bearing against the side of its head, and the resistance to these lateral strains by the top portion of the bar must originate very low in the bar in the member which bears upon the top of the foot of the rail, and in the member extending inwardly beneath the rail base.

The fundamental principle of the tapering upper member is, that the gradual increase in thickness toward the top affords a much lighter and stiffer member than can be obtained in any other way. This gradual increase keeps the bulk of the metal near the top, where it is most efficient vertically, and at the same time it permits the joining of the top member to the foot member adjacent to the outer edge of the rail base with a minimum amount of metal, thus avoiding the use of an excessive amount of metal to provide a bolting face out near the edge of the rail base. Our invention provides a light and rigid upper member, which affords a preferably vertical bolting face, and which at the same time joins the foot member fitting the top of the rail base at a point far enough out from the web of the rail to prevent buckling, which feature is fundamental. This latter feature is also of very great importance in the case of bars which have depending flanges extending below the base of the rail, since the tapered upper member reaches farther out than is otherwise possible, and

thus transmits the strains to the lower member in such a way as to cause the entire bar to act with its full capacity throughout and without any tendency to buckle. These features have hitherto been obtained in part only and by adding an excessive amount of metal. The tapering upper member affords bolting faces of various forms adjacent to the outer edge of the rail base. In all cases, however, these bolting faces have their general direction more nearly approaching the vertical than is possible to attain where a slanting upper member of uniform thickness is used. This feature becomes especially valuable as the bolting face approaches more nearly to the vertical, as in this position interposed beveled washers are unnecessary, and the bars do not need to be cut or forged to form a vertical face for the bolt heads and nuts. This gradually tapering upper member, then, is most efficient in distributing metal at the greatest distance from the horizontal neutral axis of the bar, in providing a vertical or substantially vertical bolting face adjacent to the outer edge of the rail base, and in general, in causing the various members of the bar to act with their full capacity and without any tendency to buckle out of contact with the top face of the rail base, all of which advantages enable us to make a light, practical bar, which is easy to roll, and which can be very readily brought up to equal any rail section in vertical and lateral stiffness.

What we claim is:—

1. A splice bar for rails having an upper member with a substantially vertical outer face and an upright face adjacent to the rail web, and a foot member to extend inwardly from a point adjacent to the outer edge of the rail base, said upper member having bolt holes through it and extending in a downwardly and outwardly direction to the outer end of the foot member and having a substantially flat inner face extending in a downward and outward direction from said upright inner face to a point below a horizontal plane through the center of the bolt holes.

2. A splice bar for rails, having an upper member with a substantially vertical bolting face, and a foot member to extend inwardly from a point adjacent to the outer edge of the rail base, said upper member decreasing gradually from the thickness of its thickest portion adjacent to its top and extending in a downward and outward direction to the other end of said foot member.

3. A splice bar for rails, having an upper member with a substantially vertical outer face located adjacent to the outer edge of the rail base, said member having an upper head portion and a lower contracted neck portion to lie vertically above the outer edge

of the rail base and gradually decreasing in thickness from the thickness of the former to the thickness of the latter.

4. A splice bar for rails, having an upper member lying entirely below the lower outer edge of the rail head and having a substantially vertical outer face, and a foot member to extend inwardly from the outer edge of the rail base, said upper member extending in a downward and outward direction to the outer end of the foot member.

5. A splice bar for rails, having an upper member with a substantially vertical outer face, and a foot member, said upper member having an upright face to lie adjacent to the rail web and an inner face extending from the lower edge of said face in a downward and outward direction and intersecting the foot member adjacent to the outer edge of the rail base.

6. A splice bar for rails, having an upper member with a substantially vertical outer face and an upright inner face adjacent to the rail web, and a foot member to extend inwardly from the outer edge of the rail base, said upper member having an inner face extending in a downward and outward direction from its intersection with said upright inner face to a point adjacent to the outer edge of the rail base.

7. A splice bar for rails, having an inwardly extending rib to fit the rail base, and an upper member with a substantially vertical outer face, an upright inner face adjacent to the rail web, and an inner face extending in a downward and outward direction from its intersection with said upright inner face to a point adjacent to the outer edge of the rail base.

8. A splice bar for rails, having an upper member with a substantially vertical bolting face and an upright inner face adjacent to the rail web, and a foot member to extend inwardly from a point adjacent to the outer edge of the rail base, said upper member having an inner face extending in a downward and outward direction from its intersection with said upright inner face to its juncture with the outer end of said foot member.

9. A splice bar for rails, having a foot member extending inwardly from the outer edge and contacting with the top of the rail base, and an upper member increasing in thickness gradually and upwardly sufficiently to equal its greatest thickness, said member having a substantially vertical outer face and an inner face extending inwardly and upwardly from the outer end of said foot member to a point adjacent to the rail web.

10. A splice bar for rails, having an upper member increasing in thickness with sufficient taper to equal the thickness of a top head portion lying adjacent to the rail web,

said member having a substantially vertical outer face and an inwardly extending foot member above the rail base joined at its outer end to the upper member.

11. A splice bar for rails, having a downwardly and outwardly slanting upper member, with a substantially vertical bolting face, joined to the outer end of a foot member fitting the top of the rail base and extending inwardly from a point vertically above its outer edge.

12. A splice bar for rails, having an upper member slanting downwardly and outwardly to a foot member fitting the top of the rail base, and extending to its outer edge, the upper member having a substantially vertical bolting face extending down to the foot member and also having a contracted neck substantially equal in thickness to the thickness of the rail web joining it to the outer end of the foot member.

13. A splice bar for rails, having an upper member with bolt holes through it and with a substantially vertical outer face and an upright inner face adjacent to the rail web, said member also having an inner face slanting in a downward and outward direction from its intersection with said upright inner face to a point below a horizontal plane through the center of said bolt holes and adjacent to a vertical plane at the outer edge of the rail base.

14. A splice bar for rails having an inwardly extending rib above the rail base and an upper member extending in an upwardly and inwardly direction and gradually increasing to its greatest thickness adjacent to its top, said upper member having a substantially vertical outer face and joining the outer end of the said rib vertically above the outer edge of the rail base.

15. A splice bar for rails, having an upper member with a substantially vertical outer face and an upright inner face adjacent to the rail web, a foot member, and a portion extending below the rail base, said upper member having a substantially flat inner face extending in a downward and outward direction from its intersection with said upright inner face adjacent to the rail web to its point of intersection with the foot member adjacent to the outer edge of the rail base.

16. A splice bar for rails having an upper member with a substantially vertical bolting face, and an inwardly extending rib fitting the rail base, and a portion extending below the rail base, said upper member extending inwardly and upwardly and gradually increasing from its least thickness at a point vertically above the outer edge of the rail base to its greatest thickness adjacent to its top.

17. A splice bar for rails, having an upper member, a foot member, and a lower mem-

ber below the rail base, all joined together at the outer edge of the rail base, said upper member slanting downwardly and outwardly and gradually diminishing in thickness, and
 5 having a substantially vertical outer face and said lower member having an under face extending under the rail base at an angle between the vertical and horizontal.

18. A splice bar for rails having an upper
 10 member with a substantially vertical bolting face, said upper member extending inwardly and upwardly from a point vertically above the outer edge of the rail base, and gradually increasing in thickness to such an extent as to equal the thickest part of its upper
 15 portion.

19. A splice bar for rails, having an upper member with a substantially vertical outer face adjacent to the outer edge of the rail
 20 base, and a foot member extending to the outer edge of the rail base, said upper member joining the foot member at its outer end and tapering gradually from the thickness of its thickest portion adjacent to its top to
 25 its thinnest portion at its juncture with the foot member.

20. A splice bar for rails having an upper member with a head at its upper end and a contracted neck at its lower end, said member having a substantially vertical outer
 30 face and gradually decreasing in thickness from the thickness of the head portion to the thickness of the neck portion, said member also extending in a downward and outward direction to a point vertically above
 35 the outer edge of the rail base.

21. In a rail joint, a splice bar for the rails having an upper member with its highest portion extending under the heads of
 40 both rails, and also having a bolting face located outside of the outer edge of the rail base, said member having bolt holes through it and gradually increasing in thickness to equal its thickest portion adjacent to its top,
 45 the bar having an inner face slanting in a downward and outward direction to a point below the center line of the bolt holes and adjacent to the outer edge of the rail base.

22. In a rail joint, a splice bar for the
 50 rails, having an upper member extending under the heads of both rails, and provided with a bolting face located outside of the outer edge of the rail base, and having an

upright inner face adjacent to the rail web, said member having bolt holes through
 55 it, and an inner face thereof slanting in a downward and outward direction from its intersection with said upright face to a point below the center line of the bolt holes.

23. In a rail joint, a splice bar for the
 60 rails having an upper member with its highest point fitting under the rail head and with a bolting face located outside of the outer edge of the rail base, the bar also having an inner face adjacent to the rail web and
 65 another inner face extending in a downward and outward direction to a point adjacent to the outer edges of the rail bases.

24. A splice bar for rails having an upper member with a substantially vertical outer
 70 face located outside of the outer edge of the rail base, said member slanting downwardly and outwardly and having an upper head portion and a lower contracted neck portion and gradually decreasing in thickness
 75 from the thickness of one portion to the thickness of the other.

25. A splice bar for rails having an upper member with its highest portion fitting under the rail head and an outer face located
 80 outside the outer edge of the rail base, a foot member fitting the top of the rail base, and a member extending below the rail base, said upper member having bolt holes through it and an inner face extending in a down-
 85 wardly and outwardly direction to a point below the center line of the bolt holes.

26. A splice bar for rails having an upper member with its highest portion fitting under the rail head, a foot member, and a portion
 90 extending below the rail base, said upper member having a bolting face outside of the outer edge of the rail base and extending in a downwardly and outwardly direction to the outer end of the foot member,
 95 said upper member gradually diminishing from the thickness of its thickest upper portion to its thinnest lower portion.

In testimony whereof, we have hereunto set our hands.

WILLIAM P. THOMSON.
 SAMUEL G. THOMSON.

Witnesses:

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 E. A. MORTON.