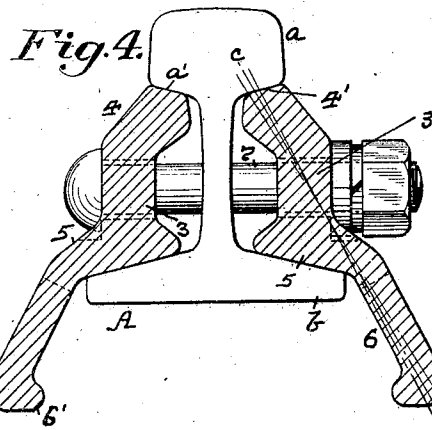
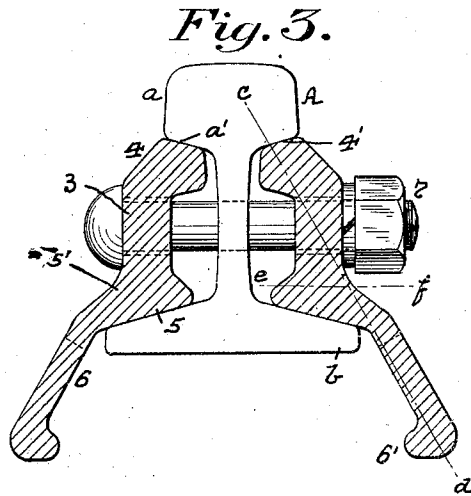
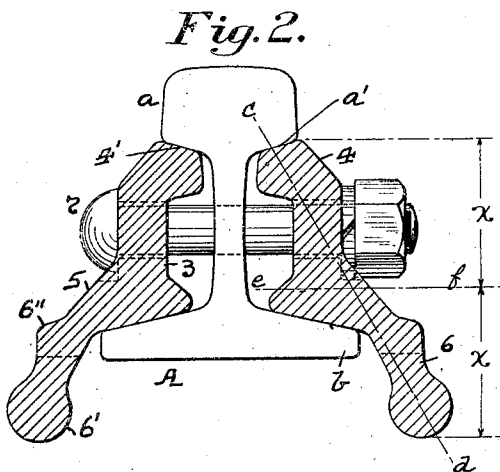
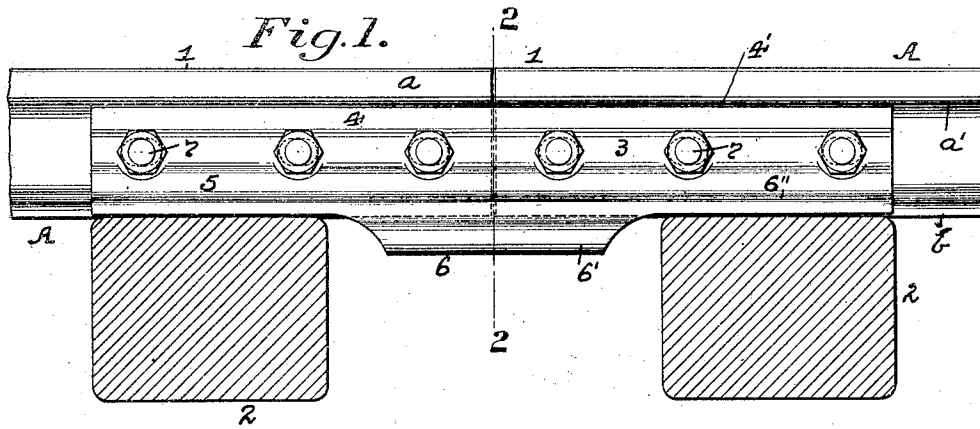


J. D'ESPOSITO.
RAIL JOINT.
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933,534.

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WITNESSES
Walter Samaniss
O. L. Thompson.

INVENTOR
John D'Esposito,
By J. M. Brooke,
Attorney.

UNITED STATES PATENT OFFICE.

JOSHUA D'ESPOSITO, OF PITTSBURG, PENNSYLVANIA.

RAIL-JOINT.

933,534.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, JOSHUA D'ESPOSITO, a resident of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Rail-Joints; and I do hereby declare the following to be a full, clear, and exact description thereof:

My invention relates to rail joints and has special reference to the angle, fish or splice bars used for suspended joints of railway-rails, such as the joints in which the meeting ends of the rails are not located over a tie.

The object of my invention is to provide a simple, strong and efficient form of a joint structure which will support the rail ends, as well as one which will possess the same, or nearly the same properties as to stiffness, load carrying capacity and deflection as the rails to be joined, with the least expenditure of metal, and without departing from the generally adopted type of such structures.

My invention consists, generally stated, in the novel arrangement, construction and combination of parts, as hereinafter more specifically set forth and described and particularly pointed out in the claims.

To enable others skilled in the art to which my invention appertains to construct and use my improved rail-joint, I will describe the same more fully, referring to the accompanying drawing, in which:—

Figure 1 is a side elevation showing a portion of a railway-track provided with my improved angle or splice bar. Fig. 2 is a vertical cross-section of the joint. Figs. 3 and 4 are similar sections of other forms of the joint.

Like symbols of reference herein indicate like parts in each of the figures of the drawing.

As illustrated in the drawing and referring to Figs. 1 and 2, in which is shown the preferred form, 1—1 represent the meeting ends of the rails A and 2—2 the ties on each side of the rail-joint.

The angle-bars on opposite sides of the rail-joint are similar in character and each consists of an upper vertically-extending portion 3 having a head 4 thereon for fitting under the inclined under surface *a'* of the rail-head *a* by its upper inclined face 4' and this portion merges into the intermediate and sloping portion 5, which fits on the base or flange *b* of the rail. The portion 5 is

projected outwardly and downwardly at an incline at a point beyond the edge of the rail flange to form the depending outwardly inclined portion 6, and it will be noted that by the position or direction of said portion 6 the principal axis of bending moment remains wholly within the body of the angle bar, as shown by the axial line *c—d*, while the horizontal neutral axis is shown by the axial line *e—f*. The axes of bending moment in the angle bars are arranged at an inclination to the vertical axis of the rail and are at a downwardly extending angle between 30 and 35 degrees, or at substantially an angle of $31\frac{1}{2}$ degrees to said vertical axis. It is considered that an axis passing through the lower end of the flange on the bar or through the center of the enlargement on said end, and through the center of gravity of the section of said bar as a whole, is the axis of bending moment, or moment of flexure, or the axis along which the stresses coming into said bar, when in actual use, are transmitted through the body of said bar. The conformation of the bar under consideration is such as to contain this axis throughout its length, and the axis passing through the bar in this manner is obtained by bringing out the main body of the bar a considerable distance from the web of the rail through filling in and rounding the angle in the outer face of the bar, as at 5', as well as by disposing all the metal of the bar as nearly as possible in a straight line throughout the same and along said axis. In the use of these angle bars, the portions 3, 4 and 5 of the same are extended longitudinally over the ties at the ends of the joint and the depending outwardly inclined portion 6 is cut away at the ends in order to fit down between the ties and be free to spring under the strains incident thereto. In the connecting up of these angle bars to the rails such bars are secured in place by the bolts 7 passing through the same and rail ends in the ordinary manner and at the usual height in the rails, and the free flanges or portions 6 will project below the base of the rail.

It will thus be obvious that in the use of my improved angle bar the metal is so distributed as to form a shape having a cross-section in which the axis passing through the center of gravity of the section will remain within the limit of the same, and on account of such an arrangement the stresses

set up in the shape and under loading such as is obtained in the bar in actual service, will be transmitted throughout the body of the bar for its entire length, and as they act normally to such axis, they will not create a buckling tendency in such shape. It will also be obvious that the principal axes of bending moment passing through the center of gravity of the bars being nearly normal or perpendicular to the inclined under faces of the rail head will better support such head, and there will not be a tendency of the tops of the bars to open up and slide away from the head of the rail, as is the case with the ordinary approved constructions of these bars, but such bars will have a tendency to be forced inwardly thereby. It will also be noted that by locating the portion of the bar between the head and base of the rail away from the web of the rail a greater proportion of metal can be provided at the head of the bar, and so thereby take better care of the reverse bending moments set up in the bar under various locations of the loads. All these advantages are obtained by a bar having a depending flange located between the ties, extending below the level of the base of the rail and bent outwardly, so as to be in the same general direction with the bar, and to contain a line passing through the center of gravity of the bar, such line being at the same time contained for its entire length by the outline of the section, and to be normal or nearly normal to the under side of the rail-head.

If desired, the depending flange 6 can terminate in a bulb or similar enlarged or increased shape, as shown at 6', and such an arrangement will increase the stiffness at a small expenditure, will equalize the amount of metal above and below the neutral axis, as indicated in Fig. 2, and thereby equalize fiber stresses in top and bottom fibers, or in other words, give a uniform section modulus or amount of resistance.

In Figs. 3 and 4, the depending flange 6 is shown as being somewhat lengthened over that shown in Figs. 1 and 2, and thereby dispenses with the abrupt shoulder 6'' shown in the latter and on the outer surface of the bar between the sloping portion 5 and said flange for the holding of the spike head, while if desired the connecting bolts 7 can be placed in a lower position than the usual one, as shown in said Fig. 4. Various other changes in the form and arrangement of the angle bar and flange, as well as in the connecting parts may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

What I claim as my invention, and desire to secure by Letters Patent, is:—

1. A splice bar for rails having the axis

of bending moment wholly within the bar 65 and passing through the center of gravity and the upper end and lower extremity of the bar.

2. A splice bar for rails having the axis of bending moment wholly within the bar 70 and passing through the center of gravity and the upper and lower ends of said bar, and a depending flange on said bar extending below the base of the rail and in the same general direction as the axis of said 75 bar.

3. A splice bar for rails having the axis of bending moment wholly within the bar and passing through the center of gravity and the upper and lower ends of the bar, a depending flange on said bar extending below the base of the rail and in the same general direction as the axis of said bar, and an enlarged portion at the termination of said 85 flange.

4. A splice bar for rails having the axis of bending moment wholly within the bar and passing through the center of gravity and the upper supporting face and the lower extremity of the bar, and a depending flange 90 on said bar below the base of the rail and in the same general direction as the axis of the bar.

5. A splice bar for rails having the principal axis of bending moment wholly within 95 the bar and passing through the center of gravity and the upper end and lower extremity of the bar.

6. A splice bar for rails having the principal axis of bending moment wholly within 100 the bar and passing through the center of gravity and the upper and lower ends of the bar, and a depending flange on said bar extending below the base of rail and in the same general direction of said axis. 105

7. A splice bar for rails having the principal axis of bending moment wholly within the bar and passing through the center of gravity and the upper and lower ends of said bar, a depending flange on said bar below the base of the rail and in the same general direction as the principal axis of the bar, and an enlarged portion at the termination of said flange. 110

8. A splice bar for rails having a depending flange below the base of the rail terminating in an enlarged portion, said bar having the axes of bending moments passing through the body of said depending flange, through the center of gravity of the bar as whole, 120 and through its upper end and being wholly within the bar.

In testimony whereof, I, the said JOSHUA D'ESPOSITO, have hereunto set my hand.

JOSHUA D'ESPOSITO.

Witnesses:

J. N. COOKE,

JAMES L. WEHN.