

(No Model.)

3 Sheets—Sheet 1.

M. C. NILES.
RAIL JOINT.

No. 513,275.

Patented Jan. 23, 1894.

Fig. 1.

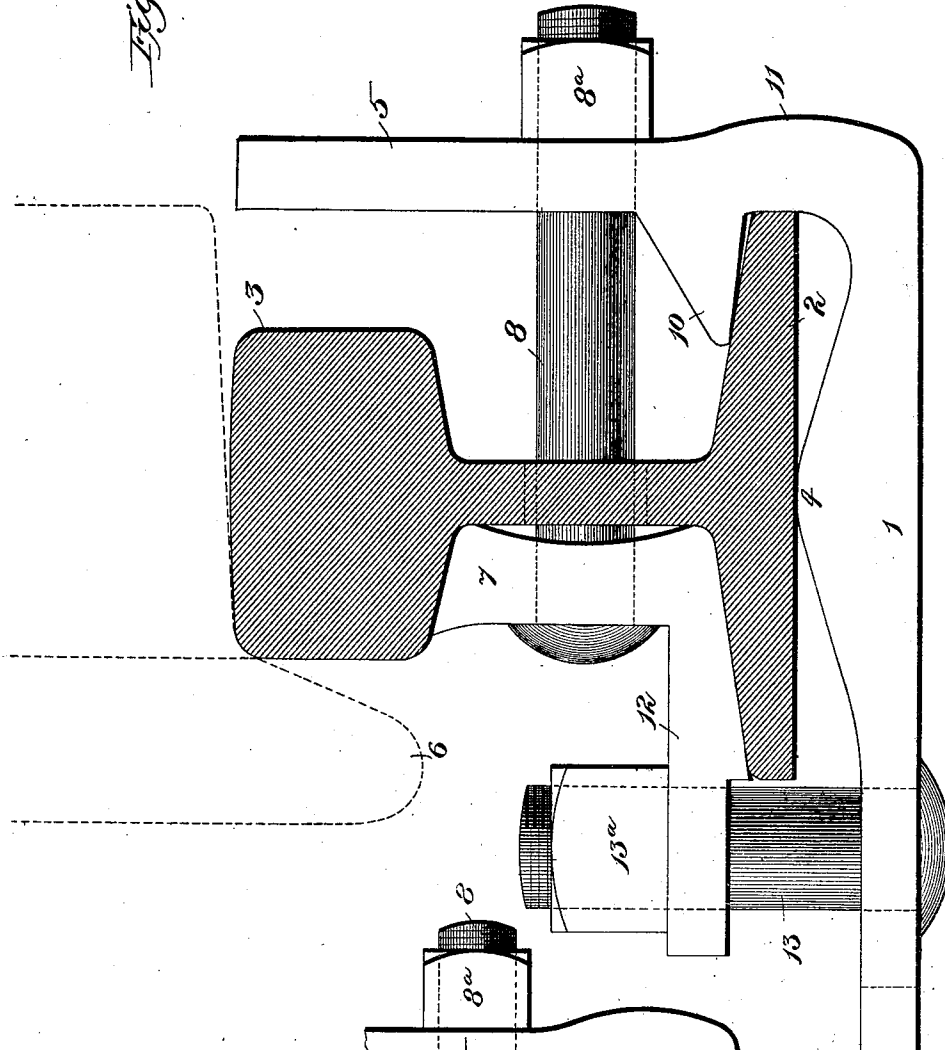
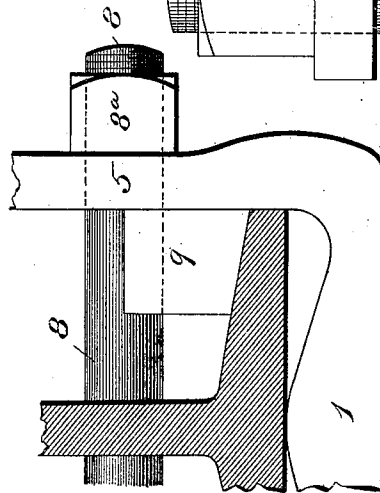


Fig. 6.



Witnesses:

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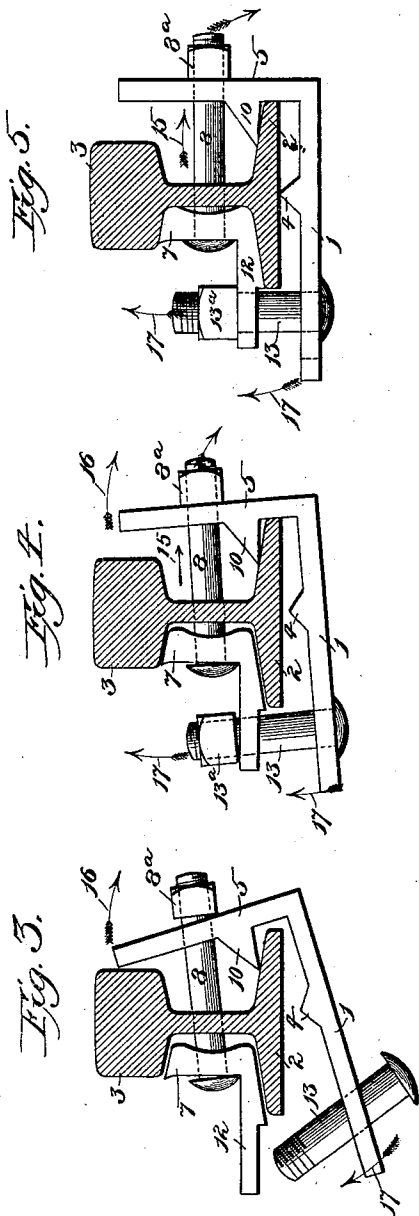
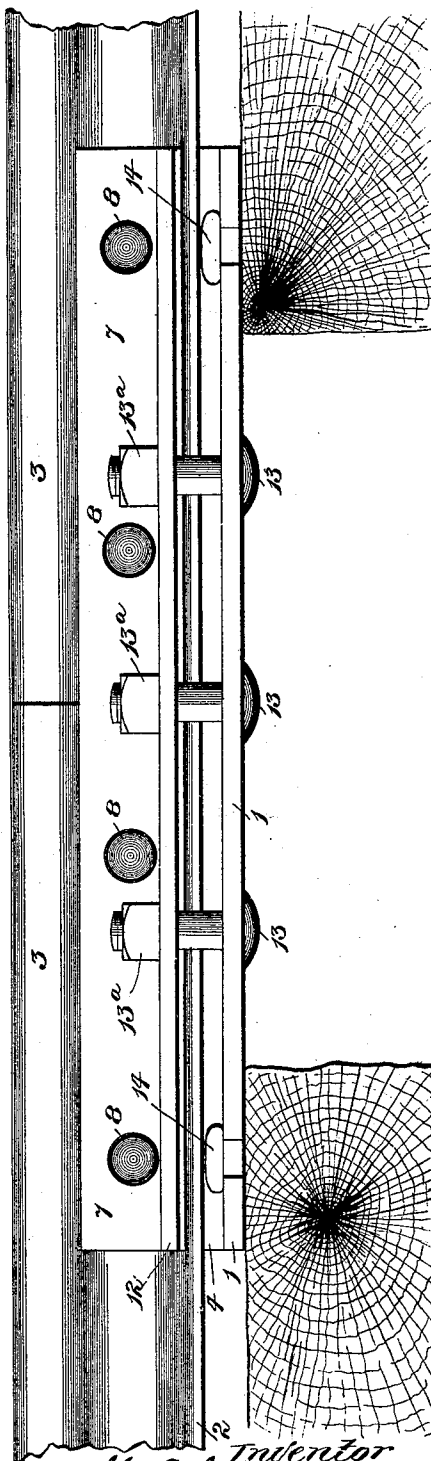


Fig. 2.



Witnesses:

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(No Model.)

3 Sheets—Sheet 3.

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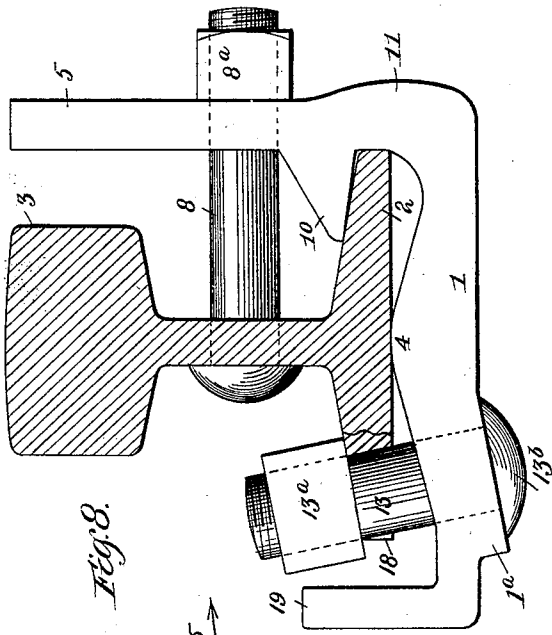


Fig. 8.

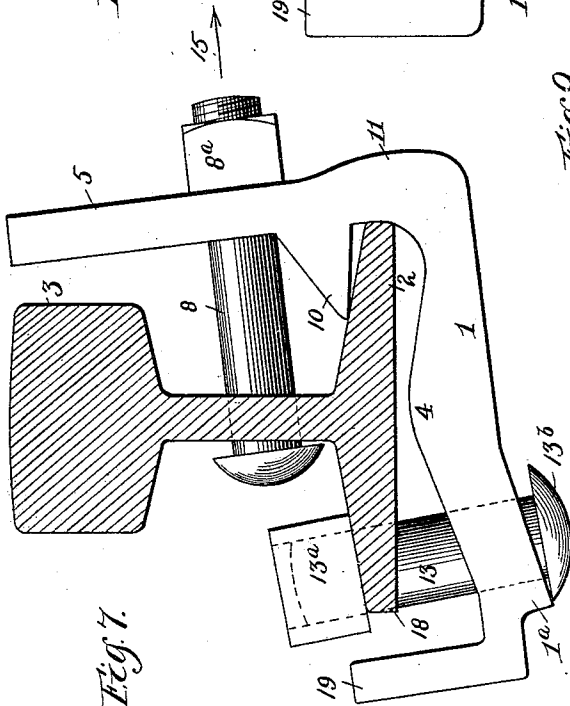


Fig. 7.

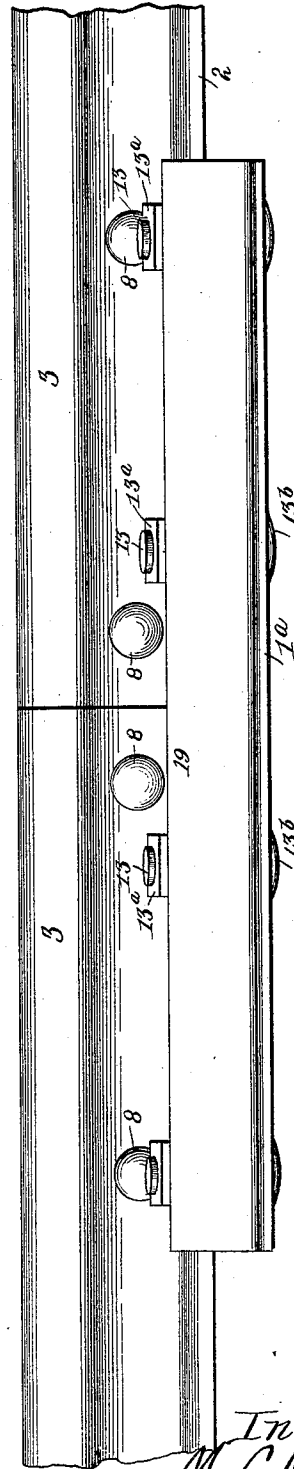


Fig. 9.

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UNITED STATES PATENT OFFICE.

MILTON C. NILES, OF OAK PARK, ILLINOIS.

RAIL-JOINT.

SPECIFICATION forming part of Letters Patent No. 513,275, dated January 23, 1894.

Application filed March 20, 1893. Serial No. 466,899. (No model.)

To all whom it may concern:

Be it known that I, MILTON C. NILES, a citizen of the United States, residing at Oak Park, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Rail-Joints, of which the following is a full, clear, and exact specification.

My present invention relates to that class of rail joints such as shown and described in my application for patent, Serial No. 444,869, filed September 2, 1892, in which the rails are supported against downward movement at their meeting ends by means of a base-plate clamped to the under side of the foot flanges of the rails by means of clamps taking their bearing upon the upper side of such flanges, while the lateral stress is resisted by other means exerting a lateral pressure against the rails. In devices for this purpose it is essential that the construction be such as to sustain the rails at their meeting ends or joints with a power that equals, but does not exceed, the strength of the rail itself, whereby the rails at their joints will be neither more nor less elastic or yielding than they are throughout their length, and further than this, it is generally conceded by those versed in the art, that the forms or shapes of the various parts of the practical rail joint must be such as are capable of being produced by the rolling or the drop-forging processes. Hence, to design the parts whereby this end may be attained is a problem of equal importance with the problem of obtaining the maximum degree of strength and simplicity of operation, with the minimum amount of metal and number of parts.

My said former invention has for one of its objects to provide a rail joint which shall be as elastic as the rail itself, and at the same time, capable of supporting the rail with a pressure equal to the strength thereof, and my present invention has for its object to accomplish the same end but by a much simpler, more convenient and cheaper construction and a greatly reduced number of parts.

With these ends in view my invention consists in certain features of novelty shown in the drawings, and hereinafter described in connection therewith, and particularly pointed out in the claims.

In the said drawings, Figure 1, is a trans-

verse section of a rail showing my improved joint applied thereto. Fig. 2, is a side elevation, on a smaller scale, of the meeting ends of two rails provided with my improved joint. Figs. 3, 4 and 5 are diagrammatic views illustrating the operation of the joint in being applied to the rails. Fig. 6, is a detail sectional view similar to Fig. 1, on a smaller scale, but illustrating a slight modification hereinafter explained. Fig. 7 is a view similar to Fig. 1, but on a smaller scale, illustrating a modification hereinafter described, and showing the parts in the position they assume before being fully tightened. Fig. 8, is a similar view of the parts tightened up, and Fig. 9, is a side elevation of the same.

Likesigns of reference indicate like parts throughout the several views.

My present invention may be embodied in a device consisting of but one part, excepting the necessary tightening bolts, but the preferred form of my invention and which I will first describe, comprises an additional part or member. The form of each of these parts, however, is such that it may be produced by one or the other of the before named processes.

Referring now to Figs. 1 to 5, one of these parts or members is a base-plate having a bearing under the rails and being supported at one side by one side of the rail flanges while the other part or member consists of a bar adapted to be forced laterally against the rails for holding them in alignment or against lateral displacement, and at the same time constituting a bearing upon which the other side of the said base-plate is adjustably suspended.

In my present invention, as in that shown in my aforesaid application, the horizontal portion 1, of the base-plate is fulcrumed against the under side of the foot flanges 2 of the rails 3, by means of a fulcrum or boss 4, which may be conveniently formed directly upon the portion 1 itself, but the manner in which this fulcrum is provided is immaterial so long as it affords a firm bearing for the base-plate and extends horizontally of the rails a sufficient distance to come on both sides of the intersection between their meeting ends. This base-plate, also like my said former device, is provided along one side

with a vertical or upright flange 5, arranged, as shown, at a distance from the rail webs, which flange in the present invention, however, is substantially coterminous in vertical extent with the rails, and is arranged on the outer side of the rails, that is, on the side opposite that on which the wheel flanges 6 pass; thus making it possible to extend the vertical diameter of the flange 5 up to the level of the rail and thereby greatly add to its strength without danger of being struck by the wheel flanges. This upturned flange 5, as in my former invention, is connected to a bar 7, arranged on the opposite side of the rails but which bar in my present invention is adapted to be forced laterally directly against the rails by the said flange 5, for holding them in alignment or against lateral play. Such connection between the bar 7 and the flange 5 may be effected by a number of horizontal bolts 8, preferably about four, two in each rail, passing through the usual bolt-holes in the rail webs, and also through corresponding holes in the bar 7 and the flange 5; but in this invention, instead of interposing filling-blocks between the webs of the rails and the flange 5 for supporting the base-plate and transmitting the lateral pressure of the flange 5 to such webs, I bring the flange 5 directly against the edges of the flanges of the rails on one side, whereby lateral movement of the rails in one direction will be resisted by the bar 7, and in the opposite direction by the flange 5. The base-plate, however, may be supported on one side, as in my former device, by means of a block 9 arranged under each of the bolts 8 as shown in Fig. 6, and having a concave seat in its upper side for the bolt, as will be understood, but in the present instance, such block 9 does not touch the webs of the rails, and hence it does not constitute a fulcrum or bearing as in my former device for the flange 5 to swing upon; but should it be preferred to avoid the employment of the separate blocks for this purpose, the flange 5 may be provided along its inner side with a laterally projecting flange 10 arranged to bear a considerable distance up on the rail flanges, the material of the flange 10 being carried upward to the lower side of the holes through which the bolts 8 pass for the sake of greater strength, and its underside being so formed that its inner edge or point will find a bearing on the rails before its remaining portion comes in contact, thus insuring against raising such inner edge or point out of contact by tightening up the device and thereby avoid bringing the whole pressure at or near the extreme outer edges of the rail flanges where the same are thin and liable to break. The lower edge of the flange 5 on the outside may, if desired, be provided with a swell 11, for reinforcing it at the bend, the most vulnerable point, where it fulcrums against the edges of the rails.

The bar 7 is provided along its lower edge with a laterally projecting flange 12 which

rests upon the foot flanges of the rails and constitutes a bearing upon which the side of the base-plate opposite the flange 5, is adjustably supported by any suitable means, and which means preferably consists of a number of short, stout bolts 13, passing upwardly through the edge of the base-plate, and through suitable openings formed at the outer edge of the flange 12, the upper surface of such flange 12 being arranged horizontally so as to form a square firm bearing for the nuts 13^a. By the employment of this flange 12 arranged at a low point in the height of the rail, for supporting the bolts 13, it will be seen that I am enabled to locate the tightening bolts 13 on the inner side of the rails, that is, on the side on which the wheel flanges pass, and hence, the flange 5 which is consequently located on the outside, may be extended upward level with the rail and its strength thereby greatly increased, the lateral flange 12 at the same time adding strength to the bar 7 and serving as a means for connecting such bar and consequently the rails with the base-plate on the inner side, whereby the movement resulting from the expansion and contraction of the rails, will be limited. The bar 7 and flange 12 may be substantially equal in length with the base-plate, and such base-plate may be of such length as to rest on two ties, as shown in Fig. 2, whereby the whole device may be secured in place upon the ties and thus prevent it from moving with the rails as they contract and expand. This connection may be effected by means of ordinary spikes 14, passing through suitable notches formed in the edge of the base-plate as shown in Fig. 2, the edge of the base-plate being extended slightly beyond the edge of the flange 12, whereby the spikes may be driven home. But while it is desirable that the base-plate be of sufficient length to rest upon the cross-ties, I wish it to be understood, nevertheless, that the nature of my improved joint is such that it affords ample support for the rails independently of the cross-ties, and if desired, may be so arranged as to come between such ties without touching them.

Theoretically speaking, when the device is first applied to the rails the parts will assume the positions shown in Fig. 3; when the lower edge of the base-plate is raised into the position shown in Fig. 4, the nuts 8^a on the horizontal bolts will hold the flange 5 from moving outward, and consequently such flange will move inward at its lower edge until it strikes the edge of the rail flange from which time the base-plate with its upright flange 5 acts as a bell-crank lever swinging on the edge of the rail flange as its fulcrum, and drawing the bolts 8 outward in the direction of the arrow 15; thus causing the bar 7 to be forced against the webs of the rails with great pressure and thereby bringing them into alignment and holding them against lateral play in one direction, while the pressure of

the flange 5 against the flanges of the rails holds them against displacement in the opposite direction. When the parts are applied to the rails in the position shown in Fig. 3, the nuts 8^a should be so adjusted that sufficient lateral movement of the bolts 8 may be effected, and the rails fully clamped or held against lateral movement before the fulcrum 4 has attained a bearing against the under side of the rails. Thus it will be seen, that after the outward oscillation of the flange 5 in the direction of the arrows 16 has effected the tightening of the rails laterally and the fulcrum 4 has come in contact with the under side of the rails, any further movement of the base-plate and bolts 13 in the direction of the arrows 17 will cause such fulcrum 14 to impinge the rails with great force and hold them against downward movement, the pivotal point of the base-plate which acts as a lever, changing at this instant from the edge of the rail flanges to the fulcrum 4, and consequently exerting a slight tendency to move the flange 5 away from the edges of the rail flanges, but the space between such flanges thus produced is immediately taken up by the sliding of the base-plate toward the rails, and thus virtually maintaining the flange 5 in constant contact with the rail flanges.

Referring now to Figs. 7, 8 and 9 illustrating the form of my invention consisting of a single piece, it will be seen that I have simply omitted the bar 7 and its flange 12 and have supported the inner edge of the base-plate directly upon the inner edges of the rail flanges by means of the short bolts 13. In order, however, that the nuts 13^a of these bolts may be afforded a square position or bearing upon the rail flanges without danger of twisting or bending the bolts, I arrange the bolts on a slight incline so as to bring the lower faces of the nuts 13^a flat against or parallel with the surface of the rail flanges; and in order that this inclination of the bolts 13 may not deprive their heads 13^b of a firm and square bearing against the under side of the base-plate, I provide the under side of such plate with inclined bearing-bosses 1^a, through which the bolts 13 pass and against which the heads 13^b squarely rest. The edges of the rail flanges may be provided with perforations or notches 18, preferably simple notches, for the passage of the bolts 13, whereby the nuts 13^a are brought farther inward on the rail flanges and thus afforded a firmer bearing and at the same time, the rails are connected on their inner sides directly with the base-plate, and the movement resulting from expansion and contraction thus limited, it being understood that the connection between the base-plate and the rails afforded by the horizontal bolts 8 would be hardly sufficient to accomplish this end. In this form of my invention the inner edge of the horizontal portion 1 of the base-plate may be provided with a short upturned flange 19 for the sake of adding strength and stiffness to the

base-plate. There may be any desired number of the bolts 13, but I preferably employ four, arranged substantially as shown in Fig. 9, that is to say, two near the end of each rail.

The operation of this device, it will be seen, is substantially the same as that described with reference to Figs. 1 to 5. When the device is applied to the rails and is in the position shown in Fig. 7, it acts as a bell-crank lever pulling outward on the bolts 8 in the direction of the arrow 15, and consequently forcing the rails into alignment and holding them against lateral movement in one direction, while the flange 5 bearing against the rail flanges, holds them against lateral movement in the opposite direction. By the time the fulcrum 4 reaches the bottom of the rails the lateral tightening is supposed to have been completed, and hence, any further outward movement of the base-plate will cause the fulcrum 4 to impinge the rails with great force, as before described. The bolts 13 being arranged on an incline their tendency will be to force the rails in the direction of the flange 5 and to pull the base-plate in the opposite direction, thus assisting in effecting the alignment of the rails and at the same time, insuring against the displacement of the upper ends of the bolts 13 from their notches 18.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. In a rail joint, the combination with the rails, of a base-plate having an upturned flange at one side fulcrumed or supported against inward movement toward the rails, and connected to but having its upper portion arranged at a distance from the webs of the rails, and means for supporting the other side of said base-plate upon the rails and drawing it upward relatively to the rails, substantially as set forth.

2. In a rail joint, the combination with the rails, of a base-plate having an upturned flange at one side, fulcrumed directly against the edges of the rail flanges and being connected to but arranged at a distance from the webs of the rails, and means for supporting the other side of said base-plate upon the rails and drawing it upward relatively to the rails, substantially as set forth.

3. In a rail joint, the combination with the rails, of a base-plate provided with an upturned flange at one side, fulcrumed against the rails, and having its upper portion arranged at a distance from the rail webs bolts passing through said flange and the rail webs, and having heads arranged on the opposite side of said webs, and means for supporting the other side of said base-plate by the rails and drawing it upward relatively to the rails, substantially as set forth.

4. In a rail joint, the combination with the rails, of the base plate fulcrumed under the rails and being thereby held at a distance from the under sides of said rails, said base

plate being provided at one side with an upturned flange supported upon and connected to the rails, and means for adjustably suspending the other side of said base plate upon the rails, said upturned flange being also fulcrumed at or near its lower edge or base, and its upper edge being free to swing inwardly and outwardly independently of its lower edge or base, substantially as set forth.

- 10 5. In a rail joint, the combination with the rails, and a base-plate supported at one side upon one side of the rail flanges and having an upturned flange, arranged at a distance from the rail webs of a bar arranged on the opposite side of the rails and adapted to be forced laterally against the rails and being connected to said upturned flange and means for adjustably suspending the other side of said base-plate upon said bar, substantially as set forth.

- 20 6. In a rail joint, the combination with the rails, of a base plate having a fulcrum under, and being held away from the rails, said base plate having an upturned flange at one side supported upon and fulcrumed or bearing against the flanges of the rails and being adapted to swing outwardly without leaving its said fulcrum or bearing against the rail flanges, a connection between said upturned flange and the webs of the rails, and means for adjustably suspending the other side of said base-plate upon the rails, substantially as set forth.

- 35 7. In a rail joint, the combination with the rails, and a base-plate supported at one side

upon one side of the rail flanges and having an upturned flange, of a bar arranged on the opposite side of the rails, connected to said upturned flange and having a projection arranged on the inner side of the rails below the wheel flanges extending beyond the edge of the rail flanges, and means for adjustably suspending the other side of said base-plate upon said projection, substantially as set forth.

- 45 8. In a rail joint, the combination with the rails, and a base-plate supported at one side upon one side of the rail flanges and having an upturned flange, of a bar arranged on the opposite side of the rails and connected to said upturned flange and having at its lower edge a horizontal level top projection resting upon and extending beyond the edge of the rail flanges, and means for adjustably suspending the other side of said base-plate upon said horizontal projection, substantially as set forth.

- 60 9. In a rail joint, the combination with the rails, and a base-plate supported at one side upon one side of the rail flanges, and having a fulcrum bearing under rails, of a bar arranged on the opposite side of the rails, means for raising the other side of said base-plate relatively to said bar, and means for forcing said bar laterally against the rails, substantially as set forth.

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Witnesses:

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