(No Model.) 2 Sheets—Sheet 1.

J. NEAFIE.

RAILWAY RAIL AND CONNECTION.

No. 551,688. Patented Dec. 17, 1895.

Fig. 1.

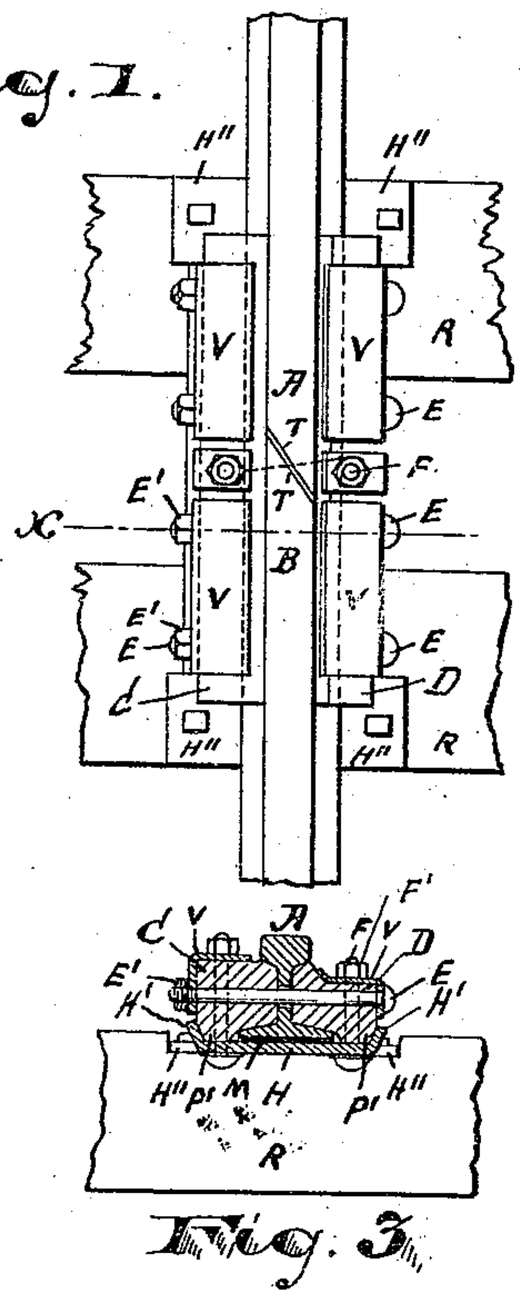

Fig. 2.

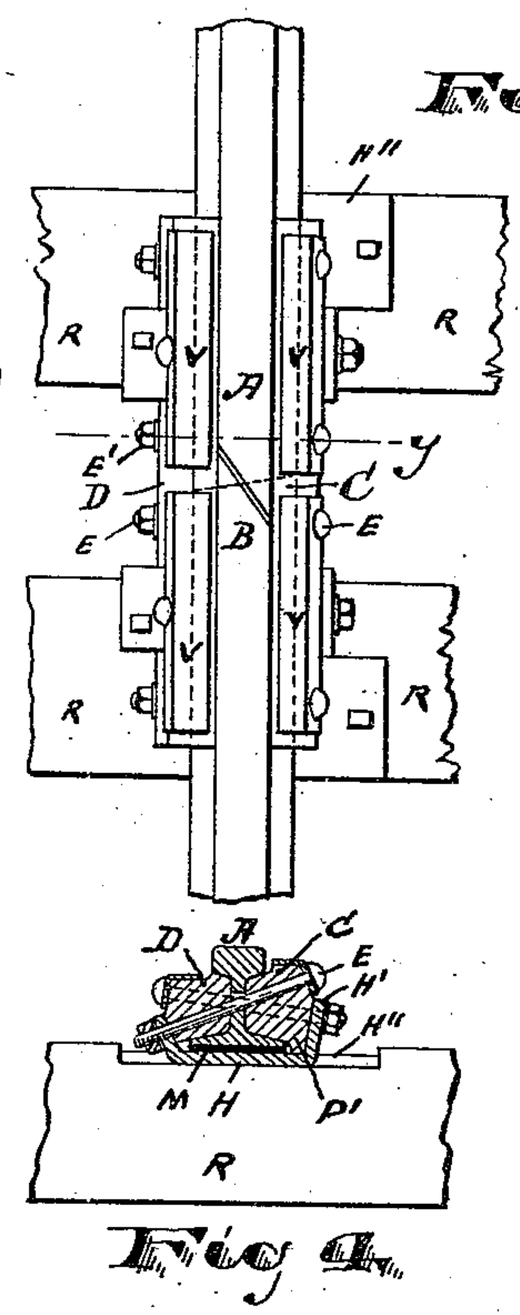

Fig. 5.

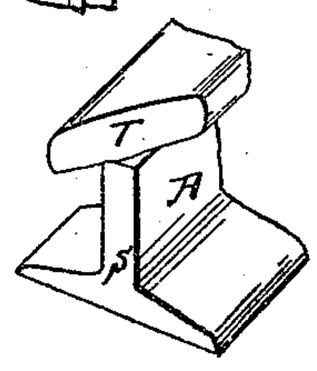

Fig. 6.

Fig. 3.

Fig. 4.

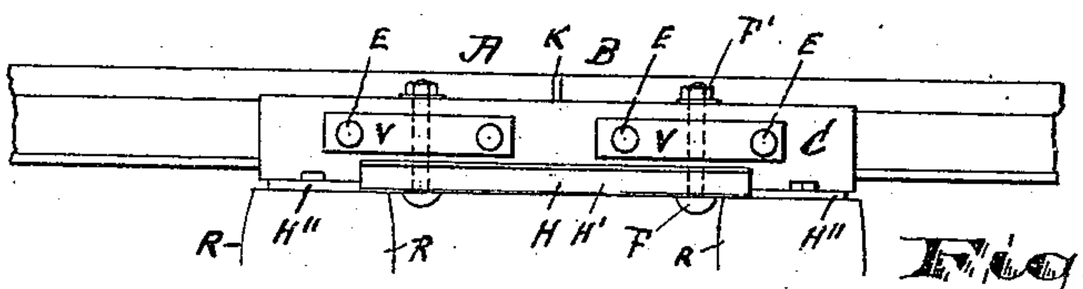

Fig. 7.

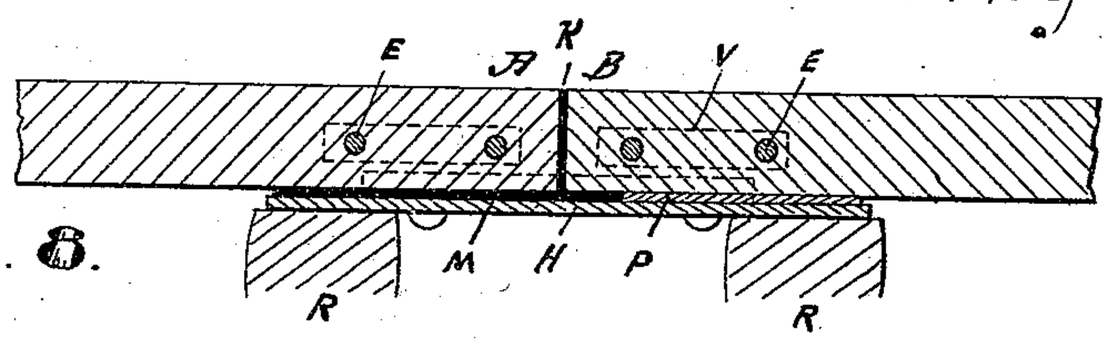

Fig. 8.

Fig. 9.

Witnesses
Robert Sollberger
Beatrice Charles.

Inventor.
James Neafie,
By Drake & Co. Atty's.

(No Model.) 2 Sheets—Sheet 2.

J. NEAFIE.

RAILWAY RAIL AND CONNECTION.

No. 551,688. Patented Dec. 17, 1895.

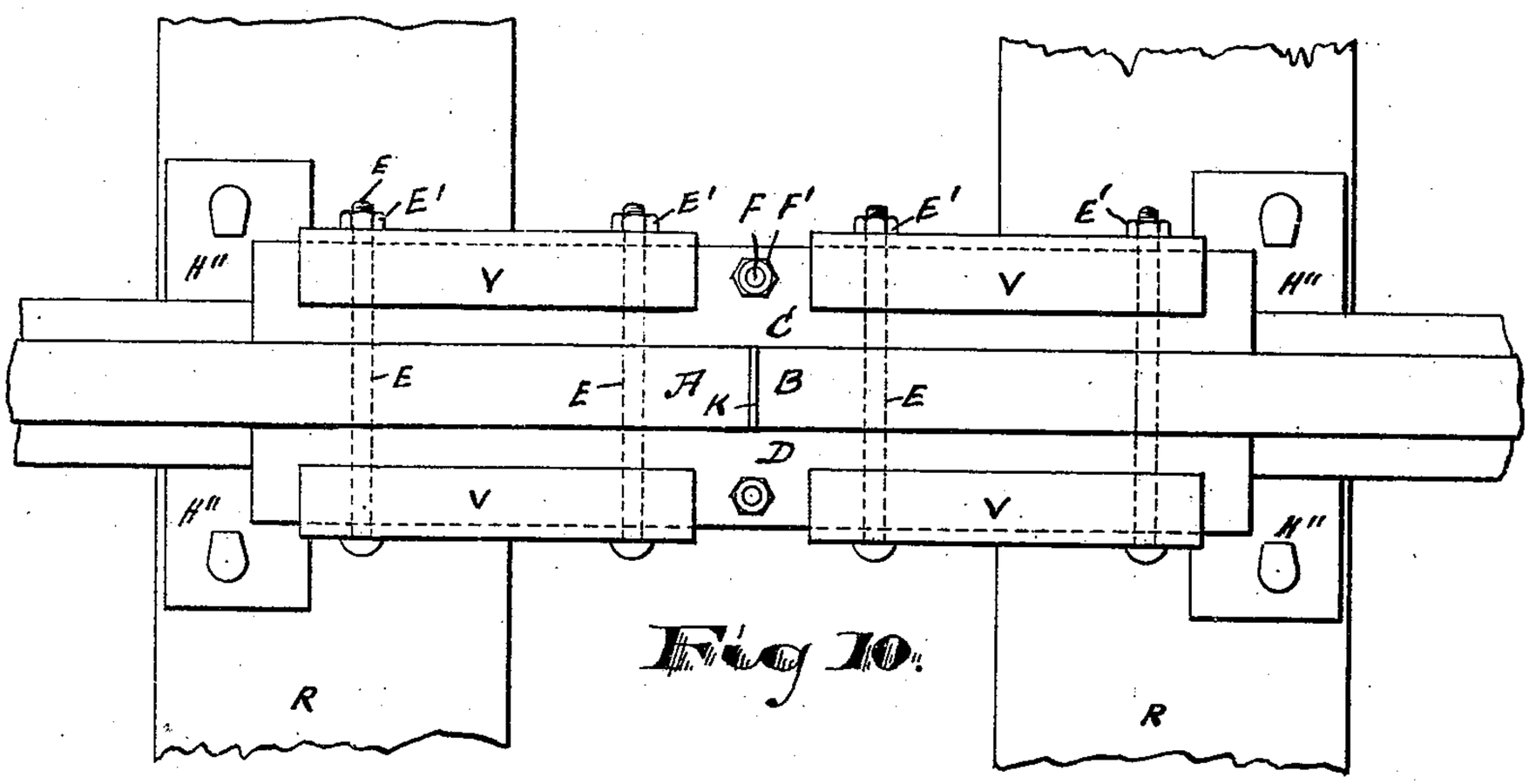

Fig 10.

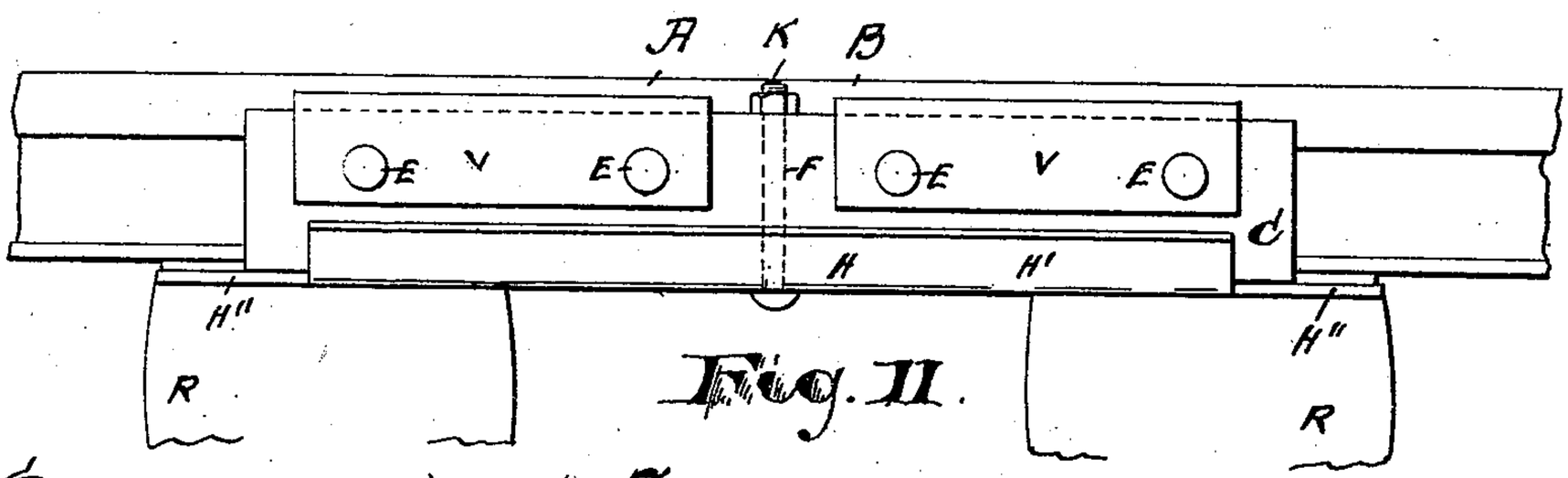

Fig. 11.

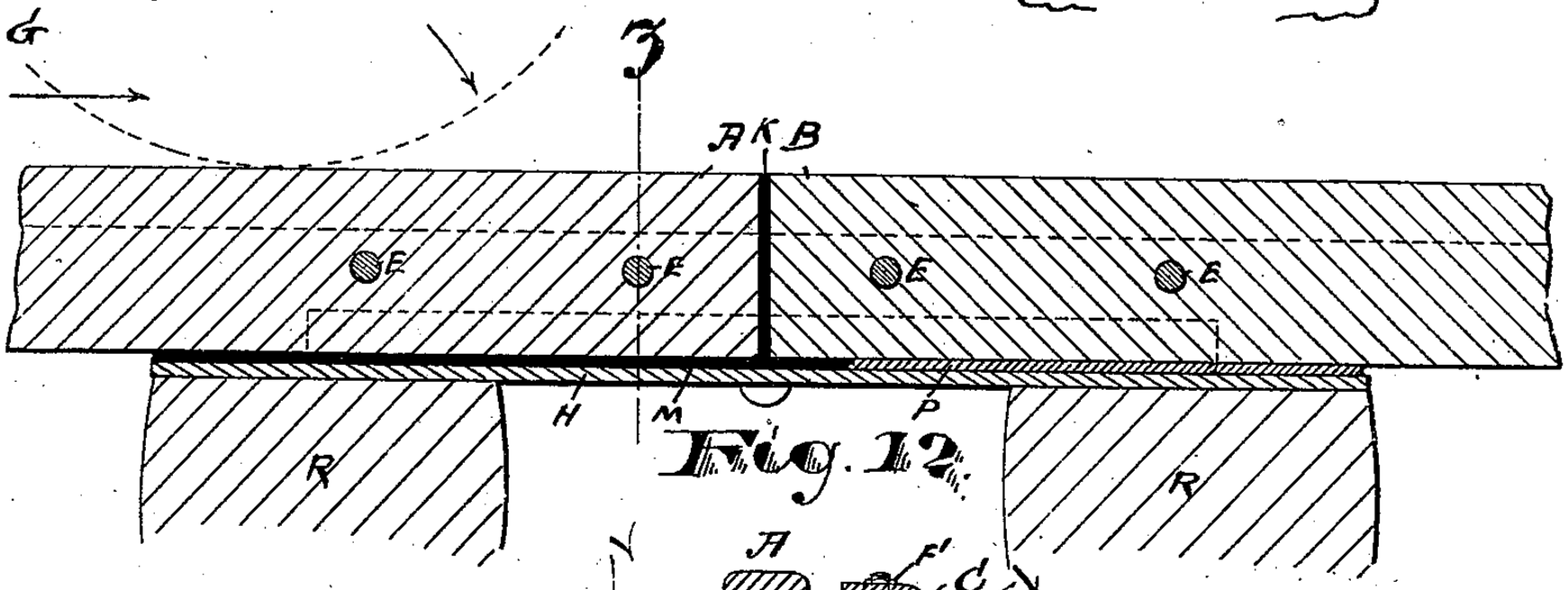

Fig. 12.

Fig. 13.

Witnesses
Robert Sollberger
Beatrice Charles.

Inventor:
James Neafie,
By Drake & Co Atty's.

UNITED STATES PATENT OFFICE.

JAMES NEAFIE, OF BOONTON, NEW JERSEY.

RAILWAY-RAIL AND CONNECTION.

SPECIFICATION forming part of Letters Patent No. 551,688, dated December 17, 1895.

Application filed April 4, 1895. Serial No. 544,392. (No model.)

To all whom it may concern:

Be it known that I, JAMES NEAFIE, a citizen of the United States, residing at Boonton, in the county of Morris and State of New Jersey, have invented certain new and useful Improvements in Railway-Rails and Connections; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This improvement relates to the joints or junctions of the several lengths of rails. The conditions to be fulfilled involve difficulties.

My invention is intended more particularly for use in connection with the block system of signaling by electrical currents transmitted through the rails and through wires arranged to bridge the joints therein, but the strength and slightly-elastic qualities imparted by the construction is of advantage in addition to the promotion of the insulation.

This invention also relates to rail-joints in which one rail is entirely insulated from the rail next adjacent.

The advantages attainable by the use of firm pieces of wood extending across the joint on each side of the rails have been long appreciated. I use wood in connection with metal. I make the track, in effect, very nearly uniform from end to end, with suitable provision for expansion and contraction, and with great facility for repairs.

The ties may be chestnut or other wood, bedded in broken stone or sufficiently firm earth. I cut into the ties adjacent to the joint on each side and let the rail-supports down into them so as to aid in preventing the track from spreading. The rails may be of any ordinary pattern.

The objects of the invention are to secure more perfect insulation of the rails from one another at the joint, to obtain increased durability, maintain the desired elasticity and admit the expansion and contraction due to varying temperatures and to secure other advantages and results, all substantially as will be hereinafter set forth in connection with the description of the working parts.

Referring to the accompanying drawings, in which like letters indicate corresponding parts in each of the several views, Figures 1 and 2 are plans showing the jointed rails when said rails are cut obliquely at their ends and showing slight variations in the arrangements of certain bolts. Figs. 3 and 4 are sections taken at lines *x* and *y*, respectively. Fig. 5 shows in plan two adjacent rail ends cut obliquely in oppositely-inclined planes. Fig. 6 is a perspective view of one of said rail ends. Fig. 7 is a side elevation of the said joined rails, and Fig. 8 a central longitudinal and vertical section of the same; and Fig. 9 is an edge view of certain plates on which the rails are seated, showing a variation in the thickness of the same. Fig. 10 is a plan of the joint when the ends of the rail are cut at right angles to the longitudinal lines. Fig. 11 is a side view and Fig. 12 a central vertical and longitudinal section of the same, and Fig. 13 is a section taken at line *z*.

In said drawings, A and B indicate the adjacent ends of two rails arranged in line.

C and D indicate splice-bars, which are stout pieces of hard wood and serve not only to keep the rails in line but admit of a limited elasticity. Said splice-bars are shaped by hand or machinery, as indicated in Figs. 3, 4 and 13, and are applied one on each side of the rail ends. They are of sufficient length to extend nearly the whole length of the truss-plate or chair underlying the said rail ends.

The truss-plate is marked H and serves as a bed for the rail ends. It is provided at its lateral edges with upwardly-extending inclined ribs which perform important functions and are marked H′. At each end said truss-plate is flat from longitudinal edge to edge. At the opposite ends, where it bears on the ties R R, lips H″ are formed, as shown, but between said lips each longitudinal edge H′ is turned upward at about an angle of sixty degrees along the mid-length, as shown in Figs. 3, 4, 7, 11, and 13, for purposes hereinafter referred to.

Each splice-bar C and D presses firmly downward on the inner face of the corresponding inclined edge H′. It also presses up under the shoulder of the tread on one side of each rail end A B and presses firmly down

upon the upper face of the bottom flange of each rail end on that side.

The rail ends are separated by a piece of insulation, preferably wood K, which may be about three-eighths of an inch thick and shaped to correspond to the cross-section of the rail.

G represents a portion of a car-wheel, the horizontally-disposed arrow indicating the direction in which it travels along the track and the downwardly-inclined arrow illustrating the direction of the strong percussive action with which the wheel passes from one rail to the second, the force of impact tending to hammer the second rail end and produce a lowered tread-surface and to force said second rail end below a proper relation to the first.

M is a flat piece of wood, hard rubber or fiber of a width about equal to or a little greater than the base of the rail, lying mostly under the rail A, and extending beyond the abutting points, so as to lie some four to six inches under the rail B. The remaining portion of the base of the rail B, at the truss-plate, is underlaid by a corresponding piece P, of iron or steel, which nearly corresponds in thicknsss with the wood, but at the first is a little thinner, as indicated in Fig. 9, to allow for a compression of the wood under the heavy load to which it is subjected. The iron or steel plate is not compressible, however, and thus, when the rail B receives the impact above referred to, said rail is not lowered in its relation to the rail A, but the tread-surfaces, when the insulating-wood is once compressed, are maintained at a true and uniform level or alignment. The insulating-plate M and the steel plate P are seated in line on the truss-plate H, and are held from lateral displacement by the downward extensions P′ of the splice-bars.

The ends of the rails are preferably sawed obliquely at the ends to more fully prevent a vibration as the car-wheel passes over the joint, as will be understood upon reference to Figs. 1, 2, 5 and 6. To prevent the rails from being thrown out of line because of such a construction, the lower part S of the rail is beveled oppositely from that of the tread portion T, as clearly shown in Fig. 5. By this means, should the rails lengthen by expansion, the tendency to lateral movement due to the corresponding bevels is counteracted by the opposite inclinations and thus the rails remain in proper alignment. To allow one rail to be removed from its seat without disturbing those next adjacent, the inclination of the lower bevels vary but slightly from a right angle and thus the space occupied by the insulation provides sufficient way for the rail to pass out sidewise from between the adjacent rails, as will be understood.

Of the splice-bars C and D, before referred to, the bar C on the outer side of the rail is higher than the bar D, the latter being on the inner face of the rail where the flange of the wheel passes, to allow a free passage to said flange. Each piece of wood is pressed firmly against the rail by bolts E, of proper length, which extend through holes drilled in the web of the rails and corresponding holes in the splice-bars C D, and in metal plates V, applied to the outer surfaces of the latter. These bolts are strained by nuts E′.

F F are vertical bolts extending upward through the truss-plate and through the splice-bars. They are firmly set by nuts F′.

The wooden splice-bars are cut at their bottoms wider than the flanges of the rail and extend from the web of the rail into engagement with the inclined upper faces at the edges of the truss-plate, and thus when the vertical bolts are screwed up and the splice-bars brought to bear hard upon the inclined surfaces, said bars are held against said web with great force. The wooden pieces are of a thickness to lie closely between the inclined surfaces on the under side of the tread and upper side of the flange and slightly against the vertical web, no bearing being made by the wood against the edge of the flange; but back from said edge the said splice-bars are provided with the extensions serving as keepers for the underlying plates for the rail above referred to. Should the splice-bars be devoid of such extensions or the extensions fail of being drawn down sufficiently far, then the upwardly-inclined ribs of the truss-plate will serve as keepers to prevent the insulation from working out of place. The said ribs, extending as they do from tie to tie, serve in addition to the other functions mentioned to give great strength to the truss-plate so that it is prevented from bending under the weight of the locomotive or car, and maintains a level seat for the plates M and P.

The metal plates V extend lengthwise of the joint and are in some cases rolled or otherwise formed at an angle corresponding with that of the wood to which they are to be applied. They form efficient supports to keep the wood in position and to receive and transmit thereto a strong tension from the bolts.

When the parts have become firmly and properly compressed together, the wood, acted on directly by the tension of the bolts E, and also wedgewise by the action of the inclined ribs H′, is urged with great force toward the center line of the rail. The pressure obliquely upward under the treads and obliquely downward upon the bottom flanges insures that the wood shall act favorably to support the joint.

There is a tendency in all fish-joints to the spreading apart of the lower portions. The wedge-like action of the inclined faces H′ urge the bottoms of the wood pieces inward with great force. This insures that the joint shall be supported very firmly laterally at the bottom.

The wood or vulcanized fiber between the rail ends and beneath the same both insulates and imparts elasticity but undue compression

due to the wheel, in crossing the joint, passing upon and hammering the second rail, and the consequent forcing of the tread-surface of said second rail out of alignment is prevented by the steel plate between the second rail and the truss-plate.

By means of the truss-plate extending from tie to tie as described and the joint being disposed between said ties the force of impact is distributed upon the two ties, and this further serves to maintain a perfect alignment, to prevent the wear upon the wood splice-bars such as would cause them to work loose and cause a frictional action and wear upon the insulating-plates and to hold said insulating plates more firmly and securely in position.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. I can omit the vertical bolts F and substitute horizontally-inclined bolts, as indicated in Fig. 4. Instead of having the plates V angular, they may be plain pieces, as in Figs. 7 and 8.

Having thus described the invention, what I claim as new is—

1. A pair of rail ends, in combination with the ties R, bed H, having flat ends resting on the ties, and having inclines H′, extending along the sides, and with wood pieces C, D, matching within such inclines, and means as bolts and nuts for holding the wood firmly both laterally and vertically, so that the wedging effect of the inclines shall act through the mass of wood, C, and D to support the rail ends both laterally and vertically substantially as herein specified.

2. A pair of rail ends, in combination with the ties R, bed H, having flat ends resting on the ties, and having inclines H′, extending along the sides, and with wood pieces C, D, matching within such inclines, and means as bolts and nuts for holding the wood firmly both laterally and vertically, so that the wedging effect of the inclines shall act through the mass of wood C, D, to support the rail ends both laterally and vertically, and with the insulating material G, held between the bases of the rail ends, all arranged to serve substantially as herein specified.

3. The rail ends, A, B, having the joint at the base nearly at right angles to the track, and the joint at the tread oblique, in combination with the ties R, recessed as shown, bed H, having flat ends resting on the ties, matching in such recesses and having inclines H′, and with wood pieces C, D, matching within such inclines, and means as bolts and nuts for holding the wood firmly both laterally and vertically so that the wedging effect of the inclines shall act through the mass of wood C and D, to support the rail ends both laterally and vertically, and with the metal plates V receiving the action of the bolts and presenting broad bearings therefor all arranged to serve substantially as herein specified.

4. A pair of rail ends in combination with the ties R, recessed as shown, bed H, having flat ends resting on the ties, matching in said recesses, and having inclines H′, and with the wood pieces C and D, matching within such inclines, and means as bolts and nuts for holding the wood firmly both laterally and vertically so that the wedging effect of the inclines shall act through the mass of wood C and D to support the rail ends both laterally and vertically, and with the metal plates, V, receiving the action of the bolts and presenting broad bearings therefor, and with the insulating material, G, all arranged for joint operation substantially as herein specified.

5. In an insulating chair for railroad joint supports, the insulating plate, M, interposed between one rail-end A, and the bed, and extending under a portion of the second rail-end, B, in combination with a corresponding but slightly thinner metal plate, P, between the remaining portion of such second rail-end and the bed, so as to efficiently support the rail-ends and resist the concussion of car wheels moving from A, to B, and to maintain the insulation, all substantially as herein specified.

6. The improved railway joint herein described in which is combined with the rail ends A, B, and a bed, H, an insulating plate, M, interposed between one rail and the bed end and extending under a portion of the second rail end and a metal plate, P, between said second rail end and the bed, to prevent undue compression of the insulation, substantially as set forth.

7. The improved railway joint herein described in which is combined with the rail ends, A, B, and bed, an electrical insulation interposed between the first of said rails and the bed and supporting the said rails and a metallic plate interposed between the other of the rails and the bed and taking the concussion due to the passage of the car wheel over the joint from the first to the second of said rails, substantially as set forth.

8. The combination with the railway rails having tread and flange portions, a bed plate, H, non-conductive splice bars extending across the joint formed by the abutting ends and arranged between said flange and tread portions, suitable bolts, and an insulation arranged between said abutting ends, of an insulating plate arranged under one of said rails and a metallic plate arranged beneath the other of said rails, and adapted to take the concussive force of the car wheels as they pass from the first to the second rail, substantially as set forth.

9. The improved railway joint herein described, in which is combined with the rails, a truss-plate underlying the same and having upwardly projecting side ribs, a plate, M, of insulation between the rails and truss plate, splice bars, C, and D, pressing on said rib and upwardly under the shoulder of the rail tread and holding said rail down upon said insulation, and bolts extending through said bars and holding said splice bars, truss-plate, rails

and insulating plate in relative positions, substantially as set forth.

10. The improved railway joint herein described in which is combined with the rails and a truss-plate underlying said rails and having upwardly projecting ribs at the longitudinal edges, a thin plate, M, of insulation seated on said truss-plate, the ends of said rails being seated on said plate of insulation, splice bars, C, and D, arranged on opposite sides of said rails and bolts extending through said splice bars and rails and truss-plate and pressing the splice bars inward against the tread and flange of the rail and the truss-plate and splice bars together and holding the insulation between the flange of the rail and the truss-plate, substantially as set forth.

11. The improved railway joint herein shown and described in which is combined, the railway rails having tread and flange, a truss-plate, a plate of insulation arranged between the rail and truss-plate of about the width of the flange, splice bars having downward extensions, P′, preventing lateral displacement of the insulating plate and bolts holding said parts in relative positions, substantially as set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 27th day of March, 1895.

JAMES NEAFIE.

Witnesses:
CHARLES H. PELL,
BEATRICE CHARLES.