H. F. ROACH.

RAIL JOINT.

APPLICATION FILED OCT. 14, 1909.

954,649.

Patented Apr. 12, 1910.

3 SHEETS—SHEET 1.

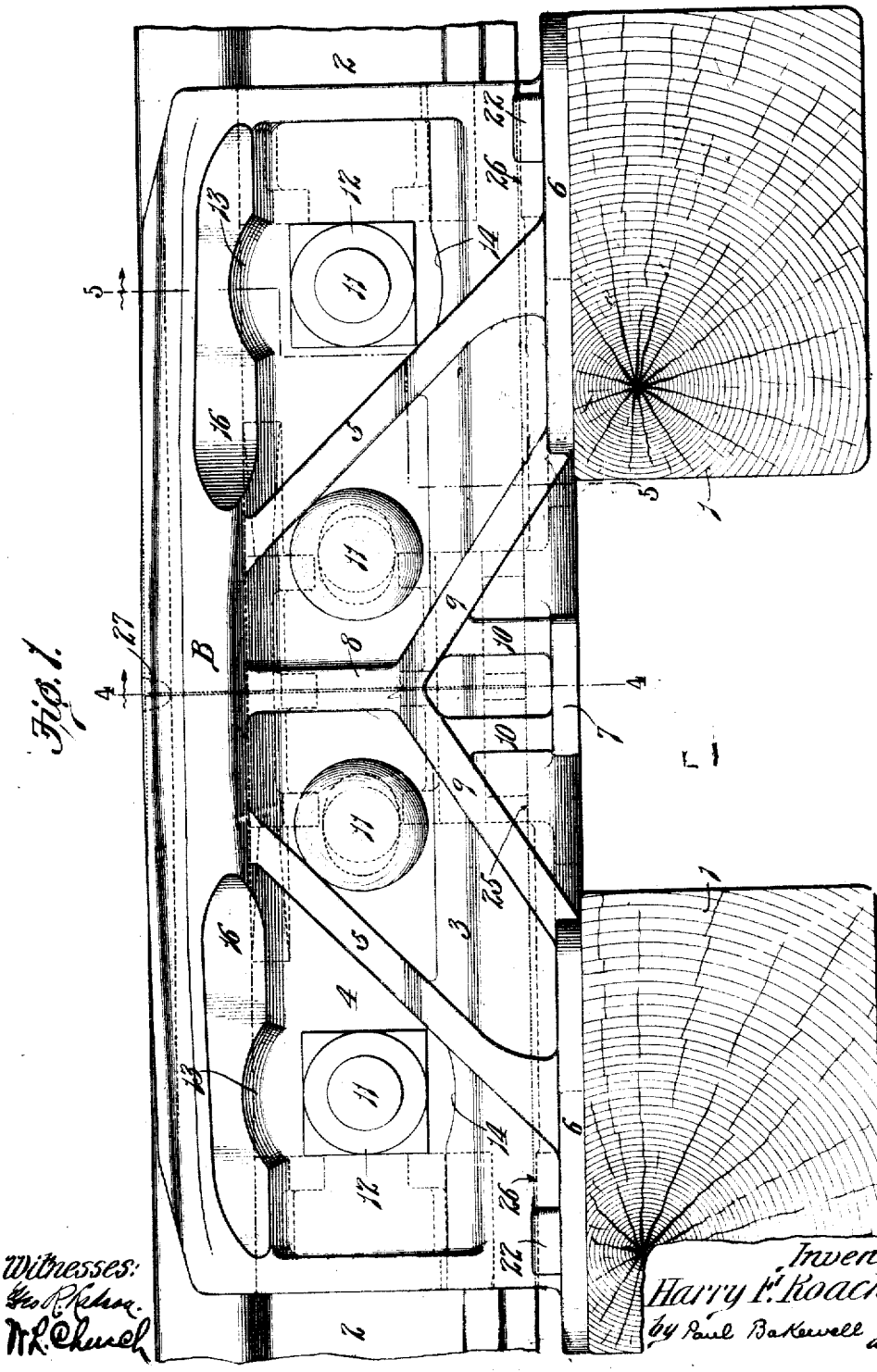

Fig. 1.

Witnesses:
Geo. P. Nelson.
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Harry F. Roach.
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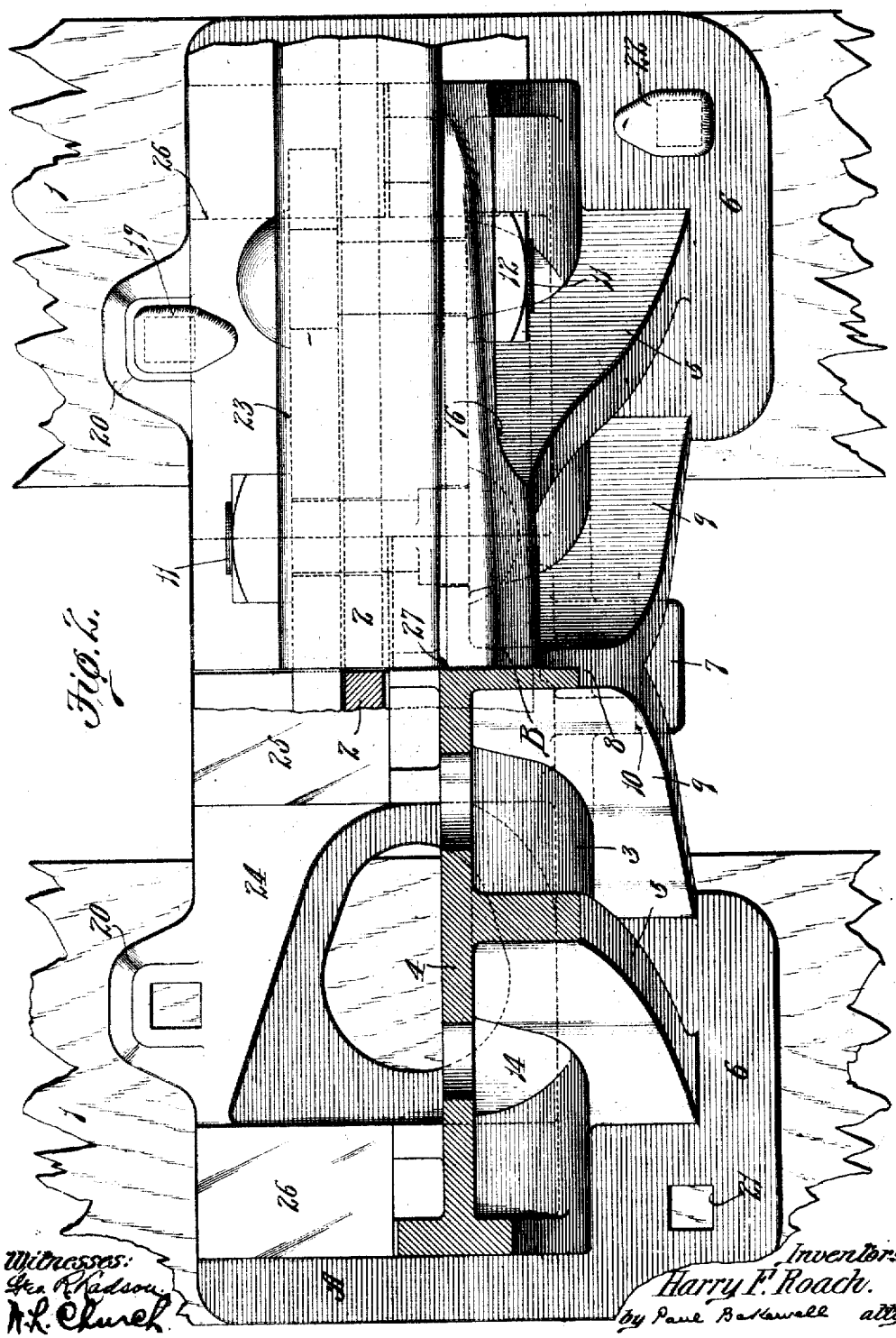

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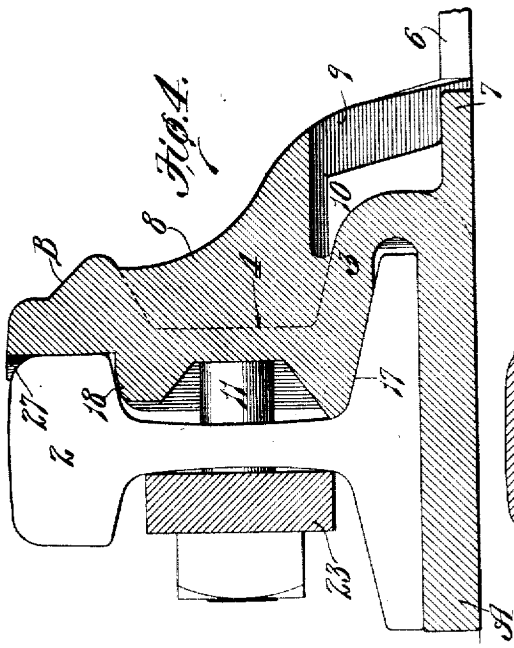

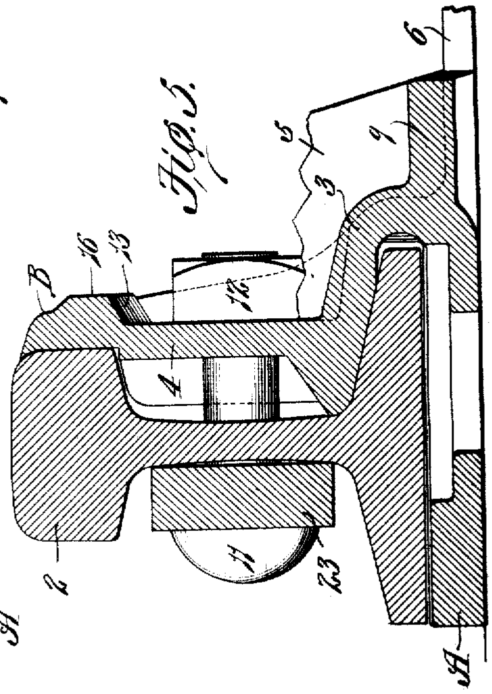

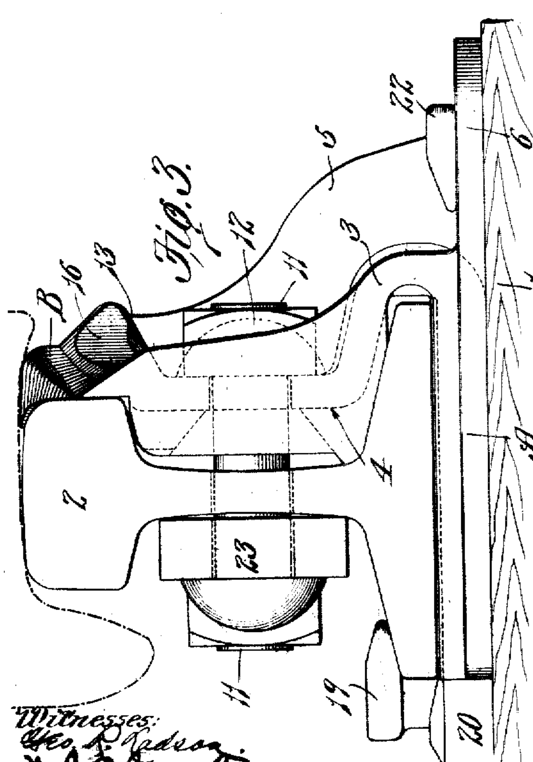

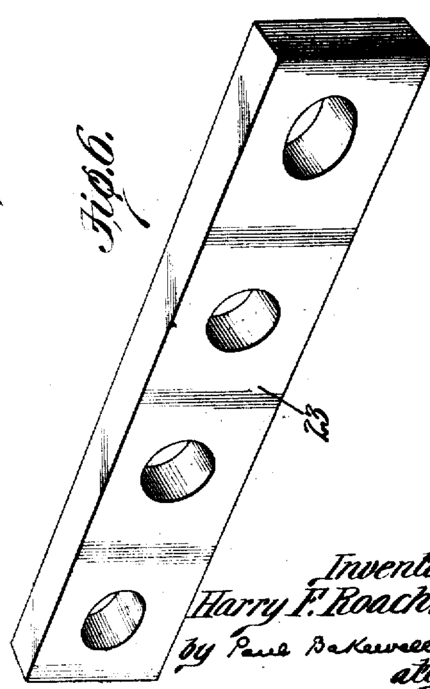

Witnesses:
Geo. R. Judson.
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Inventor:
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UNITED STATES PATENT OFFICE.

HARRY F. ROACH, OF ST. LOUIS, MISSOURI.

RAIL-JOINT.

954,649. Specification of Letters Patent. Patented Apr. 12, 1910.

Application filed October 14, 1909. Serial No. 522,639.

To all whom it may concern:

Be it known that I, HARRY F. ROACH, a citizen of the United States, residing at St. Louis, Missouri, have invented a certain new and useful Improvement in Rail-Joints, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to rail-joints, and particularly to rail-joints of that type which are provided with a wheel-tread member that extends across the joint between the ends of the abutting rails so as to reinforce and strengthen the rails at the joint and also provide a bearing surface for the wheels.

One object of my present invention is to provide a rail-joint of the type referred to which is so designed that it can be made comparatively light but still be strong enough to withstand the strains to which it is subjected under normal conditions without liability of breakage.

Another object is to provide a trussed rail-joint that lies entirely above the track ties on which the joint rests.

Another object is to provide a braced rail-joint that can be used either as a suspended or a supported joint, and having means for receiving the usual bolts that pass transversely through the track rails.

Another object is to provide a rail-joint comprising a base provided with an integral web arranged on one side of the rails for preventing lateral movement thereof in one direction, a wheel-tread member on said web, and openings in said base through which spikes or other suitable members pass to engage the base flanges of the rails and thus prevent them from moving laterally in the opposite direction, said openings being completely surrounded by the metal in the base.

Other objects and desirable features of my invention will be hereinafter pointed out.

Figure 1 is a side elevational view of a rail-joint constructed in accordance with my invention; Fig. 2 is a top plan view partly in horizontal section of the rail-joint shown in Fig. 1; Fig. 3 is an end elevational view of said joint; Fig. 4 is a vertical cross sectional view taken on approximately the line 4—4 of Fig. 1; Fig. 5 is a vertical cross sectional view taken on approximately the line 5—5 of Fig. 1; and Fig. 6 is a perspective view of the splice bar.

Referring to the drawings which illustrate the preferred form of my invention, A designates a base plate that rests on the track ties 1, and forms a support for the abutting rails 2. Said base plate is provided with an integral portion 3 that partially laps over the base flanges of the rails, as shown in Figs. 3, 4 and 5, and a vertically disposed web 4 is integrally connected to the inner edge of said overlapping portion 3, said vertical web being provided at its upper edge with a wheel-tread member B. This wheel-tread member B extends across the joint between the ends of the rails so as to reinforce and strengthen the end portions of the rails and also provide a tread surface for a wheel that passes over the joint, and said wheel-tread member is so formed that it will permit a perfect, flat or double-flanged wheel to pass over the joint without subjecting the rolling stock to a perceptible or excessive perpendicular shock or jar, the term "double-flange" being used to designate a wheel whose tread surface has become worn to such a degree that it is approximately concave or channel-shaped in cross section, as shown in Fig. 3. The top face or wheel-tread surface of the member B is of greatest width adjacent the joint between the ends of the rails and then diminishes gradually in width toward its opposite ends, as shown clearly in Fig. 2, said top face or wheel-tread surface also varying gradually from an approximately horizontal plane at the center of said member to an inclined plane at the ends of said member so as to produce a wheel-tread surface of varying angularity. In other words, the wheel-tread surface of the member B twists gradually from an inclined surface at each end of said member into an approximately horizontal surface at the center of said member so that when a double-flanged wheel reaches the member B it will pass onto same without a perceptible vertical shock or jar and be shifted laterally by the gradual variation in the shape of the wheel-tread surface of the member B. It will thus be seen that the twisting wheel-tread surface of the member B not only forms a substantial supporting surface for an imperfect or double-flanged wheel while it is pass-

ing over the joint but said surface also acts as a guide to cause a double-flanged wheel to be gradually shifted laterally, and thus prevent the outer flange of the wheel from bearing on the member B in such a manner that the wheel is subjected to an excessive perpendicular shock. A construction of this character causes an imperfect or double-flanged wheel to pass over the joint smoothly irrespective of the lateral position of the wheel relatively to the rail for if the outer flange or double flange of the wheel hugs the rail when the wheel reaches the member B the twisting tread surface of said member will cause the wheel to shift laterally far enough to prevent the outer flange from engaging the member B in such a manner that the wheel is subjected to an excessive vertical shock.

A pair of oppositely inclined braces 5, which are arranged on the outer face of the web 4 and overlapping portion 3 of the base, strengthen said parts and also stiffen the base, the upper ends of said ribs being integrally connected to the central portion of the wheel-tread member B, and the lower ends of said ribs being flared outwardly and integrally connected to laterally projecting portions 6 of the base A. These ribs 5, of course, strengthen the wheel-tread member and transmit the strains to which said member is subjected directly to the base, and as said ribs are flared outwardly they serve as lateral reinforcements for the wheel-tread member B and the web to which it is connected and prevent said parts from deflecting outwardly when the rails 2 exert excessive lateral pressure on the same.

By referring to Fig. 1 it will be seen that the upper ends of the oppositely inclined diagonal ribs 5 are spaced apart instead of being integrally connected together, thereby producing a structure that can deflect slightly under loads but which is strong enough to withstand the strains to which it is subjected under normal conditions.

The laterally projecting portions 6 of the base A are so arranged that when they bear on two track ties the joint between the ends of the rails will be located intermediate said ties, as shown in Fig. 1, so as to produce what is commonly called a suspended joint. I also prefer to provide the base plate A with a laterally projecting part 7 arranged midway between the laterally projecting portions 6 of the base so that it will rest upon a track tie placed underneath the joint between the ends of the rails 2 and thus produce a supported joint. At approximately the middle of the vertical web 4 is a vertical rib 8 which merges into two oppositely inclined ribs 9 whose lower ends are connected to the laterally projecting portions 6 of the base plate, the upper end of said vertical rib 8 merging into the under side of the wheel-tread member B. A pair of short vertical ribs 10 is also located between the laterally projecting part 7 of the base and the inclined ribs 9 so as to reinforce and strengthen the joint at that point where the greatest deflection is liable to occur in a suspended joint, said ribs 10 also assisting the inclined ribs and the vertical web to carry their load in a suspended joint. The inclined ribs 9 coöperate with the base to form a truss that bridges the space between the laterally projecting track tie-engaging portions 6; and the vertical rib 8, which is interposed between this truss and the wheel-tread member B, acts as a strut that transmits the stresses which the wheel-tread member is subjected to, directly to said truss.

By reinforcing the web 4 and the parts associated therewith in the manner above described I produce a structure which is capable of withstanding great downward stresses and lateral stresses without liability of breaking under normal loads, and said reinforcing means are so located that sufficient space is provided for the bolts 11 which are usually passed transversely through the webs of the rail so as to limit the movement of the rails caused by expansion and contraction of the rails and also assist to retain them in position. That is to say, the inclined ribs 9 and vertical ribs 8 and 10 impart sufficient strength to the wheel-tread member B and the vertical web 4 at the middle thereof that it is possible to arrange the inclined ribs 5 far enough away from the transverse center of said web and wheel-tread member to provide a sufficient clearance between the ribs for the bolts 11 which pass transversely through the web 4 and through the track rails. I prefer to arrange the two intermediate bolts 11 with their heads on the outside of the web 4, as shown in Fig. 1, and the two end bolts 11 with their nuts 12 on the outside of said web. The under side of the wheel-tread member B is provided with recesses 13 and the outer surface of the overlapping portion 3 of the base plate is recessed at 14 directly underneath the end bolts so as to provide a clearance for the nuts 12 and thus permit them to be turned on the bolts, the side face of the wheel-tread member B being cut away adjacent the recesses 13, as indicated by the reference character 16, so as to permit a track wrench to be used to turn the nuts 12.

The inner face of the wheel-tread member B bears against the side faces of the heads of the rails, as shown in Fig. 4, and the vertical web 4 is provided on its inner face with a raised bearing surface 17 which is adapted to bear upon the base flanges of the rails, as shown in Fig. 4, said web also being provided adjacent its upper edge with a thickened portion 18 so as to reinforce and strengthen same. This thickened portion

18 lies under the heads of the rails but it is not intended to contact directly with said heads although it is immaterial if said thickened portion bears against the heads at the terminals of the rails; namely, at the joint between the abutting ends of the rails. It is essential, however, that this thickened portion 18 does not bear against the heads of the rails throughout its entire length in view of the fact that the base plate is so designed that the rails can deflect slightly when a load is imposed on same, as hereinafter described. The overlapping portion 3 of the base, the vertical web 4, and the wheel-tread member B prevent the rails from moving laterally in one direction, and said rails are prevented from moving laterally in the opposite direction by means of spikes 19 or other suitable members which pass through openings formed in laterally projecting lugs 20 on the base plate, the heads of said spikes lapping over the base flanges of the rails, as shown clearly in Fig. 3. The laterally projecting portions 6 of the base are also provided with openings 21 through which spikes 22 pass to connect said base plate to the track ties. In view of the fact that the openings through which the spikes 19 pass are completely surrounded by portions of the base plate, the lateral stresses which the flanges of the rails exert on said spikes will be transmitted to the base plate and thus bring the spikes 22 on the opposite side of the base plate into service, said spikes 19 and 22 thus coöperating directly with each other to retain the base plate in position and also prevent the rails from moving laterally in one direction.

If desired, a splice bar 23 can be arranged on one side of the webs of the rails, as shown in Figs. 3 and 4, but the main function of this splice bar is to hold the bolts 11 in proper position as the spikes 19 constitute the chief means for preventing the rails from moving laterally away from the wheel-tread member.

The intermediate portion of the base plate is preferably thickened at 24, as shown in Fig. 2, so as to impart great strength to the base plate at this point, and raised bearings 25 and 26 are formed on the base plate adjacent the center and ends thereof, respectively, for the base flanges of the rails, the terminals of the rails resting on the raised bearing 25 at the center of the base plate, and the bearings 26 being normally spaced away from the base flanges of the rails so as to permit the rails to deflect slightly when they are subjected to downward pressure.

The wheel-tread member B preferably conforms to the side face of the rail heads so that a wide joint will not be formed between said member and the rails, and the part of said member that partially laps over the upper corner of the rail head, as shown in Figs. 3 and 4, is notched out at 27, as shown in Fig. 1, adjacent the joint between the rails so that the metal in said overlapping portion will not be jammed down into said joint and thus prevent the rails from expanding. A joint of the construction above described overcomes the necessity of spacing the track ties during the operation of relaying rails or building a new track for every portion of the joint lies above the top faces of the track ties. Furthermore, said joint is very strong and capable of carrying great loads for the base plate A acts as the tension member of a truss whose compression members consist of the oppositely inclined diagonal ribs 9.

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

1. In a rail-joint, a rail-supporting base provided with a portion that partially laps over the base flanges of the rails which rest on the base, a web on said overlapping portion provided with a wheel-tread member, a pair of laterally projecting portions on said base which are adapted to rest on track ties, a truss bridging the space between said laterally projecting portions, and a strut interposed between said truss and the wheel-tread member.

2. In a rail-joint, a base provided with a vertical web, a wheel-tread member carried by said web, laterally projecting portions on said base which are adapted to rest on track ties, oppositely inclined braces interposed between said wheel-tread member and laterally projecting portions and having their lower ends flared outwardly, a truss bridging the portions and connected to the thickened portions of the base, and a strut interposed between said truss and wheel-tread member.

3. In a rail-joint, a base provided with a web whose upper edge is thickened, laterally projecting portions on said base which are adapted to rest on track ties, a truss bridging the space between said laterally projecting portions and connected to the thickened portion of said web, and oppositely inclined braces connected to the thickened portion of said web and having their lower ends flared outwardly and connected to the laterally projecting portions of said base.

4. In a rail-joint, a rail support that lies entirely above the track ties, a vertical web on said support that lies on one side of the webs of the rails which rest upon said support, said web being provided at its upper edge with a thickened portion, members arranged between the rail support and the thickened portion of said web and coöperating with said support to form a truss, and a strut interposed between said truss and the thickened portion on said web.

5. In a rail-joint, a rail-supporting base, a vertical web on said base provided at its upper edge with a thickened portion, laterally projecting members on said base which are adapted to rest on a pair of spaced track ties, members that coöperate with the base to form a truss which bridges the space between said tie-engaging members, a strut interposed between said truss and the thickened portion on said web, and oppositely inclined braces interposed between said thickened portion and base.

6. In a rail-joint, a vertical web provided with a wheel-tread member that extends across the joint between the ends of the rails, a truss arranged above the track ties on which the rails rest, and means for transmitting the stresses which said wheel-tread member is subjected to directly to said truss.

7. In a rail-joint, a base having a web that carries a wheel-tread member, members connected to said base and coöperating therewith to form a supporting truss, and a strut interposed between said truss and wheel-tread member.

8. In a rail-joint, a base for supporting the rails, a vertical web on said base provided with a wheel-tread member that extends across the joint between the ends of the rails, members on the upper side of the base that coöperate with the base to form a truss, and a strut interposed between said truss and the wheel-tread member on said web.

9. In a rail-joint, a base having a vertical web that is provided adjacent its upper edge with a thickened portion, oppositely inclined diagonal ribs on the outer face of said web which have their upper ends spaced away from each other and their lower ends flared outwardly and connected to said base, and a pair of independent oppositely inclined ribs connected at their lower ends to the base at a point above the track ties and having their upper ends merging into a vertical strut which is connected to the thickened portion on said web.

10. In a rail-joint, an approximately flat base whose under side is free from depending projections or portions that prevent the base from being moved transversely of the ties on which it rests, a continuous web on said base whose length is at least equal to the distance between the pair of spaced track ties, said web having a thickened portion, and a bracing means arranged between the base and the thickened portion on the web and consisting of an approximately vertically disposed strut whose lower end is connected to a pair of oppositely inclined diagonal ribs that bear directly on the base.

11. A rail-joint comprising a truss which consists of an approximately flat tension member that lies entirely above the top faces of the track ties, and oppositely inclined compression members that have their upper ends connected together and their lower ends connected to said tension member, a web carried by said tension member and provided with a thickened portion, and a strut interposed between said thickened portion and the compression members of said truss.

12. In a rail-joint, a rail support having an approximately flat under side that lies entirely above the top faces of the track ties upon which the support rests, a vertical web that lies at one side of the rails that rest upon the support, said web being provided with a longitudinally extending thickened portion, and oppositely inclined strengthening devices on one side of said web having their lower ends connected to the support and their upper ends connected together and terminating below the thickened portion on said web.

13. In a rail-joint, a rail support having an approximately flat under side that lies entirely above the top faces of the track ties upon which the support rests, a vertical web carried by said support and provided with a longitudinally extending thickened portion, an approximately inverted V-shaped strengthening device on said web connected at its lower end to the support, and a vertically disposed member interposed between the upper end of said strengthening device and the thickened portion on said web.

14. A rail-joint, comprising a truss that is arranged above the track ties, a vertical web carried by said truss and arranged on one side of the webs of the rails, a wheel-tread member on said vertical web that extends across the joint between the ends of the rails, and a strut arranged between said truss and said wheel-tread member.

15. In a rail-joint, a base, a vertical web on said base provided with a thickened portion, a pair of spaced tie-engaging wings or flanges that project laterally from one edge of the base, and a stress-transmitting means arranged between said flanges and the thickened portion on the web and consisting of a vertically disposed strut and oppositely inclined diagonal ribs connected at their upper ends to said strut and at their lower ends to said laterally projecting wings or flanges.

16. In a rail-joint, a vertical web that lies on one side of the webs of the rails, said web being provided adjacent its upper edge with a thickened portion, a supporting truss arranged entirely above the track ties and having a tension member on which the rails rest, and a stress-transmitting means arranged between said truss and the thickened portion on said web.

17. In a rail-joint, abutting rails, a rigid base plate provided with an integral raised

portion on which the terminals of the rails normally rest, and independent integral raised surfaces that are normally spaced away from the base flanges of the rails so as to form a support for the rails when they are deflected by a load passing over same.

In testimony whereof I hereunto affix my signature in the presence of two witnesses, this eleventh day of October 1909.

HARRY F. ROACH.

Witnesses:
WELLS L. CHURCH,
GEORGE BAKEWELL.

Correction in Letters Patent No. 954,649.

It is hereby certified that in Letters Patent No. 954,649, granted April 12, 1910, upon the application of Harry F. Roach, of St. Louis, Missouri, for an improvement in "Rail-Joints," an error appears in the printed specification requiring correction as follows: Page 3, line 104, the words "portions and connected to the thickened" should be stricken out and the words *space between the laterally projecting* inserted instead; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 17th day of May, A. D., 1910.

[SEAL.]

C. C. BILLINGS,
Acting Commissioner of Patents.

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