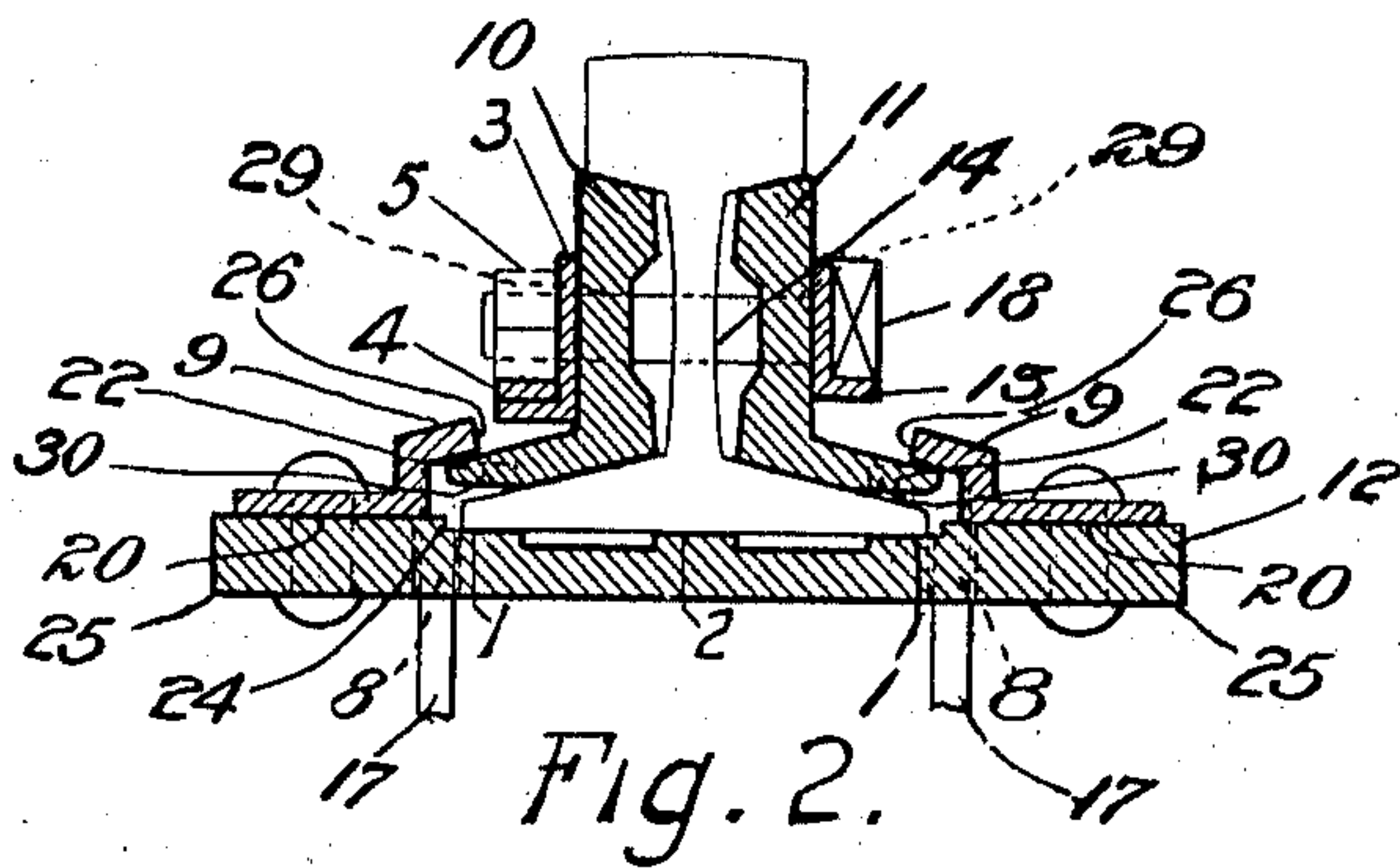
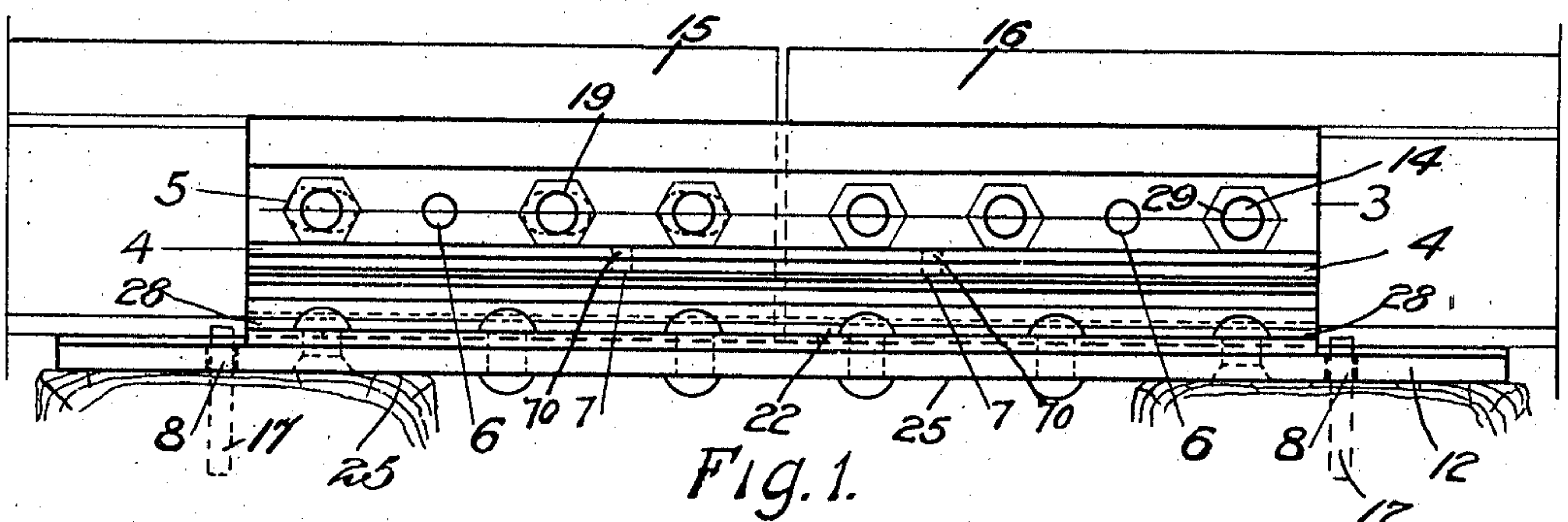


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RAILWAY RAIL SPLICE.
APPLICATION FILED MAY 29, 1907.

945,415.

Patented Jan. 4, 1910.



Mark Oppenhein
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WITNESSES

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RAILWAY-RAIL SPLICE.

945,415.

Specification of Letters Patent.

Patented Jan. 4, 1910.

Application filed May 29, 1907. Serial No. 376,371.

To all whom it may concern:

Be it known that I, ISRAEL NOAH PRENOVICH, a citizen of the United States, and a resident of the city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Railway-Rail Splices, of which the following is a specification.

My invention relates to improvements in railway-rail splices, and the primary object of my invention is to provide more efficient and more permanent means, than usual, for supporting the meeting ends of railway-rails without interfering with the required longitudinal sliding of the said ends of the rails.

A further object of my invention is to prevent by means of the splices, a lateral displacement and a bodily longitudinal movement of the rails.

I attain my objects by the construction, illustrated in the accompanying drawing, forming part of this specification, in which—

Figure 1, is an elevation, and Fig. 2, a cross-section of the splice (the ends of a pair of adjacent rails 15 and 16, are shown in fine lines).

Similar numerals refer to similar parts throughout the two views.

The main parts of the splice are: two fish-plates 10 and 11, one base-plate 12, and two Z-bars 9—9, riveted to the marginal ends of the said base-plate and adapted to interlock the latter with the fish-plates 10 and 11. The fish-plates 10 and 11, are alike, and are, in general, of the ordinary shape, consisting each of an upright member, adapted to bear against the inclined surfaces of the top flange of the rails, and an oblique member, continuous with the lower edge of the upright member and adapted to rest on the inclined surfaces of the lower rail-flanges. The longitudinal lower ends 22—22, of the fish-plates, are rounded up somewhat, in order to facilitate the erection and removal of these fish-plates sidewise from the rails, and around the upper ends of the Z-bars. The idea as such, to erect, and to remove the fish-plates sidewise from the rails is old. The fish-plates are connected with each other and with the webs of the rail-ends of bolts 14. An angle-plate 3, comprising two legs, at right angles to each other, and having in one of its legs the holes 6, and 29, and in the other leg the holes 7, may be

connected with the fish-plate 10, by rivets, passing through the holes 6. A flat bar 4, having the holes 70, matching the holes 7, of the outstanding leg of the angle-plate 3, is connected with the latter by bolts, passing through the said holes; the flat bar in combination with the outstanding leg of the angle-plate 3, is adapted to engage the nuts 5 of the bolts 14. An angle-plate 13, comprising two legs, at right angles to each other, and having in one of its legs the holes 6 and 29 (these holes are not shown in the drawings), may be similarly connected with the fish-plate 11, by rivets, passing through the holes 6. The bolts 14, pass also through the holes 29, in the angle-plates 3 and 13, thus additionally connecting the latter with the fish-plates and with the webs of the rail-ends. The base-plate 12, rests on the two ties adjacent to the joint, and has four holes 8, for spikes to pass through. The plate may have ribs 1—1 and 2 on its top side, serving as an immediate base-surface for the rail-ends 15 and 16, and marginal ribs 20—20, projecting above the base of rail, serving as bases for the Z-bars 9—9, as shown in the drawings. The inclined top flanges of the Z-bars, run parallel to, and project partly over the oblique members of the corresponding fish-plates.

A free space 30 is provided between the adjacent surfaces of the top flanges of the Z-bars 9—9, and the oblique members of the fish-plates 10 and 11 and the surfaces in question will only be in contact with each other when the rail-ends and splice-plates are deflected a trifle, under the influence of the passing trains. The principal object of the free space 30, is, first, to make possible for the rail-ends 15 and 16, to be raised up somewhat, from the surface they are supported on, so as to clear the interlocked parts of the projections, forming the roughness of their bottoms and the roughness of the base-surface, while sliding on the latter, in consequence of the expansion and contraction of the rails, by changes in the temperature; and second, to make the inward movements of the fish-plates, required from time to time in order to make up for the wear of the metal of both, the fish-plates and the rails, independent of the Z-bar construction. The initial width of the free space 30, is made as small as practicable; it is augmented, however, somewhat, after the splice has been in

use for some time, in consequence of the wear of the metal, at the contact surfaces of the rail-ends and the base-plate, caused not only by the pressure of the passing trains, but also by the longitudinal sliding of the rail-ends. The part of the top-surface of the base-plate 12, serving as an immediate base for the rail-ends 15 and 16, or the tops of the ribs 1—1 and 2, if used, may be planed, in order to reduce the roughness of the same. The initial width of the free space 30, can be reduced to a minimum, in this case, and the wear of the metal at the contact surfaces of the rail-ends, and the base-plate, especially the part of the wear, which is caused by the sliding of the rail-ends, will be greatly reduced. The rail-ends and the splice-plates will in this latter case be deflected but very little, before the interlocking between the fish-plates and the base-plate will become tight and effective, when under the influence of the passing trains. In case the part of the top surface of the base-plate 12, serving as a base for the rail-ends 15 and 16, or the top of the ribs 1—1 and 2, if used, are planed, the base-plate 12, shall preferably be made of wrought iron, instead of steel, as the former metal is much easier to plane than the latter.

The main object of the ribs 1—1 and 2, is to reduce to a minimum the area of the part of the top-surface of the base-plate 12, which may be planed. The ribs 20—20, limit the part of the top-surface of the said base-plate, which may be planed, and are also adapted to prevent the rails from sliding off the base-plate laterally, as will be described later.

The rivets connecting the Z-bars 9—9, with the base-plate 12, are made of rivet-steel. They must not be made of wrought iron, as the pull on their heads is parallel to the fiber of the metal of the rivet-stem, and iron is not strong enough for stresses of this kind.

The base-plate 12, is fixed in position by the four spikes 17, passing through the four holes 8, provided for this purpose, in the said plate; and the rail-ends 15 and 16, are prevented from changing their location laterally, when under the influence of the passing trains by having their lower flanges, in combination with the oblique members of the fish-plates 10 and 11, wedged in between the base-plate 12, and then riveted to the latter Z-bars 9—9, abutting tightly against the top flanges of the Z-bars.

I prefer to locate the four spike-holes 8, two at each end of the base-plate 12, and in such a way, that the spikes passing through the two holes, at each end of the base-plate, are adapted to engage laterally, the two sides of the lower flange, of one of the rail-ends, and longitudinally the two adjacent corners 28—28, of the lower ends 22—22, of the fish-plates. By this arrangement, the four spikes

17, while acting jointly to prevent a lateral displacement of each of the rail-ends 15 and 16, by keeping the base-plate 12, securely in position as described, are also adapted to set separately, as an additional precaution, against a lateral displacement of the rail-ends. One of the two spikes, engaging the two sides of the bottom flange of each rail-end, prevents in this case, a horizontal movement, and the other a turning, of the rail-end in question, in the direction of the lateral pressure.

The vertical parts of the Z-bars 9—9, and also the marginal ribs 20—20, of the base-plate 12, are safe-guards against an appreciable lateral movement of the rail-ends 15 and 16, if such a movement should ever take place, relatively to the base-plate 12. The vertical part of a Z-bar 9, begins to act, as a guard, after the clearance, between its inside surface and the corresponding adjacent end of a fish-plate (the clearance is a provision for possible inaccuracies in the lower ends 22—22, of the fish-plates), has been reduced to zero by a small movement of the rail-ends in combination with the fish-plates, toward the Z-bar in question. A marginal rib 20, begins to act as a guard, after the clearance between its longitudinal end 24, and the adjacent ends of the bottom flanges of the rail-ends 15 and 16 (this clearance has been provided in order to facilitate the erection of the base-plate), has been reduced to zero, by a small movement of the rail-ends toward the said edge. Longitudinally, the rail-ends 15 and 16, being well connected with the fish-plates 10 and 11, by the bolts 14, are prevented from changing their location in either direction—except, so provided for, by oval holes—, by the two spikes 17, placed at each end of the splice, and engaging at each end, the two adjacent corners 28—28, of the fish-plates 10 and 11, as described before. The Z-bar connection between the said fish-plates, and the base-plate 12, make this commonly known anchoring of the rail-ends 15 and 16 (this clearance sense, more efficient than in ordinary fish-plate splices, by preventing the oblique members of the fish-plates 10 and 11, from being forced away from the rails, by the actions of the creeping force, which may be combined with the lateral pressure, transferred to the rails, by the passing trains. The creeping force, passing through the upright members of the fish-plates 10 and 11, and the resistance to the creeping force transferred to the two corresponding corners 28—28, of the fish-plates, by the two resisting spikes 17, being a couple of two equal forces, parallel to, and at a certain distance from, each other, have a tendency to force the said corners 28—28, away from the rails. The said tendency is apt to become dangerously great in ordinary fish-plate splices, where the spikes,

engaging the bottom flanges of the rail-ends, are the only means for keeping the rail-ends in position laterally, and where one loose, or otherwise defective, bolt, may expose the rail-ends, to greater or less, lateral movements. by the pressure of the passing trains. The fish-plate, on the side of the rails, which is toward the direction of the said lateral movements of the rail-ends, would, in such a case, be greatly hindered, at that of its corners 28, which is in contact with the spike 17, resisting the creeping force, passing through the fish-plate, to follow the lateral movements of the rail-ends, by the friction developed at the contact surfaces of the corner 28 in question, and the resisting spike 17.

The forcing of the oblique members of the fish-plates away from the rails, when under the influence of the passing trains, is made impossible in the splice, herein described, first, by the Z-bars 9—9, tightly pressing the said oblique members against the bottom flanges of the rail-ends, and second, by the said Z-bars preventing the rail-ends 15 and 16, from changing their location laterally, even in case of a failure of one or the other of the four spikes 17. The spikes, acting in the splice under consideration not only separately, but also jointly, while resisting the lateral pressure of the passing trains on the rail-ends, as described before, are also not likely to be destroyed as often as in ordinary fish-plate splices, where one bolt has to resist the full horizontal, lateral pressure, transferred to a rail-end, by the passing trains (except where the two rails of a track are connected with each other by a tie-rod, in which latter case, a part of the lateral pressure may be transferred to a spike at the second rail).

The oval holes 19, in the web of the rail-end 15, as dotted in Fig. 1, show the ordinary provision for a small longitudinal sliding of the rail-end, due to the expansion and contraction of the corresponding rail, by changes in the temperature. The clear horizontal distance 26—26, between the oblique top flanges of the Z-bars 9—9, is determined with the point in view, that the base-plate 12, could be easily put in place, from underneath the bottoms of the rails without disturbing the latter.

The bolts 14, are put in place, with one of the flat sides of their heads 18, parallel to the locking face of the angle-plate 13, and are thus prevented from turning. In order to lock the nuts 5, the latter are screwed up tight, and one of their sides made parallel to the outstanding leg of the angle-plate 3. The flat bar 4, is then put in place and bolted to the said leg of the angle-plate 3, and the nuts are in this way, prevented from turning. The angle-plates 3 and 13, being well connected with the fish-plates 10 and 11 and with the webs of the rail-ends, as described

before, are also splices of the joints, strengthening and stiffening the joints, both vertically and laterally. The flat bars 4, add also to the strength and lateral stiffness of the joints.

While I have shown and described only one example of the physical embodiment of my invention, I do not intend to limit the scope of my invention to this specific example. I want it to be understood that many changes may be made in the detail of the construction without departing from the general principle of my invention. In relation to the part of my invention, relating to the angle-plates 3 and 13, I want it to be also understood, that although shown in the drawing with their outstanding legs turned downward, the said angle-plates may be used with their outstanding legs turned upward, without changing the principle of my invention.

I am aware that it is not new to employ a base-plate having upturned edges, adapted to engage the lower ends of the fish-plates, or to employ a base-plate, having ribs on its surface; it is equally not new to use fish-plates, having their lower members turned upward, or to prevent the turning of the bolts and nuts, by means of bars, connected with the fish-plates. I do not claim any of the above ideas broadly, but—

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

1. In a railway-rail joint, the combination with the ends of two adjacent rails, of splice bars, a base-plate, resting on the two ties, adjacent to the joint, having holes for spikes to pass through, ribs serving as the immediate base for the rail-ends, and marginal ribs, projecting above the base of the rail, and two Z-bars, permanently connected with the marginal ribs of the base-plate, the top flanges of the Z-bars projecting partly over the corresponding inclined surfaces of the lower flanges of the splice bars, and forming a free space of a given width, between the bottom surface of each top flange, and the adjacent surfaces of the lower flanges of the splice bars, substantially, and for the purpose, as set forth and described.

2. In a railway-rail joint, the combination with the ends of two adjacent rails, of splice bars, a base-plate, resting on the two ties adjacent to the joint, having holes for spikes to pass through, ribs planed on top, serving as the immediate base for the rail-ends, and marginal ribs, projecting above the base of the rail, and two Z-bars, permanently connected with the marginal ribs of the base-plates, the top flanges of the Z-bars projecting partly over the corresponding inclined surfaces of the lower flanges of the splice bars, and forming a free space of a given width between the bottom surface of each top flange and the adjacent surfaces of the

lower flanges of the splice bars, substantially, and for the purpose, as set forth and described.

3. In a railway-rail joint, the combination
5 with the ends of two adjacent rails, of splice bars, a base-plate, resting on the two ties adjacent to the joint, having holes for spikes to pass through, and two Z-bars, permanently connected with the marginal edges of the
10 base-plate, the top flanges of the Z-bars, projecting partly over the corresponding inclined surfaces of the lower flanges of the splice bars, and forming a free space of a given width between the bottom surface of
15 each top flange, and the adjacent surfaces of the lower flanges of the splice bars, substantially, and for the purpose, as set forth and described.

4. In a railway-rail joint, the combination
20 with the ends of two adjacent rails, of splice bars, a base-plate resting on the two ties adjacent to the joint, having holes for spikes to pass through, and having the part of its top surface, serving as the immediate base
25 for the rail-ends, planed, and two Z-bars, permanently connected with the marginal edges of the base-plate, the top flanges of the Z-bars projecting partly over the corresponding inclined surfaces of the lower
30 flanges of the splice bars, and forming a free space of a given width between the bottom surface of each top flange and the adjacent surfaces of the lower flanges of the splice bars, substantially, and for the purpose, as
35 set forth and described.

5. In a railway-rail splice, the combination of a base-plate, resting on the two ties adjacent to the joint, having holes for spikes to pass through, ribs serving as the immediate
40 base for the rail-ends and marginal ribs projecting above the base of rail, two fish-plates having their lower extreme ends rounded up, two Z-bars, permanently connected with the marginal ribs of the base-plate, the top
45 flanges of the Z-bars running parallel to, and projecting partly over, the oblique members of the fish-plate, forming a free space between the bottom surface of each top flange, and the adjacent surfaces of the said
50 oblique members of the fish-plates, spikes, and bolts, connecting the fish-plates with each other, and with the webs of the rail-ends, substantially as herein described.

6. In a railway-rail splice, the combination of a base-plate, resting on the two ties adjacent to the joint, having holes for spikes to pass through, ribs, planed on top, serving
55 as the immediate base for the rail-ends and marginal ribs projecting above the base of rail, two fish-plates having their lower extreme ends, rounded up, two Z-bars, permanently connected with the marginal ribs of the base-plate, the top-flanges of the Z-bars
60 running parallel to, and projecting partly over, the oblique members of the fish-plates,

forming a free space between the bottom surface of each top flange, and the adjacent surface of the said oblique members of the fish-plates, spikes, and bolts, connecting the fish-plates with each other, and with the
70 webs of the rail-ends, substantially as herein described.

7. In a railway-rail splice, the combination of a base-plate, resting on the two ties adjacent to the joint, having holes for spikes
75 to pass through, two fish-plates having their lower extreme ends rounded up, two Z-bars permanently connected with the marginal edges of the base-plate, the top flanges of the Z-bars, running parallel to, and projecting
80 partly over, the oblique members of the fish plates, forming a free space between the bottom surface of each top flange, and the adjacent surface of the said oblique members of the fish-plates, spikes, and bolts, connecting the fish-plates with each other and
85 with the webs of the rail-ends, substantially as herein described.

8. In a railway-rail splice the combination of a base-plate, resting on the two ties adjacent to the joint, having holes for spikes to pass through, and having the part of its top surface, serving as the immediate base
90 for the rail-ends, planed, two fish-plates, having their lower extreme ends rounded up, two Z-bars, permanently connected with the marginal edges of the base-plate, the top flanges of the Z-bars, running parallel to, and projecting partly over, the oblique
95 members of the fish-plates, forming a free space, between the bottom surface of each top flange, and the adjacent surface of the said oblique members of the fish-plates, spikes, and bolts, connecting the fish-plates with each other and with the webs of the
100 rail-ends, substantially as herein described.

9. In a railway-rail splice, the combination of a base-plate resting on the two ties adjacent to the joint, having holes for spikes to pass through, ribs serving as the immediate
110 base for the rail-ends, and marginal ribs, projecting above the base of rail; the two fish-plates 10 and 11, having their lower extreme ends rounded up; two Z-bars permanently connected with the marginal ribs
115 of the base-plate, and adapted to engage the lower ends of the fish-plates; the angle-plate 3, comprising integrally two legs at right angles to each other, having one of its legs riveted onto the fish-plate 10, and having
120 the holes 7, in the other, outstanding, leg; the flat bar 4, having holes 7, matching the holes 7, of the angle-plate 3; the angle-plate 13, comprising integrally two legs at right angles to each other, having one of its legs
125 riveted on to the fish-plate 11; the spikes 17; and the bolts 14, connecting the fish-plates 10 and 11, and the angle-plates 3 and 13, with each other, and with the webs of the rail-ends, substantially as herein described. 130

10. In a railway-rail splice the combination of a base-plate, resting on the two ties adjacent to the joint, having holes for spikes to pass through, ribs planed on top, serving as the immediate base for the rail-ends, and marginal ribs, projecting above the base of rail; the two fish-plates 10 and 11, having their lower extreme ends rounded up; two Z-bars permanently connected with the marginal ribs of the base-plate, and adapted to engage the lower ends of the fish-plates; the angle-plate 3, comprising integrally two legs at right angles to each other, having one of its legs riveted onto the fish-plate 10, and having the holes 7, in the other, outstanding, leg; the flat bar 4, having holes 7, matching the holes 7, of the angle-plate 3; the angle-plate 13, comprising integrally two legs, at right angles to each other, having one of its legs riveted on to the fish-plate 11; the spikes 17; and the bolts 14, connecting the fish-plates 10 and 11, and the angle-plates 3 and 13, with each other and with the webs of the rail-ends, substantially as herein described.

11. In a railway-rail splice the combination of a base-plate, resting on the two ties adjacent to the joint, having holes for spikes to pass through; the two fish-plates 10 and 11, having their lower extreme ends rounded up; two Z-bars, permanently connected with the marginal edges of the base-plate and adapted to engage the lower ends of the fish-plates; the angle-plate 3, comprising integrally two legs at right angles to each other, having one of its legs riveted on to the fish-plate 10, and having the holes 7, in the other, outstanding, leg; the flat bar 4, having holes 7 matching the holes 7, of the angle-plate 3; the angle-plate 13, comprising integrally two legs, at right angles to each other, having one of its legs riveted on to the fish-plate 11; the spikes 17; and the bolts 14, connecting the fish-plates 10 and 11 and the angle-plates 3 and 13, with each other and with the webs of the rail-ends, substantially as herein described.

12. In a railway-rail splice, the combination of a base-plate, resting on the two ties adjacent to the joint, having holes for spikes to pass through, and having the part of its top surface, serving as the immediate base for the rail-ends planed; the two fish-plates 10 and 11, having their lower extreme ends

rounded up; two Z-bars permanently connected with the marginal edges of the base-plate, and adapted to engage the lower ends of the fish-plates; the angle-plate 3, comprising integrally two legs, at right angles to each other, having one of its legs riveted on to the fish-plate 10, and having the holes 7, in the other, outstanding, leg; the flat bar 4, having holes 7, matching the holes 7, of the angle-plate 3; the angle-plate 13, comprising integrally two legs, at right angles to each other having one of its legs riveted on to the fish-plate 11; the spikes 17; and the bolts 14, connecting the fish-plates 10 and 11, and the angle-plates 3 and 13, with each other and with the webs of the rail-ends, substantially as herein described.

13. The herein described nut-lock and joint splice for railway-rails, consisting of the L shaped plate 3, and the flat bar 4, the L shaped plate 3, comprising integrally two legs at right angles to each other, one of the legs of the said L shaped plate, having the holes 6, adapting the plate to be permanently connected with one of the fish-plates of the joint, and the holes 29, adapting the plate to be connected with the webs of the rail-ends, and the other leg, being straight and true, throughout its length, and outstanding, when in position, having the holes 7, the flat bar 4, having the holes 7, registering with the holes 7, of the L shaped plate, substantially as herein described.

14. The herein described bolt-lock and joint-splice, for railway-rails, consisting of the L shaped plate 13, comprising integrally two legs at right angles to each other, and having in one of its legs the holes 6, adapting the plate to be permanently connected with one of the fish-plates of the joint, and the holes 29, adapting the plate, to be connected with the webs of the rail-ends, the other leg of the angle-plate being straight and true throughout its length, and outstanding when in position, substantially as herein described.

Signed at the city of New York in the county of New York and State of New York this 27th day of May A. D. 1907.

ISRAEL NOAH PRENOVICH.

Witnesses:

MARK OPPENHEIM,
MAX EPSTEIN.

It is hereby certified that in Letters Patent No. 945,415, granted January 4, 1910, upon the application of Israel Noah Prenovich, of New York, N. Y., for an improvement in "Railway-Rail Splices," errors appear in the printed specification requiring correction as follows: Page 1, line 52, the word "of" should read *by*; page 2, line 54, the word "then" should read *the*; same page, line 70, the word "set" should read *act*; line 104, the word "so" should read *as*; and lines 112-113 the parenthesis and words "(this clearance sense," should be stricken out; page 3, line 91, before the word "surface" the word *top* should be inserted; page 4, line 120, and page 5, line 14, the word "onto" should read *on to*; page 4, line 122, and page 5, lines 16, 38, and 62, before the word "matching" the numeral "7" should read 70; and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 8th day of February, A. D., 1910.

[SEAL.]

E. B. MOORE,
Commissioner of Patents.