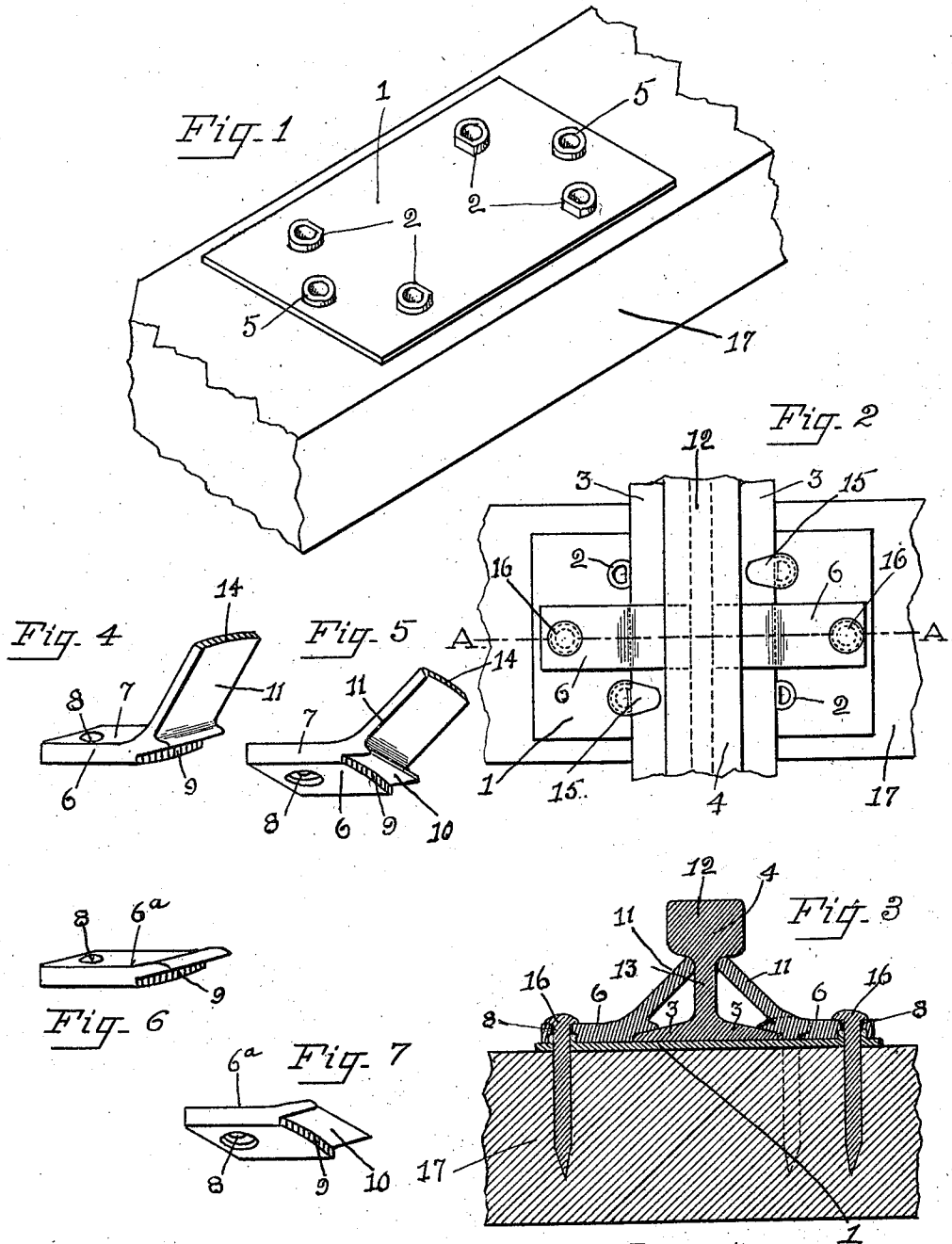


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RAIL LOCKING CAM AND BRACE FOR TIE PLATES.  
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949,908.

Patented Feb. 22, 1910.



Witnesses—

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# UNITED STATES PATENT OFFICE.

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RAIL-LOCKING CAM AND BRACE FOR TIE-PLATES.

949,908.

Specification of Letters Patent. Patented Feb. 22, 1910.

Application filed November 26, 1909. Serial No. 529,863.

To all whom it may concern:

Be it known that I, ROBERT LAW, a citizen of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented a new and useful Improvement in Rail-Locking Cams and Braces for Tie-Plates, of which the following is a specification.

My invention relates to a rail locking cam and a brace for tie plates.

In application Serial No. 456,105 filed October 5, 1909, I have shown and described a tie plate formed of an elongated rectangular plate of wrought metal, struck up in a punch and die press to form a pair of tubular bosses on each end portion of the plate in position to form side abutments for the base flanges of a rail and reinforced holes for spikes securing the rail.

My present invention relates to the combination with said tie plate of a rail locking cam and brace and the adaptation of the plate thereto, whereby the rail is both frictionally locked against "creeping" on the ties, and better secured against "spreading", by lateral pressure on the tread of the rail.

With these objects in view my invention consists in providing each end portion of my tie plate aforesaid, equi-distant from the abutment bosses, and nearer the ends of the plate, with a tubular boss struck up in like manner as the bosses forming abutments for the rail as aforesaid, and pivotally mounting and securing thereon a locking cam brace, which extends between the abutment bosses and frictionally engages the edge of the adjacent flange, and, preferably also, the tread and web of the rail, as is more fully hereinafter set forth and described and illustrated in the drawings, in which—

Figure 1 is a top view in perspective of the tie plate constructed in accordance with my invention. Fig. 2 is a plan view of the same with the rail mounted and secured thereon and provided with locking braces in accordance with my invention. Fig. 3 is a longitudinal section on line A—A of Fig. 2. Fig. 4 is a top perspective view of a locking cam brace. Fig. 5 is a bottom perspective view of the same. Fig. 6 is a top perspective view of a modified form of locking cam brace, and Fig. 7 is a bottom perspective view of the same.

In the drawings 1 is an elongated rectangular tie plate having formed on the

upper face of each end portion, by being struck up in a punch and die press, as aforesaid, a pair of tubular bosses 2 in position to form abutments for the flanges 3 of a rail 4, when the rail is mounted transversely on the plate between the pairs, and a tubular boss 5 which is located nearer the end of the plate 1 than the adjacent pair of bosses 2, and equi-distant from each boss of the pair. Each boss 5 is provided with a locking cam brace 6, having a body portion 7 of a width less than the distance between the adjacent bosses 2 and that is faced on its under side to coincide with and rest on the upper face of the plate 1, and having near its outer end the transverse orifice 8, counter-bored from the under face to adapt it to be pivotally mounted on the boss 5. The under face of the body portion 7 extends to a cam shoulder 9 which is the same distance from the center of the orifice 8 in said face, on the center line of the face, as the axis of the boss 5 is from the outer edge of a rail flange mounted on the plate 1 and engaging the adjacent bosses 2, so that when the body portion is pivotally mounted on the boss 5 between a pair of bosses 2 the center portion of the shoulder 9 is in engagement with the outer edge of the rail flange. The shoulder 9 coincides with the arc of a circle described by a radius of greater length than the distance between the center of the arc and the center of the orifice 8, and from a center that is in alinement with those two points, whereby the shoulder is made equally eccentric at each end portion to an arc described from the center of the orifice 8 by a radius of a length equal to the distance between said center and the center of the shoulder, whereby when the body portion 7 is mounted on a boss 5 with its shoulder 9 centrally engaging the edge of the rail flange 3 any pivotal movement of the body 7 in either direction increases by geometrical progression the pressure of the shoulder on the edge of the flange, and it will be readily seen that when the locking cam brace 6 is so mounted on each of the bosses 5, only slight longitudinal movement of the rail 4 in either direction will produce enormous increase of pressure of the shoulders 9 oppositely on the rail flanges, sufficient to lock the rail. The faces of the shoulders are preferably serrated to increase their grip on the rails.

In forming the shoulder 9, the under side

of the body portion 7 is also cut away at an upward angle to form a face 10 overhanging the shoulder and adapted to rest on the upper face of the rail flange, when the under face of the body portion 7 is resting on the tie plate 1.

The body portion 7 is preferably provided with an integral brace extension 11, which extends at a suitable angle upward to engagement with the tread 12 and web 13 of the rail at the angle of their junction. The free end 14 of the brace extension 11 is formed to coincide with an arc of a circle concentric to the arc of the shoulder 9, whereby it coöperates with the shoulder 9 to lock the rail against more than slight longitudinal movement, while at the same time it forms a strong brace supporting the rail against lateral pressure on the tread tending to spread or overturn the rail.

When the locking braces 6 are in position on the bosses 5 with their shoulders 9 engaging the rail flanges, and with their brace ends 14 engaging the web and tread of the rail as shown and described, the rail, the tie plate, and the locking braces are preferably secured in such position by half round spikes 15 having elongated heads for engaging the flanges of the rail, in one or both of the bosses 2 of each pair of abutments, and by spikes 16 (having rounded heads and rounded body portions adjacent to the heads) in the bosses 5, driven into the tie 17 upon which the rail and tie plate are supported. It is manifest however that other forms of spikes may be used without departing from the principle of my construction, and I therefore do not limit my invention to the kind of spikes above described. Rails thus mounted and secured are firmly braced against the lateral pressure that tends to spread them, and only a slight longitudinal movement of the rail is sufficient to produce a vise-like grip on the base flanges of the rail by the cams 9 and 14 of each tie plate, and it is manifest that the "creeping" of the rails that is produced by trains running on them in either direction is so limited by the locking cams as to be negligible, while they permit the natural expansion and contraction of the rails produced by changes of temperature. The abutment bosses 2 form stops for the cams which limit this movement of the cams in either direction, and prevent them from being moved beyond their points of greatest eccentricity. It is apparent also that a portion of the weight of trains is distributed by the locking braces to the outer end portions of the tie plate, whereby any tendency of the tie plate to buckle or bend along the edges of the rail flanges is neutralized. It is apparent also that a rail being so locked against longitudinal movement greatly reduces, if it does

not wholly prevent, the wear of the rail upon the abutment bosses 2 and on the spike heads.

While the locking cam brace 6 having the brace extension 11 is preferred, it is manifest that for straight tracks the brace extension 11 may be omitted therefrom, and in Figs. 6 and 7 I have shown a locking cam 6<sup>a</sup> from which the extension 11 is omitted, (but which is otherwise of the same form as the locking cam brace 6). The locking cam brace 6 may be substituted for the locking cam brace 6 on the inner sides of the rail, or alternated with it in such proportions of the number of ties under any rail as may be found expedient. The lateral pressure on the bosses 5 of the cam 6<sup>a</sup> as well as of the cam brace 6 is also adapted to prevent any buckling or bending of the tie plate along the line of the rail flange. This lateral pressure is distinct from the downward pressure produced by the extension 11 of the locking brace 6, and either pressure alone is sufficient to neutralize the tendency to buckle a plate along such line.

What I claim to be new is—

1. The combination with a tie plate having a pair of tubular bosses on each end portion adapted to form side abutments for the base flanges of a rail mounted on the plate between the pairs and reinforced holes for spikes to jointly secure the rail and the plate to a tie, and having a tubular pivot boss formed between a pair of the abutment bosses and an end of the plate, of a locking brace pivotally mounted and secured on the pivot boss and extending between the adjacent abutment bosses and movable through a limited arc there between, said locking brace having a transverse cam shoulder adapted to engage the edge of a rail flange that is in engagement with the adjacent abutment bosses, and operating to produce increasing locking pressure on the rail flange as longitudinal movement of the rail produces pivotal movement of the locking brace in one direction.

2. The combination of a tie plate having a pair of tubular bosses at each end portion adapted to form side abutments for the base flanges of a rail mounted on the plate between the pairs and reinforced holes for spikes to jointly secure the rail and the plate to a tie and having a tubular pivot boss formed between a pair of the abutment bosses and an end of the plate, of a locking brace pivotally mounted and secured on the pivot boss and extending between the adjacent abutment bosses and movable through a limited arc there between, said locking brace having a transverse cam shoulder adapted to engage the edge of a rail flange that is in engagement with the adjacent abutment bosses, and operating to produce in-

creasing locking pressure on the rail flange as longitudinal movement of the rail produces pivotal movement of the locking brace in either direction.

5 3. The combination with a tie plate having a pair of tubular bosses on each end portion adapted to form side abutments for the base flanges of a rail mounted on the plate between the pairs and reinforced holes for  
10 spikes to jointly secure the rail and the plate to a tie and having a tubular pivot boss formed between each pair of the abutment bosses and an end of the plate, of a locking brace pivotally mounted and secured on each  
15 pivot boss and extending between the adjacent abutment bosses and movable through a limited arc there between, each locking brace having a transverse cam shoulder adapted to engage the edge of a rail flange that is in  
20 engagement with the adjacent abutment bosses, and operating to produce increasing locking pressure on the rail flange as longitudinal movement of the rail produces  
25 pivotal movement of the locking brace in one direction.

4. The combination of a tie plate having a pair of tubular bosses on each end portion adapted to form side abutments for the base  
30 flanges of a rail mounted on the plate between the pairs and reinforced holes for spikes to jointly secure the rail and the plate to a tie and having a tubular pivot boss formed between each pair of the abutment  
35 bosses and an end of the plate, of a locking brace pivotally mounted and secured on each pivot boss and extending between the adjacent abutment bosses and movable through a limited arc there between, each locking  
40 brace having a transverse cam shoulder adapted to engage the edge of a rail flange that is in engagement with the adjacent abutment bosses, and operating to produce  
45 increasing locking pressure on the rail flange as longitudinal movement of the rail produces pivotal movement of the locking brace in either direction.

5. The combination with a tie plate having a pair of tubular bosses at each end portion adapted to form side abutments for  
50 the base flanges of a rail mounted on the plate between the pairs and reinforced holes for spikes to jointly secure the rail and the plate to a tie and having a tubular pivot boss formed between a pair of the abutment  
55 bosses and an end of the plate, of a locking brace pivotally mounted and secured on the pivot boss and extending between the adjacent abutment bosses and movable through a limited arc there between, said locking  
60 brace having cam shoulders adapted respectively to engage the edge of a rail flange that is in engagement with the adjacent abutment bosses and the web and tread of the rail at their junction, and operating to

produce increasing locking pressure on the  
65 rail flange as longitudinal movement of the rail produces pivotal movement of the locking brace in one direction.

6. The combination with a tie plate having a pair of tubular bosses at each end portion  
70 adapted to form side abutments for the base flanges of a rail mounted on the plate between the pairs and reinforced holes for spikes to jointly secure the rail and the plate  
75 to a tie and having a tubular pivot boss formed between a pair of the abutment bosses and an end of the plate, of a locking brace pivotally mounted and secured on the  
80 pivot boss and extending between the adjacent abutment bosses and movable through a limited arc there between, said locking brace having cam shoulders adapted respectively to engage the edge of a rail flange that  
85 is in engagement with the adjacent abutment bosses and the web and tread of the rail at their junction, and operating to produce increasing locking pressure on the rail flange as longitudinal movement of the rail produces pivotal movement of the locking  
90 brace in either direction.

7. The combination with a tie plate having a pair of tubular bosses on each end portion adapted to form side abutments for the base  
95 flanges of a rail mounted on the plate between the pairs and reinforced holes for spikes to jointly secure the rail and the plate to a tie and having a tubular pivot boss formed between each pair of the abutment  
100 bosses and an end of the plate, of a locking brace pivotally mounted and secured on each pivot boss and extending between the adjacent abutment bosses and movable through a limited arc there between, said locking  
105 brace having transverse cam shoulders adapted respectively to engage the edge of a rail flange that is in engagement with the adjacent abutment bosses, and the web and tread of the rail at their junction, and operating  
110 to produce increasing locking pressure on the rail as longitudinal movement of the rail produces pivotal movement of the locking brace in one direction.

8. The combination with a tie plate having a pair of tubular bosses on each end portion adapted to form side abutments for the base  
115 flanges of a rail mounted on the plate between the pairs and reinforced holes for spikes to jointly secure the rail and the plate to a tie and having a tubular pivot boss formed between each pair of the abutment  
120 bosses and an end of the plate, of a locking brace pivotally mounted and secured on each pivot boss and extending between the adjacent abutment bosses and movable through a limited arc there between said locking  
125 brace having transverse cam shoulders adapted respectively to engage the edge of a rail flange that is in engagement with the

adjacent abutment bosses, and the web and  
tread of the rail at their junction, and oper-  
ating to produce increasing locking pressure  
on the rail as longitudinal movement of the  
5 rail produces pivotal movement of the lock-  
ing brace in either direction.

In witness whereof I have hereunto signed

my name in the presence of two subscribing  
witnesses, this 17th day of November, 1909.

ROBERT LAW.

In presence of—

WM. J. FRITSCHÉ,

M. S. SMITH.