B. B. BETTS.

RAIL ANCHOR.

APPLICATION FILED MAR. 8, 1909.

996,905.

Patented July 4, 1911.

2 SHEETS—SHEET 1.

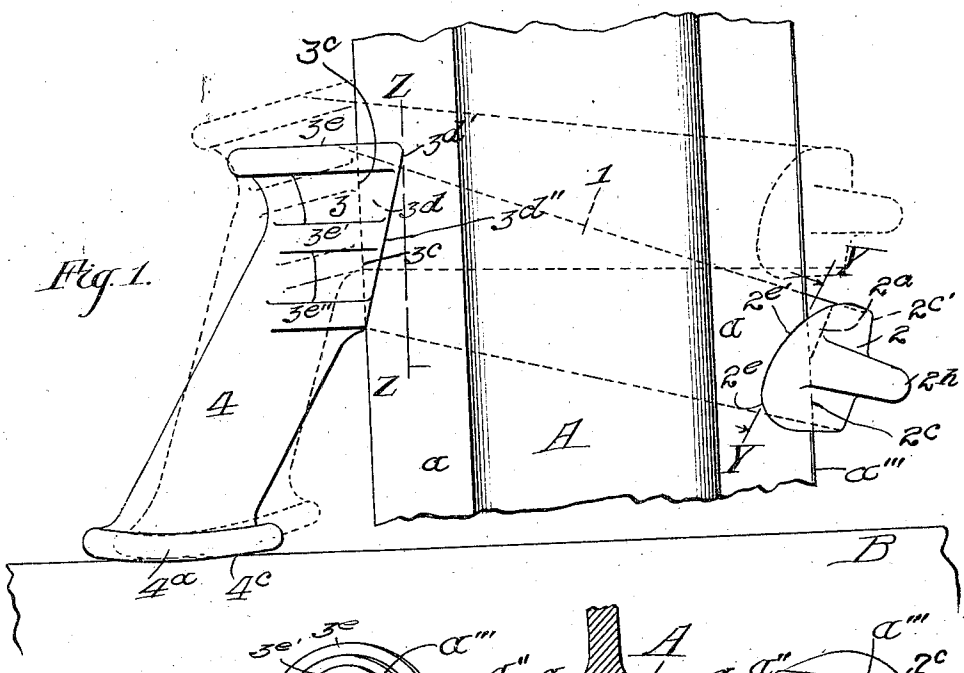

Fig. 1.

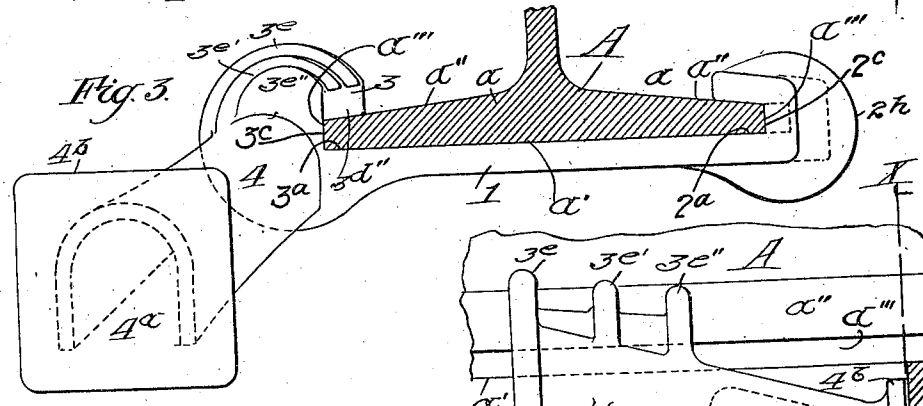

Fig. 3.

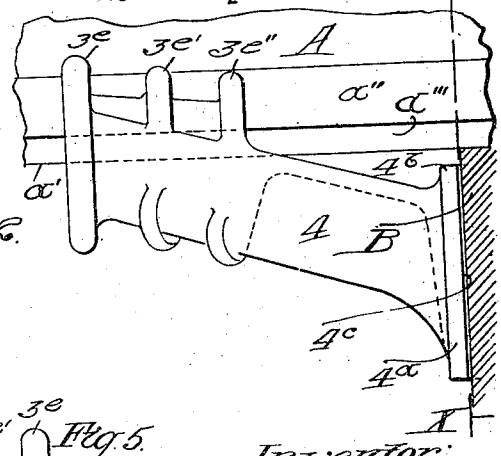

Fig. 2.

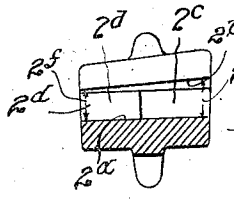

Fig. 4.

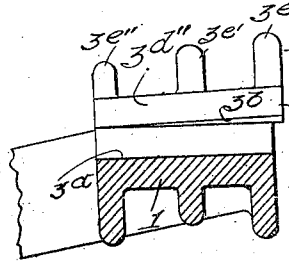

Fig. 5.

Witnesses:
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Inventor:
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2 SHEETS—SHEET 2.

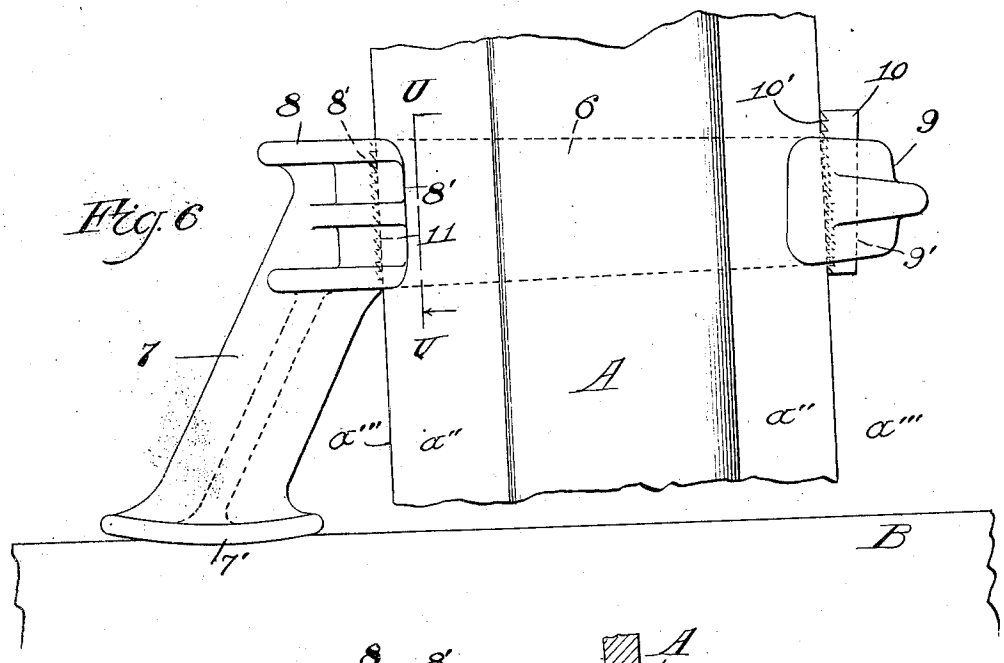

Fig. 6

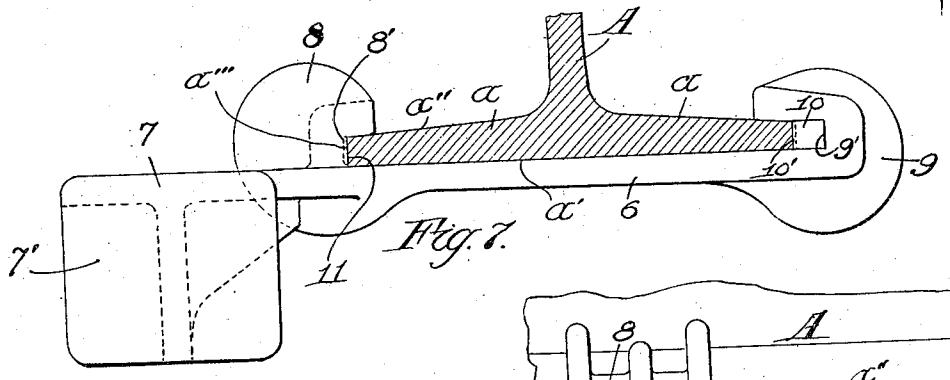

Fig. 7.

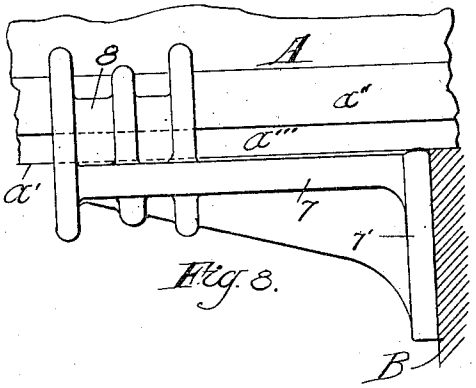

Fig. 8.

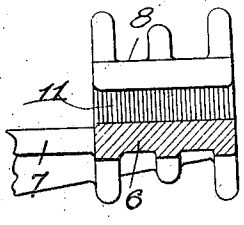

Fig. 10.

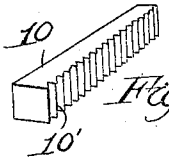

Fig. 9.

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UNITED STATES PATENT OFFICE.

BENJAMIN B. BETTS, OF ST. LOUIS, MISSOURI, ASSIGNOR TO POSITIVE RAIL ANCHOR COMPANY, OF LOUISVILLE, KENTUCKY, A CORPORATION OF VIRGINIA.

RAIL-ANCHOR.

996,905. Specification of Letters Patent. Patented July 4, 1911.

Application filed March 8, 1909. Serial No. 481,981.

To all whom it may concern:

Be it known that I, BENJAMIN B. BETTS, a citizen of the United States of America, and a resident of the city of St. Louis, Missouri, mechanical engineer, have invented certain new and useful Improvements in Rail-Anchors, of which the following is a full, true, and exact description, such as will enable others skilled in the art to make and use the same.

My invention relates to means for preventing the longitudinal movement or "creeping" of railroad rails and has particular reference to improvements in devices of the class known as rail anchors or anti-creepers.

The object of this present invention is to provide a rail anchor which shall be readily applicable to and removable from a rail, which having been applied to a rail shall be adapted to coöperate with an adjacent cross tie and effectively resist and prevent longitudinal movement of the rail thereon and which shall be simple, strong and durable.

A further object of my invention is to provide a rail anchor or anti-creeper which after being placed on a rail and against a cross tie will be automatically tightened upon the rail by the longitudinal thrust thereof.

Another object of the invention is to provide a rail anchor or anti-creeper which shall be adapted for application to and coöperation with a rail without modification in the form or contour of the latter and without resort to bolts, rivets, or the like.

A further and special object of the invention is to provide a rail anchor which shall be complete in one piece or member, of great strength and effectiveness, so formed that it may be quickly applied to a rail and secured or locked thereon without resort to special tools or wrenches.

Another object of the invention is to provide a rail stay which shall be capable of retaining its locking or clamping position upon the rail when the latter, by reason of the reversal of the tide of traffic, moves backwardly and thus carries the anchor away from the tie.

Still further objects of my invention will appear hereinafter.

My invention resides, generally, in a rail anchor or anti-creeper which comprises a bar having rail engaging portions or hooks at its ends together with a strut, lug or arm formed at one end of said bar and adapted to hold said end away from the cross tie while permitting the other end of the bar to move toward the cross tie, whereby said portions or hooks, having been engaged with opposite sides or edges of the rail, will be tightened thereon by the pivoting or turning movement of said bar upon the rail. The invention also includes various novel formations and constructions, hereinafter described, which insure the complete performance of the proper functions of a positive rail anchor or anti-creeper.

I have shown several, though not all, forms and features of my invention in the accompanying drawings. These drawings constitute a part of this specification and by reference thereto a thorough understanding of the invention may be secured.

Figure 1 of the drawings is a plan view of a rail and an anti-creeper or anchor embodying my invention. Fig. 2 is an end view of the cross tie, anchor and rail; Fig. 3 shows the end of the rail and the side of the rail anchor, being an elevation in the plane of the side of the cross tie, as upon line X of Fig. 2; Fig. 4 is a sectional view of the rail anchor on the line Y—Y of Fig. 1; Fig. 5 is a sectional view on the line Z—Z of Fig. 1; Fig. 6 is a plan view of a modified form of my rail anti-creeper; Fig. 7 is a side view of the modified rail anchor; Fig. 8 is an end view thereof; Fig. 9 is a perspective view of the wedge used at the free end of the anchor; and Fig. 10 is a sectional view on the line U—U of Fig. 6, the rail being omitted.

Throughout the drawings, A, represents a rail and, B, a cross tie. The rail here shown is of ordinary cross section having the usual T base flanges, *a—a*. The bottom

a' of the rail is flat and the upper surfaces, a'' of the flanges are slightly inclined. a'''—a''' are the edges of the rail base. The cross tie B is the usual wooden or metal cross tie, upon which the rail rests, the rail and the cross tie being arranged at right angles. Spikes or other fastenings (not shown) as usual, serve to prevent the lateral displacement of the rail on the tie. But these devices do not prevent the longitudinal movement or creeping of the rail across the tie. My invention is designed to prevent such longitudinal movement of the rail.

That form of my invention which is illustrated in Figs. 1 to 5 comprises a single piece or single member rail anchor or anti-creeper. This device is made up of four principal parts or integral portions, namely the bar portion, 1, the rail engaging portions or hooks, 2 and 3, and the power arm strut or lug, 4. When placed in one position (see dotted lines Fig. 1) the device may be readily raised into engagement with the bottom of the rail and interlocked with the edges or flanges thereof. The space between the rail engaging portions, 2 and 3, is greater than the width of the rail. This makes it possible to put the device on the rail as described. After it is thus positioned it may be pivoted, rotated, moved or twisted upon the rail as indicated by full lines in Fig. 1. This movement between the anchor and the rail serves to decrease the transverse distance between the rail engaging portions of the device and thus moves them into working engagement with the rail flanges. At the time that the anchor is pivoted or twisted on the rail its arm, 4, is also set up against the tie, B, and as the hooks or engaging parts, 2 and 3, are in locking positions at such time and as bodily movement of the anchor is prevented by the tie, it is obvious that the anchor secures the rail against movement toward and upon the tie. It is also evident that any forward movement of the rail will tend to further turn or clamp the anchor upon the rail, as such movement tends to increase the angularity of the engaged parts.

The bar portion, 1, of the rail anchor is preferably substantially rectangular in cross section, such being the best disposition of metal to resist the tension to which the bar is subjected, when the portions 2 and 3 are strongly pressed against the rail. The width of the bar is sufficient to give it the necessary strength to resist the bending force to which it is subjected in work when either hook, serves as the fulcrum. The top surface of the bar is preferably flat to fit the bottom, a', of the rail. The hook, 2, forms a continuation of the bar, 1, and its lower surface, 2^a, is coincident with the top of said bar. The upper surface, 2^b, of the hook conforms to the inclined top of the rail flange. The end or clamping surface, 2^c, is shaped to fit the edge, a''', of the rail and is of considerable longitudinal extent, affording contact at many points, but said clamping surface, 2^c, is preferably of less width than the hook, the latter being cut back on the outer side (see dotted line 2^d) to increase the effective distance between the hooks 2 and 3, as hereinafter more fully described. The end or point, 2^e, of the hook preferably overhangs the inner edge of the bar, 1, *i. e.* the edge adjacent to the tie, B, and the end $2^{e'}$ of the hook is curved or beveled rearwardly and outwardly to meet the vertical portion, $2^{c'}$. I prefer that the upper surface, 2^b, of the hook shall have the relation to the lower surface, 2^a, which is shown in Fig. 4. The space between these surfaces at the outer end, 2^f, of the hook gap being greater than the thickness of the rail base at such point and the space at the inner end, $2^{f'}$, being preferably less than the thickness of the rail base between points of engagement. The greater space at the outer end of the hook gives the necessary freedom in placing the anchor on the rail and the relative contraction of the space in the other part of the hook, 2, insures the gripping of both the top and bottom of the rail base and causes the hook to score the rail and wedge tightly thereon as well as engage the edge of the rail when the anchor is shifted from the dotted position (of Fig. 1) to that shown in full lines. The elasticity of the metal hook permits both the vertical and horizontal engagement referred to. An integral rib, 2^h, preferably in line with the neutral axis of the bar 1, adds to the strength of the hook, 2. This rib merges with the end of the hook and with the underside of the bar at the point of juncture between the bar and hook.

The hook, 3, at the opposite end of the bar, 1, is preferably of the same order as the hook, 2, but differs slightly therefrom. As in the case of the hook, 2, the hook, 3, forms a continuation of the bar, 1. Its lower surface 3^a is preferably coincident with the top of the bar and the upper surface, 3^b, is inclined to correspond to the inclined top of the rail base to be engaged thereby. The end surface 3^c, *i. e.* the bottom of the V groove or gap in the hook is preferably formed to engage the edge of the rail, as indicated in Fig. 1. But preferably, the V groove, at the outer end 3^d is too small to freely admit the edge of the rail and hence the pressure of the hook on the rail is exerted upon the top as well as against the edge of the rail. When the device is in action the force of the two rigidly connected hooks is sufficient to prevent the rail from

creeping or moving on the cross tie. I prefer that the hook, 3, shall be wider than the hook, 2, and I preferably strengthen the same by means of three ribs, 3^e. $3^{e'}$, and $3^{e''}$. These ribs are integral with the hook and merge with the end thereof and with the bar, 1, at the point of juncture between the hook and said bar. On the top, the ribs, 3^e, are preferably set to be at right angles to the rail when the device is in working position, such being the most effective position in relation to the forces which tend to open or spread the point or end of the hook. On the bottom, the ribs are preferably arranged in line with the bar, the same being here called upon to prevent the bending down of the hook as a whole upon the end of the bar. The extreme point or outer end, $3^{a'}$, of the hook, 3, preferably overhangs the outer or remote edge of the bar, 1, and in this manner I secure an extension of the clamping surface without sacrificing any part of the free rail receiving space between the two hooks 2 and 3. The form of the V groove or gap in the hook, 3, will be readily understood upon reference to Figs. 1, 2, and 4. The end $3^{d''}$ of the hook, 3, is at substantially right angles to the bar, 1, *i. e.*, to the axis thereof so that it will pass the rail edge when the anchor is in the position shown by dotted lines in Fig. 1. Therefore in putting the anchor on the rail one edge of the rail is entered in the hook, 2, and the bar, 1, being thrown at substantially right angles to the rail, the end of the hook, 3, may be raised past the opposite edge of the rail; very slight twisting of the anchor on the rail then serves to turn the end or point of the hook, 3, over the edge of the rail and interlock the rail and anchor. The further the device is angled or twisted on the rail, the tighter it is clamped thereon, for once the hook, 3, binds or clamps upon the rail, the tension from the hook, 2, as it moves toward the tie, draws the hook, 3, more and more firmly upon the rail, until the combined pressure of the hooks becomes so great as to prevent further movement. But this, obviously, would not be the case if the hook, 3, were not held at a substantially fixed distance from the tie during the forward movement of the free end of the anchor. It will be obvious also that the point, 3^d, of the hook, 3, when rotatively engaged with the rail, will slightly compress or score the top thereof. This compression or scoring of the rail by the opposite hooks, as stated, interlocks the anchor with the rail and prevents retrogressive movement of the anchor, when the latter is relieved from rail pressure against the tie.

For many reasons I prefer that the strut or stop portion through which the thrust of the rail is communicated to and taken up by the cross tie shall be an integral part of the rail anchor. I prefer also that the cramping clamp constituted by the bar and the two hooks shall have an actual power arm to the end that the pressure to which the device is subjected between the rail and the tie shall be resolved into forces which tend to thrust the hook, 3, laterally against the rail base and also increase the cramping action of the two hooks thereon, and both permit and aid the movement of the free end of the bar toward the cross tie. I therefore employ an arm or strut, 4, which is integral with and joins the hook, 3. This strut merges into the back of the hook, 3; the cross ribs formed thereby add considerably to the strength of said hook. The power arm is preferably inclined downwardly and rearwardly toward the tie and also outwardly away from the rail, as clearly shown in Figs. 1 and 3. The end of the arm is enlarged to form the pressure foot, 4^a, for which the tie serves as the abutment. I prefer that the upper end, 4^b, of the foot shall be somewhat below the plane of the bottom of the rail for two reasons; first, to facilitate the placing of the anchor on the rail, and second, to effect a downward cramping action upon the body of the rail anchor. It is desirable also to avoid direct pressure upon the relatively weak corner edge of the tie.

As the rail anchor, when in locked position and in tightening, rocks upon the pressure foot as a fulcrum, I prefer to form the foot as a rocker and to this end I curve its broad bearing surface, 4^c, as shown in Figs. 1 and 2. It will be obvious that as the hook, 2, moves toward the tie, the pressure foot will move outwardly upon the side of the tie and the curved bearing surface permits this movement and prevents the splintering or tearing of the tie. The arm, 4, may be round or oval in cross section and either solid or hollow, but in most cases I prefer that its cross section shall be of an inverted U shape, as shown by dotted lines in Figs. 2 and 3. The strut or arm, 4, is most effectively arranged at substantially right angles to the main axis of the device and I prefer that it shall form a slight obtuse angle with the inner edge or side of the bar, 1, thereby securing the advantages of both a strut and a power arm. It will now be evident that from the moment that the two hooks grip the rail, either actual movement of the rail toward the tie, or end thrust thereon, effected through the power arm strut, will tend to force the hook, 3, upon the rail and increase the angularity of the device as a whole on the rail. The parts or members of the device are formed to resist the maximum end thrust of the rail and the self gripping or automatic resisting action of the connected hooks insures the retention

of the rail after the anchor has been firmly set by hammer blows and slight initial creeping of the rail.

Several advantages of my invention may be secured in a rail anchor of the modified form shown in Figs. 6 to 10. In this case the cross bar, 6, is intended to occupy substantially perpendicular position across the bottom of the rail and hence to be substantially parallel with the cross tie. The strut, 7, is of the order before described and is integral with the end of the bar, 6. The hook, 8, corresponds to the previously described hook, 3, but is of slightly different formation as to its end or point, which may terminate in a line, 8′, that is parallel with the edge of the rail base. The hook, 9, at the free end of the bar is provided with a bearing surface, 9′, separated from the line, 8′, by a space sufficient to admit the base of the rail. When the anchor has been placed on the rail, the hook, 8, is engaged with one flange thereof and the space which is left between the other edge of the rail and the bearing surface, 9′, of hook, 9, is closed by a small wedge or gib, 10, that is driven into the hook, 9. Forward movement of the rail tends to tighten the wedge in the hook, 9, and therefore tends to exert a drawing action on the hook, 8, whereby both hooks are tightly gripped upon the rail. For further security and to prevent retrogressive action of the rail anchor on the rail, when the latter reverses its movement, I prefer to provide the bearing surface, 8′, of the hook, 8, with a number of teeth, 11, and also provide the wedge, 10, with teeth, 10′. The teeth, 11, of the hook, 8, are so disposed that they do not specially resist the forward movement of the rail, but they do effectually resist forces which would tend to loosen the rail anchor on the rail. The teeth of the wedge, 10, are disposed oppositely to those of the hook, 8, whereby the wedge is driven in the direction of movement of the rail. The latter tend to tighten the wedge in the hook, 9, but when the rail movement is reversed and relieves the rail anchor from pressure against the cross tie, all retroactive or retrogressive movement of the hook, 9, is prevented by the presence of the firmly lodged wedge. It is obvious that teeth of this character may be provided in the bearing surfaces of the hooks, 2 and 3, hereinafter described. Obviously also, a wedge either toothed or plain, like unto the wedge, 10, may be employed in the hook, 2, of the device shown in Fig. 1. They are primarily intended to prevent the shifting of the anchor on the rail, when it is relieved from the thrust of the rail. The clamping or cramping action of the anchor is all sufficient to prevent the rail from creeping. The details relating to the ribs and the formation of the strut or power arm of the device shown in Fig. 6, may conform to the design illustrated in Fig. 1, or as shown the ribs may be disposed in lines that are substantially parallel with the axis of the bar, 6, and the strut may be of T section, terminating in the broad pressure foot, 7′.

As various modifications of my invention will readily suggest themselves to one skilled in the art, I do not limit or confine the invention to the specific structures herein shown and described.

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

1. A rail anchor bar having rail engaging hook portions at its ends and provided with a projecting power arm at one end, said arm being formed to exert diagonal thrust on the bar and to hold said end away from the cross tie and permit and aid the other end to move toward the cross tie, substantially as described.

2. A rail anchor having integral rail base engaging portions at its ends and provided with a projecting off-set power arm at one said end, said arm being formed to exert diagonal thrust on said end and to hold said end away from the cross tie and permit and aid the other end to move toward the cross tie, substantially as described.

3. A rail anchor having integral rail base engaging hooks at its ends and an integral offset power arm at one said end, to engage a cross tie, said arm being formed to hold its end of the rail anchor away from the cross tie, to thrust said end diagonally upon the rail and to permit and aid the opposite end to move toward the cross tie, substantially as described.

4. A rail anchor comprising a cross bar having integral rail base engaging hooks angularly disposed upon its ends and provided with an offset power arm integral with one of said hooks, forming substantially a right angle with the inner side of said bar and adapted to exert diagonal thrust upon its hook and hold it away from the cross tie while permitting and aiding the other hook to move toward the cross tie, substantially as described.

5. A rail anchor comprising in one piece of metal, a bar having rail base engaging hooks or jaws, the bearing surfaces of which are separated by a distance exceeding the width of a rail base, a power arm strut or arm carried by said bar at the end thereof which is most remote from the tie when the device is in use, said strut being perpendicular to the longitudinal axis of said bar, substantially as described.

6. A rail anchor comprising a bar of substantially ninety degree bell crank form, having a tie abutment foot at one end and a rail

engaging portion at the other end and provided with a second rail engaging portion at its angle or knee, the end of said bar which has the abutment foot being disposed diagonally to the tie, substantially as described.

In testimony whereof, I have hereunto set my hand, this 4th day of March, 1909, in the presence of two subscribing witnesses.

BENJAMIN B. BETTS.

Witnesses:
G. L. BROOKS,
F. J. O. WILSON.