

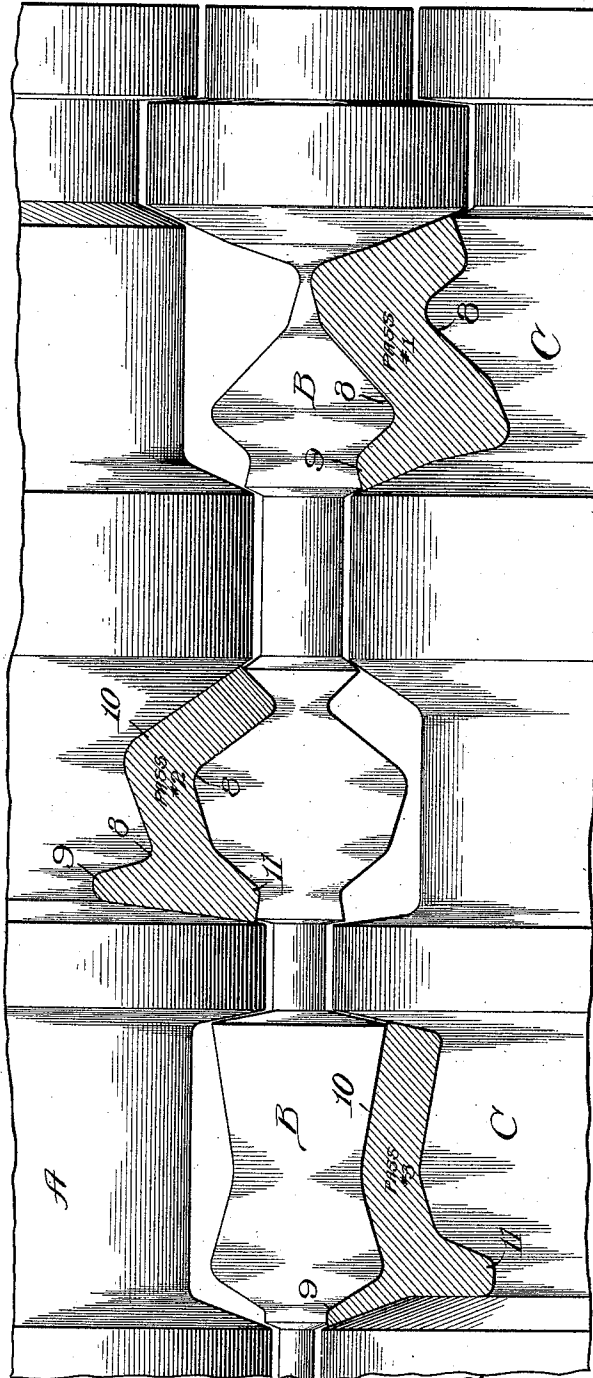
W. L. DE REMER.
METHOD OF ROLLING TIE PLATES.
APPLICATION FILED JAN. 29, 1909.

1,066,383.

Patented July 1, 1913.

5 SHEETS—SHEET 1.

Fig. 1



Witnesses:
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By Rector, Hibben & Davis
His Atty

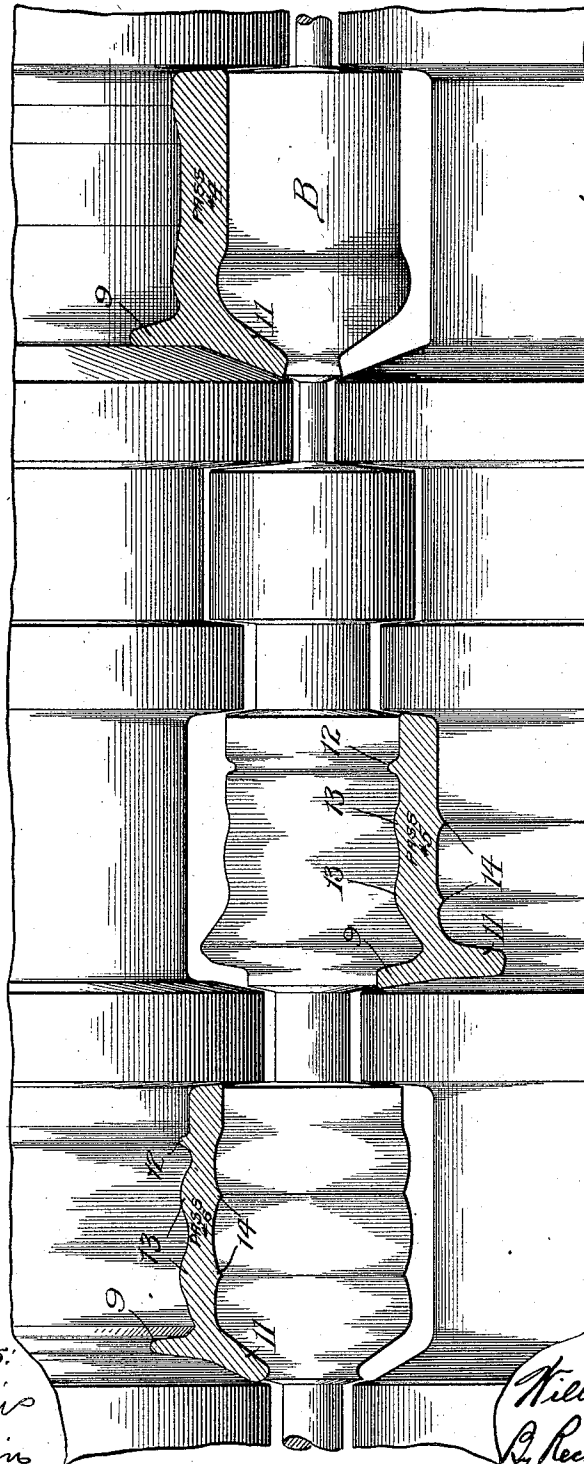
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5 SHEETS—SHEET 2.

Fig. 2



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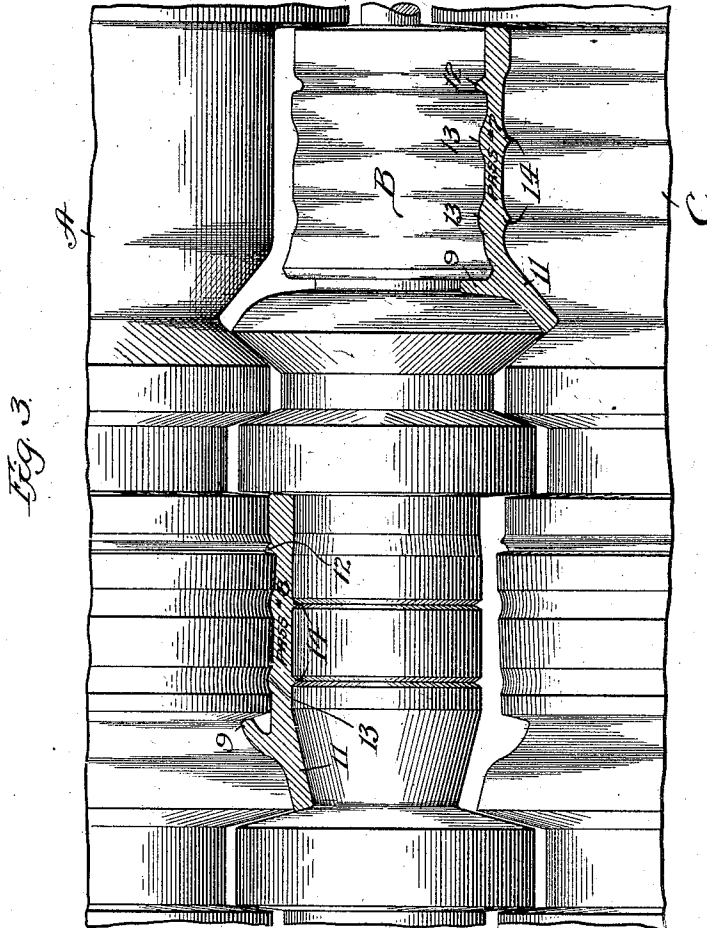
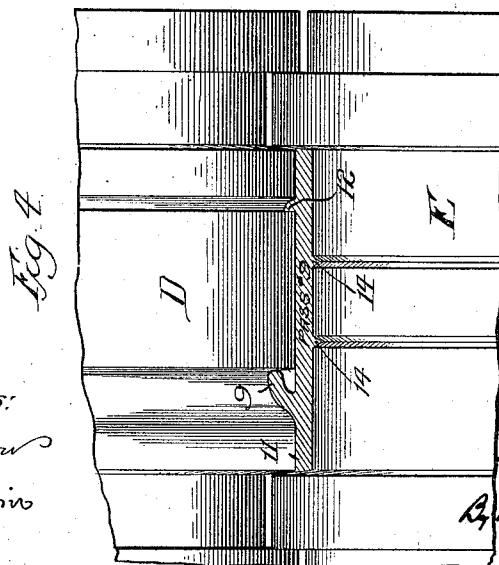
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5 SHEETS—SHEET 3.



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5 SHEETS—SHEET 4.

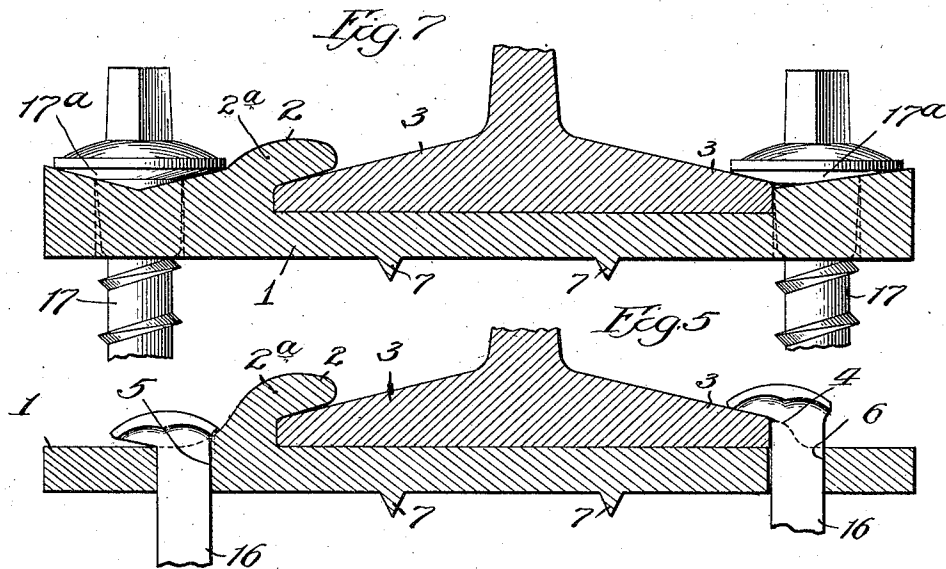
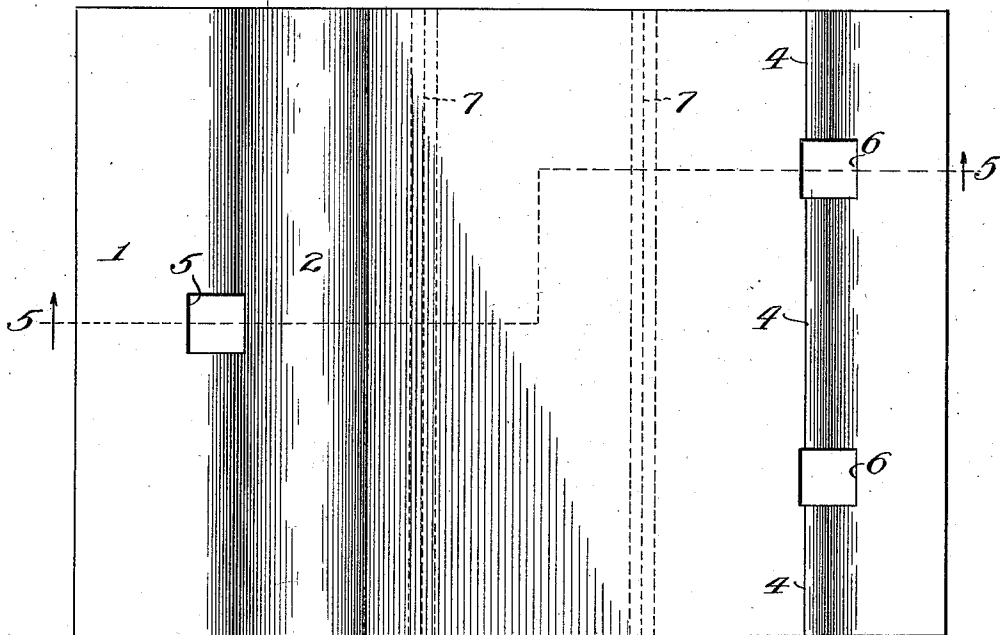


Fig. 6.



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5 SHEETS—SHEET 5.

Fig. 8.

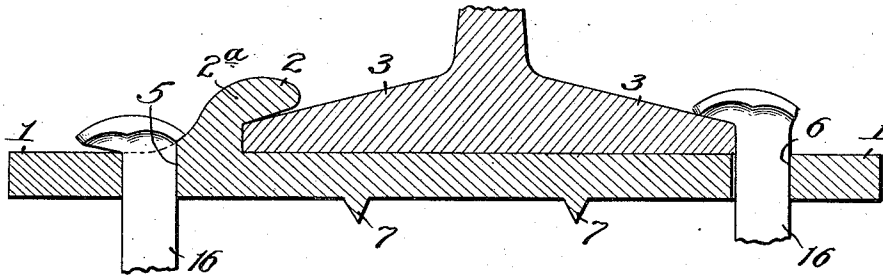
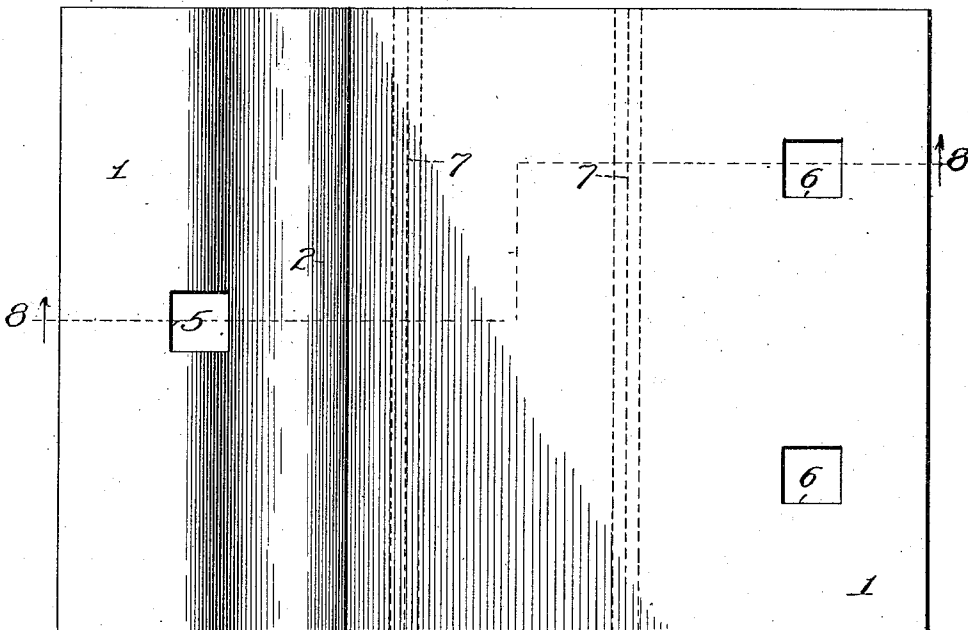


Fig. 9.



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UNITED STATES PATENT OFFICE.

WILLIAM L. DE REMER, OF CHICAGO, ILLINOIS.

METHOD OF ROLLING TIE-PLATES.

1,066,383.

Specification of Letters Patent.

Patented July 1, 1913.

Application filed January 29, 1909. Serial No. 474,963.

To all whom it may concern:

Be it known that I, WILLIAM L. DE REMER, a citizen of the United States, residing at Chicago, Cook county, Illinois, have invented certain new and useful Improvements in the Method of Rolling Tie-Plates, of which the following is a specification.

My invention relates to a new and useful method of rolling a tie plate from a billet, slab, or other piece of metal into a continuous strip or bar which is sheared off in proper lengths to form a series of separate tie plates.

My new tie plate is particularly distinguished by the provision of a hook or overhanging flange on its upper surface which runs transverse of the plate (when cut into lengths) or longitudinally of the rail and extends over or engages one side of the rail flange and results in many advantages in practice, among which may be named the following: providing for perfect contact between rail and plate and preventing so-called "shoulder mounting"; entirely eliminating the cutting or "necking" of the adjacent spikes as there is no contact between such spikes and the rail, and transferring the strain laterally to the hook which gives the greatest area of resistance, having both horizontal and vertical opposition, etc., and my new method of rolling is particularly adapted and designed for rolling such hook as a part of a continuous rolling operation.

My new tie plate also by preference comprises in addition to said hook a shoulder on the upper face thereof transverse of the plate (when cut into lengths) or longitudinal of the rail for engaging the other side of the rail flange to prevent lateral movement of the rail and consequent cutting of the spikes, the spike holes being formed slightly inwardly of the said shoulder to engage the rail flange which, in case the spikes become worn at such point, is supported by the shoulder. This shoulder is advantageous for the additional reason that it minimizes spike cutting effect from longitudinal travel of the rail and offers the greatest resistance from reacting spring or so-called "back slap" of the rail ordinarily received by the inside spikes which offer feeble resistance especially on curvatures. My new method of rolling also contemplates the production of such shoulder as a part of the continuous rolling method or process as well

as the production of flanges on the under face of the tie plate extending transverse thereof when cut into lengths.

While heretofore tie plates have been rolled from a billet or the like, yet under the methods heretofore practised it has been impossible to satisfactorily roll a tie plate of the nature in question, particularly because of the presence of the hook or overhanging flange, for which reason I have discovered and developed the new method of rolling above referred to in general and hereinafter described in detail.

In the drawings, Figures 1, 2 and 3 represent elevations of portions of rolls showing in section the bar or strip in its different stages of formation, such figures when placed in order reading from right to left representing the rolling machinery as far as the finishing rolls; Fig. 4 an elevation of the finishing rolls illustrating in section the finished bar or strip; Fig. 5 a cross section on the irregular line 5-5 showing one of the tie plates sheared from the bar or strip and the lower portion of a rail in place thereon; Fig. 6 a plan view of such tie plate of the form for use with ordinary spikes; Fig. 7 a cross section (similar to Fig. 5) showing a form of tie plate with which screw spikes are used; and Figs. 8 and 9 views similar to Figs. 5 and 6 but illustrating a plate with the transverse shoulder omitted.

Before explaining my new method of rolling, I will describe the tie plate itself, particularly its characteristic feature.

As shown in Figs. 5 to 9, the completed tie plate, which is of course made of metal, preferably steel, consists of the flat plate or body portion 1 having on its upper surface a hook or overhanging flange 2 extending transversely thereof, or in a direction longitudinal of the rail. This hook is adapted and designed to cooperate with or overhang one side of the rail flange 3 as clearly indicated in Fig. 5, thereby holding the rail securely in place and resisting both horizontal and vertical strains or pressures, insuring particularly a perfect contact between rail and plate. By preference, the hook is thickened somewhat at its neck portion as indicated at 2^a in Fig. 5, or at least made rather thick thereat in order to give the hook great strength at such point and thereby enable it to resist vertical pressures especially in case the spikes on the other

end of the tie plate should become loosened.

A tie plate as thus far described is illustrated in Figs. 8 and 9, but I prefer, however, to provide it with additional features. Describing such preferred form of tie plate, I provide the same on its upper surface with a shoulder 4 extending transversely thereof and parallel with the hook 2, as shown in Figs. 5, 6 and 7. This shoulder is adapted to engage the other side of the rail flange and prevent lateral movement of the rail and thereby resist rail pressures in this direction as well as rail travel, with the result that the spikes are protected against cutting and are relieved from "back slap" of the rail which is taken by the shoulder. This shoulder 4 presents preferably a straight vertical face to the rail flange and sufficient clearance is provided between the hook and the rail and also between the rail and the shoulder to permit of the insertion and removal of the plate without disturbing the rail. In practice a clearance of about $\frac{1}{16}$ of an inch is provided between the rail and the shoulder in respect to a rail flange having a width of say $5\frac{3}{4}$ inches, but the exact dimensions and clearance are immaterial so long as it is possible to properly apply and remove the tie plate without disturbing the rail. The said hook and shoulder are so designed as to insure ease of application of the plate to the tie without disturbing the rail or impairing the efficiency of the plate. The tie plate is provided on one end with one or more spike holes 5 and on the other end with similar holes 6, the latter extending inwardly slightly beyond the vertical side of the shoulder 4 in order that the spikes may press against the adjacent side of the rail flange and take up any clearance that may exist between the rail flange and the shoulder. Such arrangement of spikes and spike holes is used as a method of adjustment for rolling mill variations as allowed in the rolling of rails. As herein shown and by preference, the tie plate is provided on its under side with transverse flanges 7.

Having now described the tie plate, I will explain the method of rolling the strip or bar from which the tie plates are cut, beginning with the billet, slab or other piece of metal employed, and following the same through the different passes of the rolls to the completion thereof as a finished strip or bar, ready to be cut up into tie plate widths, it being understood that in the present explanation of the rolling method I will describe the rolling of the strip from which the tie plate in its preferred complete form as shown in Figs. 5 and 6 is cut. In the present instance and by preference I use in the rolling process, as far as the finishing rolls, what is called a "three-high"

mill, meaning thereby top, middle and bottom rolls herein designated in general by the reference characters A, B and C respectively, although if desired a so-called "two-high" mill might be employed but with more handling of the strip or bar. As to the finishing rolls, I employ a "two-high" mill comprising the two rolls D and E.

Referring to the preferred practice of my method by the apparatus herein shown, which is illustrated in the usual diagrammatic way, the usual billet or piece of metal is reduced by pass No. 1 to the form illustrated at the right-hand end of Fig. 1, whereby somewhat similar but reversed recesses 8 have been formed on opposite sides of the billet by means of the middle roll B and bottom roll C. At this time there is thus formed from one side of the billet a rudimentary hook 9. After passing through pass No. 2, the rudimentary hook becomes slightly further developed and the body (indicated at 10) of the plate is particularly developed from the right-hand side of the billet by means of the top and middle rolls A and B respectively, as clearly indicated in Fig. 1, but the portions of such plate are still angular. At the same time the lower left-hand corner 11 of the billet is assuming the form of a plate. By means of the next pass, No. 3, at which the middle and bottom rolls are active, the hook 9 is still further developed, becoming elongated and attenuated and likewise the downwardly projecting portion 11 of the plate becomes still further developed. Moreover, the angular portions 10 constituting the main body of the plate assume a more nearly horizontal position. At the next pass, No. 4, at which the top and middle rolls are active, the main body of the plate is brought to a horizontal position with the hook 9 extending substantially vertical and with the projecting portion 11 on the lower side of the plate extended laterally or outwardly, as clearly indicated in Fig. 2. At the next pass, No. 5, the upper surface of the plate is rolled with the shoulder 12 and two similar swells 13 by means of the middle and bottom rolls, such swells being immediately above the two similar partially formed flanges or ribs 14 on the under face of the plate. At this time the hook 9 and projection 11 are slightly changed in form and relation to each other, as clearly shown by an inspection of Fig. 2. At the next pass, No. 6, at which the top and middle rolls are active, the hook 9 becomes somewhat more pronounced and the projection 11 is beginning to be turned toward the horizontal. At the next pass, No. 7, the hook 9 is in a substantially vertical position and the projection 11 is approaching a horizontal position which is almost attained in pass No. 8. In this latter pass the hook 9 is itself turned

over slightly inwardly and toward the body of the plate and the ribs 14 become more completely formed, the material of the swells 13 being employed for the purpose of the more complete formation of said ribs. The strip or bar is now ready to be presented to the finishing rolls in pass No. 9, wherein the hook is rolled to final form by the top and bottom rolls D and E, shown in Fig. 4, so as to constitute practically a flange adapted to overhang the flange of a rail, the projection 11 having been brought to a horizontal position to serve as a part of the body of the bar. Simultaneously with this rolling of the hook inward and toward the plate, the flanges or ribs are finished by rolling down said swells. Moreover, at the same time and in pass No. 9, the shoulder 12 is finally formed or finished by reducing the thickness of metal at the right hand side of the blank (see pass No. 8) which metal in being reduced to the final thickness of the finished plate, as shown in pass No. 9, is caused to flow to completely finish said shoulder.

The result of the method or process of rolling above described is, broadly speaking, a long bar or strip which is cut into proper lengths to form the separate tie plates as seen in Fig. 6, such bar or strip having on its upper face a continuous hook or overhanging flange 2, which by preference is also provided with the shoulder 4.

The particular tie plate described is adapted to be secured to the tie by means of the ordinary form of spikes 16, but if the screw spike such as shown at 17 in Fig. 7 is employed, the tie plate is slightly modified as to its end portions in order to conform to the contour of the under side of the head 17^a of such screw spikes. In other respects the structure of the tie plate is the same.

While I have described my plate as a tie plate, used in the ordinary manner of such devices, yet it will be understood that owing to the peculiar structure thereof the same may also be utilized as a rail joint, particularly when the rails are light in weight.

I claim:

1. The method of manufacturing tie plate bars or blanks by rolling, which consists in forming during the rolling operation a partially formed blank having a longitudinally extending rudimentary hook projecting from the upper side thereof, said rudimentary hook being upon a portion of the blank whose under side lies at an angle to the rest of the under side portion of the blank, then bending the blank by rolling so that the under surface portions approach alined positions, and subsequently rolling said hook to proper hook form; substantially as described.

2. The method of manufacturing tie plate bars or blanks by rolling which consists in

forming during the rolling operation a partially formed blank having a longitudinally extending hook projecting from the upper side thereof and an angular portion extending from the under side into the opposite direction, rolling the blank so that the under side portion approaches alined position with the body of the blank, rolling a rudimentary rail-flange shoulder on the upper side of the blank and also rolling an enlargement adjacent said shoulder as a feeder therefor, rolling said hook portion to proper hook form and reducing said enlargement on the blank adjacent said shoulder to completely form and finish the latter; substantially as described.

3. The method of manufacturing tie plate bars or blanks by rolling which consists in forming during the rolling operation a partially formed blank having a longitudinally extending hook projecting from the upper side thereof and an angular portion extending from the under side into the opposite direction, rolling the blank so that the under side portion approaches alined position with the body of the blank, rolling a rudimentary rail-flange shoulder on the upper side of the blank and also rolling an enlargement adjacent said shoulder as a feeder therefor, rolling said hook portion to proper hook form and reducing said enlargement on the blank adjacent said shoulder to completely form and finish the latter, said formation of the hook proper taking place simultaneously with said reducing of said enlargement; substantially as described.

4. The method of manufacturing tie plate bars or blanks by rolling which consists in forming during the rolling operation a partially formed blank having a longitudinally extending rudimentary hook projecting from the upper side thereof, rolling a rudimentary rail-flange shoulder on the upper side of the blank during the time of rolling the rudimentary hook and also rolling on said upper side thereof an enlargement adjacent said shoulder as a feeder therefor, rolling said hook to proper hook form, and reducing the blank adjacent said shoulder to completely form and finish the latter; substantially as described.

5. The method of manufacturing tie plate bars or blanks by rolling which consists in forming during the rolling operation a partially formed blank having a longitudinally extending rudimentary hook projecting from the upper side thereof, rolling a rudimentary rail-flange shoulder on the upper side of the blank and also rolling on said upper side thereof an enlargement adjacent said shoulder as a feeder therefor, rolling said hook to proper hook form, forming flanges on the under surface of the blank, forming swells on the upper surface of the blank, and rolling down said swells and said enlargement

simultaneously with the forming of the hook proper in order to finish the flanges and shoulder; substantially as described.

6. The method of manufacturing a tie-
5 plate bar or blank which consists in rolling a billet or piece of metal into a continuous strip, forming during the rolling operation a rudimentary hook extending from the upper side of the billet or partially rolled
10 blank, rolling a rudimentary flange-shoulder also on the upper side of the blank, forming swells on the blank between said hook and shoulder, forming flanges on the under surface of the blank, rolling said hook in-

wardly and downwardly toward the body 15 of the plate to form a hook proper, rolling down said swells to finish the flanges, and reducing the blank adjacent the shoulder for finishing the latter, said rolling of the hook inwardly and rolling down of the 20 swells taking place simultaneously with the finishing of the flanges; substantially as described.

WILLIAM L. DE REMER.

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."