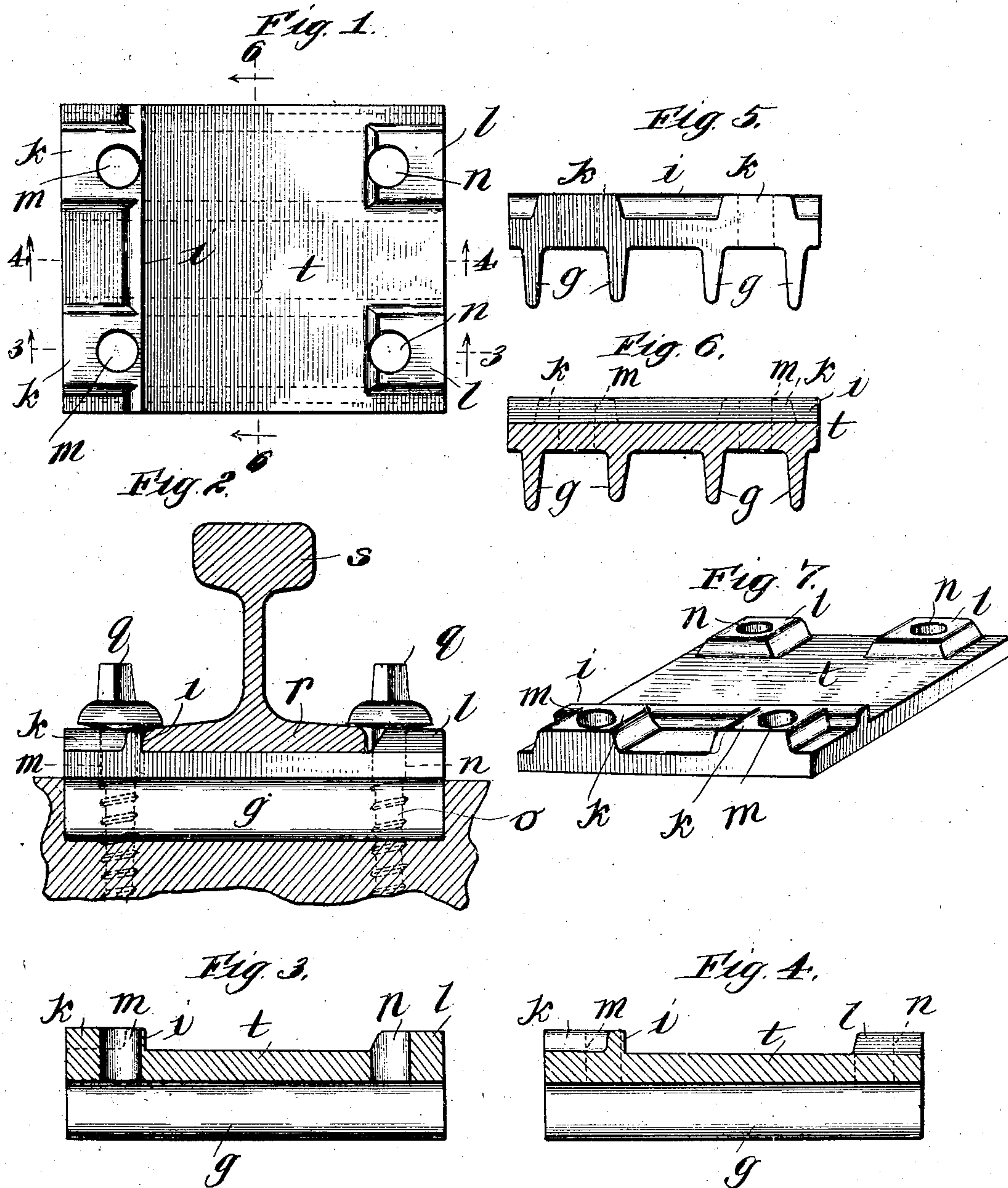


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 APPLICATION FILED JUNE 18, 1908.

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Patented Oct. 12, 1909.

2 SHEETS—SHEET 1.



Witnesses:

G. A. Schuchman  
 A. O. Sandy

Inventor:

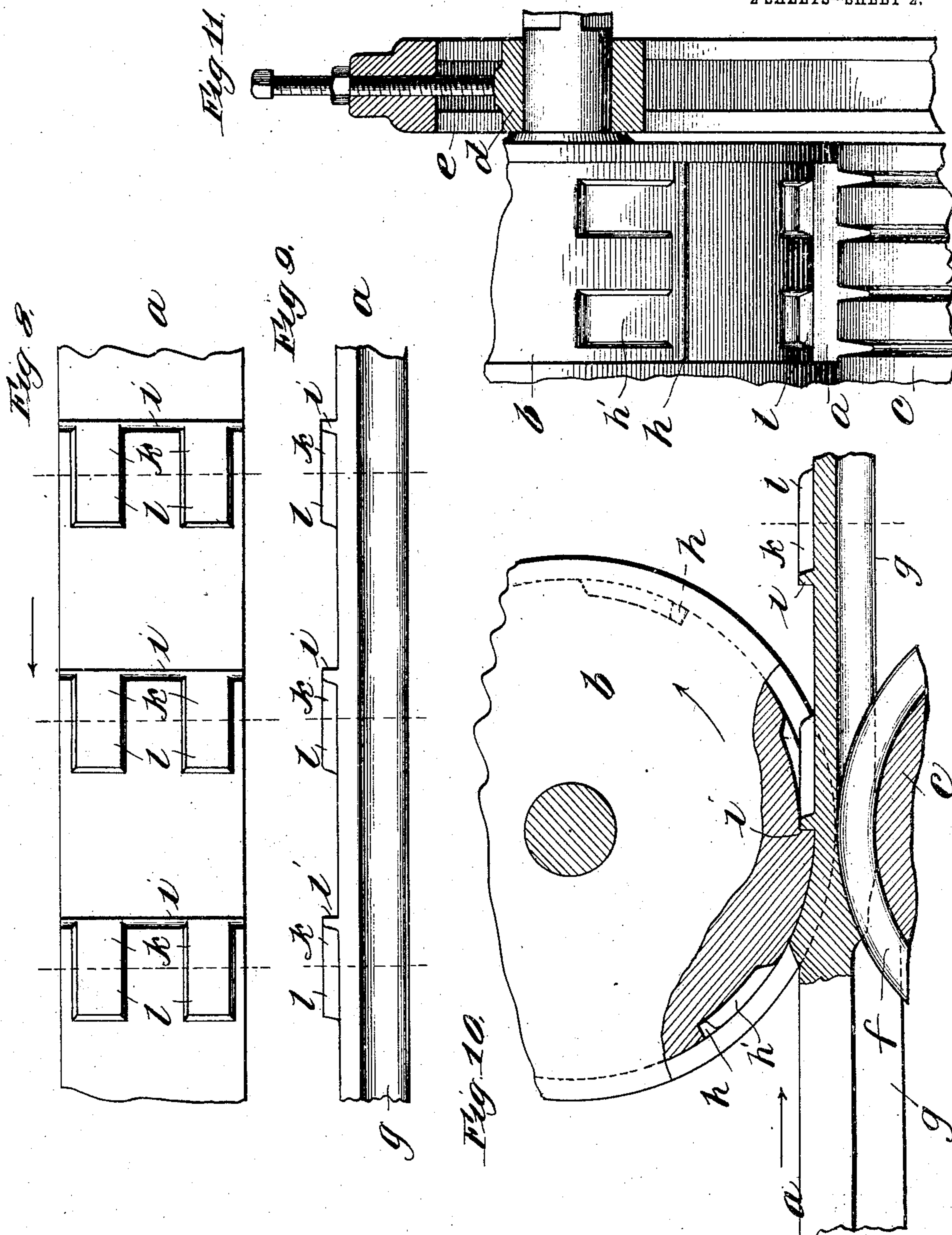
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Witnesses

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Inventor:

William L. De Remer  
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# UNITED STATES PATENT OFFICE.

WILLIAM L. DE REMER, OF CHICAGO, ILLINOIS.

PROCESS OF MAKING ROLLED-METAL TIE-PLATES.

936,423.

Specification of Letters Patent.

Patented Oct. 12, 1909.

Application filed June 18, 1908. Serial No. 439,159.

To all whom it may concern:

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

This invention relates to rolled metal tie-plates and consists in a new and useful process or method of rolling or making the same.

The object of my invention is to provide a novel, simple and efficient method or process of rolling whereby practical difficulties in the rolling of tie-plates are overcome, more particularly the distortion and unevenness resulting in tie-plates when they are rolled with a transverse shoulder or rib.

Speaking of my method as I prefer to practice it and as the same is herein illustrated, the same consists in subjecting a blank from which the tie-plate is made to a reducing pressure, as by means of rolls, to form a transverse shoulder (which by preference though not of necessity extends entirely across the plate) and a boss adjacent thereto, the pressure being partially and preferably gradually relieved in the formation of the boss whereby an undistorted and perfect tie-plate results. The boss—in the present instance and by preference a pair of bosses for each shoulder—is formed substantially simultaneously with the shoulder but preferably slightly in advance in point of time and at an angle and preferably integral therewith. However, when a tie-plate is to be formed with both the transverse shoulder or rib member on one side and a flange or flanges on the opposite side, some measure of my invention may be obtained by subjecting the body portion of the blank to a greater percentage of reduction than the flange portion thereof and then relieving the pressure upon the body portion by presenting to it the transverse slot in one of the reducing rolls, it being understood that the flange or flanges referred to run in the general direction of the blank and at an angle to the shoulder and are preliminarily formed or practically so in order that such difference in the draft or amount of reduction between the body portion and the flange portion will take place as described. It will be understood that a series of tie-plates is formed from a single

blank which is properly severed at points determined by the shoulders or rib members as gage lines and running through the bosses when the plates are provided with the latter.

In the drawings, Figure 1, is a plan view of a tie-plate made in accordance with my new process; Fig. 2 a view in side elevation of the same, showing a rail mounted thereon and screw spikes in position to secure the plate and the rail to the tie; Fig. 3 a longitudinal sectional view taken on line 3 of Fig. 1; Fig. 4 a similar view in longitudinal vertical section taken on line 4 of Fig. 1; Fig. 5 an end view of the plate shown in Fig. 1; Fig. 6 a transverse sectional view of the plate shown in Fig. 1 taken on line 6 of said figure; Fig. 7 a perspective view of the plate having a top transverse shoulder or rib and bosses, but without bottom flanges; Fig. 8 a plan view of a strip of metal or partially formed blank showing a plurality of plates before being cut apart and perforated; Fig. 9 a side elevation of the strip of metal or blank shown in Fig. 8; Fig. 10 a view in elevation of a pair of rolls with a blank or strip of metal in process of being formed into tie-plates therebetween, the rolls and strip being partly in section and partly broken away; and Fig. 11 a view in side elevation of the rolls shown in Fig. 10 with the blank or strip of metal passing therebetween in process of being rolled into tie-plates.

For the purpose of a clear and definite description of my invention I have herein shown in the drawings apparatus for carrying out or practicing my process or method without intention of limiting myself to such apparatus, and I will now proceed to describe my method in connection with such apparatus.

As herein shown, reducing rolls are provided comprising an upper roll *b* and a lower roll *c* which are rotatably mounted in suitable bearings *d* in a supporting frame *e* of the ordinary and well known construction. The lower roll is provided with annular peripheral grooves *f* for forming the longitudinal bottom flanges *g* of the tie-plates when such flanges are to be used. The upper roll is provided with longitudinal peripheral slots or grooves *h* for forming the transverse shoulders or ribs *i* which engage the rail and which by preference, though not of necessity, extend all the way



across the plate. In addition and by preference the upper roll is provided with recesses  $h'$  adjacent the slots  $h$  and also by preference in communication therewith, with the result that in the rolling of the blank according to my process the bosses or reinforcements  $k$  and  $l$  are formed integral with the transverse shoulders  $i$ , the particular portion  $k$  of the boss, after severing of the blank into tie-plate lengths, belonging to the next adjacent tie-plate, as clearly indicated in Figs. 8 and 9.

Now referring more particularly to the practice of my process in connection with the described apparatus, the blank or strip  $a$  of metal is passed between the rolls preferably in the direction indicated by the arrows in Figs. 8 and 10, although it is possible that the strip may be passed there-through in the opposite direction. The blank or strip is thereby subjected to the reducing action of the rolls and in the event that the tie-plates are to be provided with bottom flanges which are substantially completely formed prior to the arrival of the blank at the rolls  $b$  and  $c$ , the body portion of the blank is subjected to a greater percentage of reduction than the flanged portion thereof, due to the prior substantially complete formation of the bottom flanges, and thereupon, according to my new process, this pressure of reduction upon the body portion is relieved by presenting to it a transverse slot  $h$  so as to form the transverse shoulder or rib  $i$ . Substantially simultaneously and preferably slightly in advance of the formation of the transverse shoulder the pressure is materially relieved by means of the recesses  $h'$  which are arranged to form the bosses adjacent the transverse shoulder with the result that the distortion of the plate during the formation of the shoulder is prevented and the resulting tie-plate considerably strengthened. By preference the blank is fed through the rolls in a direction at an angle, preferably at a right angle, to the transverse shoulder, in all cases these bosses being arranged at an angle to said shoulder. In passing through the rolls the plate is thus subjected to gradually changing or decreasing pressure substantially during the time of formation of the transverse shoulder preferably in advance thereof by forming the longitudinally extending boss or bosses. The described reducing pressure causes the metal in advance of the rolls to become banked up somewhat and the admission of such metal under pressure into the recess and slots described, materially relieves said pressure and at the same time the desired construction of tie-plate is produced. It is preferred to employ the recesses  $h'$  both to secure a reinforced tie-plate and to bring about a material relieving of the reducing pressure, preferably

in a gradual manner, so that the transverse shoulder will be formed without any danger of distortion of the plate. However, as hereinbefore stated, when the bottom flanges are employed a difference in draft or percentage of reduction upon the body portion of the plate and the flange portion is obtained in such a manner that the transverse shoulder is properly formed without distortion of the plate. Whether the plates are provided with a flange portion or projection of any kind on the bottom side or not, the relieving of pressure in the formation of the shoulder or of the boss, or of the shoulder and boss together, is sufficient to maintain the upper or bearing surface for the rail substantially straight, said relieving of pressure on such upper surface taking place without a corresponding relieving of pressure on the other or lower side thereof. It will be understood that any desired number of passes may be employed for the complete formation of the plates, the particular rolls herein shown being the so-called finishing rolls, it being unnecessary to show the earlier rolls for reducing this billet or other piece of metal to strip or blank form. The resulting strip contains a series of tie-plates and is then severed or otherwise divided into tie-plate lengths as indicated by dotted lines in Figs. 8 and 9, each section or plate being a shouldered and reinforced tie-plate. The tie-plates are thereupon perforated or punched to form the spike holes  $m$  and  $n$  and spikes such as the screw spikes  $o$  having annular spike heads or shoulders  $p$  and squared ends  $q$  are mounted in the spike holes with the spike heads or shoulders in engagement with the bottom flanges  $r$  of the track rail  $s$  and with the outer bottom faces of said spike heads or shoulders resting upon the top faces of the reinforcing bosses  $k$  and  $l$ , respectively. The tie-plates thus formed consist of a main body portion  $t$  having bottom flanges  $g$  which are here shown as longitudinal, a transverse shoulder or rib for engaging the bottom flange of the rail, and longitudinal bosses  $k$  here integral with the transverse rib and extending therefrom to its end of the plate. However, as indicated in Fig. 7, the bottom flanges may be omitted but the top face of the plate may be however provided with both the transverse shoulder and the bosses. Thus by the practice of my invention I am enabled to roll perfect and undistorted tie-plates in a simple and economical manner by subjecting the blank or strip to the reducing action of the rolls and properly relieving the reducing pressure in a novel manner and at the same time producing a tie-plate of an efficient and desirable construction.

I claim:

1. The process of making rolled metal tie plates which consists in subjecting a blank



having a body portion and a flange portion extending in the general direction of the blank to the reducing pressure of a pair of rolls so constructed that a greater percentage of reduction will be obtained upon the body portion than upon the flange portion and having a slot for the formation of a transverse shoulder or rib.

2. The process of making rolled metal tie-plates which consists in subjecting a blank having a body portion and a flange portion projecting from one side thereof and extending in the general direction of the blank to the reducing action of a pair of rolls so constructed that a greater percentage of reduction will be obtained upon the body portion than on the flange portion and having a slot for the formation of a transverse shoulder or rib, on the opposite side of the body portion from that upon which the flange portion projects.

3. The process of making rolled metal tie-plates which consists in subjecting a blank having a body portion and a flange portion projecting from one side thereof and extending in the general direction of the blank to the reducing action of a pair of rolls so constructed that a greater percentage of reduction will be obtained upon the body portion than on the flange portion, and relieving the reducing pressure by a slot in one of the rolls for the formation of a transverse shoulder or rib on the opposite side of the body portion from that upon which the flange portion projects, said flange portion being substantially formed in advance of the transverse shoulder, such relieving of pressure being sufficient to maintain the bearing surface for the rail substantially straight.

4. The process of making rolled metal tie-plates which consists in subjecting a blank to reducing pressure by means of rolls, one of which has a slot adapted to form a transverse shoulder or rib member, and partially relieving the pressure adjacent the transverse shoulder by a recess in the roll adjacent the slot of a shape to form on the same side of the blank and upon and above the body thereof a boss extending at an angle to the shoulder, the relieving of the pressure in the formation of the boss being sufficient to maintain the bearing surface for the rail substantially straight.

5. The process of making rolled metal tie-plates which consists in subjecting a blank having a body portion and a flange portion projecting from one side thereof to reducing pressure by means of rolls, one of which has a slot adapted to form a transverse shoulder or rib member, and partially relieving the pressure adjacent such shoulder by a recess in the roll adjacent the slot of a shape to form on the same side of the blank and upon and above the body thereof a boss extending at an angle to the shoulder, the relieving of

the pressure in the formation of the boss being sufficient to maintain the bearing surface for the rail substantially straight.

6. The process of making rolled metal tie-plates which consists in subjecting a blank having a body portion and a flange portion projecting from one side thereof and extending in the general direction of the blank to the reducing action of a pair of rolls so constructed that a greater percentage of reduction will be obtained upon the body portion than on the flange portion and having a slot for the formation of a transverse shoulder or rib, and also a recess arranged adjacent the slot and recessed sufficiently to permit material relieving of the reducing pressure at said point.

7. The process of making rolled metal tie-plates which consists in subjecting a blank having a body portion and a flange portion projecting from one side thereof and extending in the general direction of the blank to the reducing action of a pair of rolls so constructed that a greater percentage of reduction will be obtained upon the body portion than on the flange portion and having a slot for the formation of a transverse shoulder or rib, and also a recess extending at an angle to the transverse slot and recessed sufficiently to permit material relieving of the reducing pressure at said point.

8. The process of making rolled metal tie-plates which consists in subjecting a blank to reducing pressure by means of rolls, one of which has a slot adapted to form a transverse shoulder or rib member, and partially relieving the pressure adjacent the transverse shoulder (substantially simultaneously with the formation of the latter) by a recess in the roll adjacent the slot of a shape to form on the same side of the blank a boss upon and above the body of the blank and at an angle to the shoulder, the relieving of the pressure in the formation of the boss being sufficient to maintain the bearing surface for the rail substantially straight.

9. The process of making rolled metal tie-plates which consists in subjecting a blank to reducing pressure by means of rolls, one of which has a slot adapted to form a transverse shoulder or rib member, and partially relieving, in advance of the formation of the latter, the pressure by a recess in the roll adjacent the slot of a shape to form on the same side of the blank a boss on and above the body of the blank and at an angle to the shoulder, the relieving of the pressure in the formation of the boss being sufficient to maintain the bearing surface for the rail substantially straight.

10. The process of making rolled metal tie-plates which consists in subjecting a blank to reducing pressure by means of rolls, one of which has a slot adapted to form a transverse shoulder or rib member, and partially



and gradually relieving the pressure adjacent the transverse shoulder by a recess in the roll adjacent the slot of a shape to form on the same side of the blank a boss upon and above the body of the blank and at an angle to the shoulder without a corresponding relieving of pressure on the other side thereof.

11. The process of making rolled metal tie-plates which consists in subjecting a blank to reducing pressure by means of rolls, one of which has a slot adapted to form a transverse shoulder or rib member, and partially and gradually relieving, in advance of the formation of the latter, the pressure adjacent the transverse shoulder by a recess in the roll adjacent the slot of a shape to form on the same side of the blank a boss on and above the body of the blank and integral with the shoulder without a corresponding relieving of pressure on the other side thereof.

12. The process of making rolled metal tie-plates which consists in subjecting a blank having a body portion and a flange portion, projecting from one side thereof and extending in the general direction of the blank to the reducing action of a pair of rolls so constructed that a greater percentage of reduction will be obtained upon the body portion than on the flange portion and having a slot for the formation of a transverse shoulder or rib, and partially and gradually relieving the pressure by a recess in the roll adjacent the slot of a shape to form on the same side of the blank a boss upon and above the body of the blank and integral with the shoulder.

13. The process of making rolled metal tie-plates which consists in subjecting a blank having a body portion and a flange portion, projecting from one side thereof and extending in the general direction of the blank to the reducing action of a pair of rolls so constructed that a greater percentage of reduction will be obtained upon the body portion than on the flange portion and having a slot for the formation of a transverse shoulder or rib, and partially and gradually relieving the pressure by a recess in the roll adjacent the slot of a shape to form on the same side of the blank a boss upon and above the body of the blank and integral with the shoulder, the relieving of the pressure in the formation of the boss being sufficient to maintain the bearing surface for the rail substantially straight.

14. The process of making rolled metal tie-plates which consists in subjecting a blank to reducing pressure by means of rolls, one

of which has a slot adapted to form a transverse shoulder or rib member, and partially relieving the pressure adjacent the transverse shoulder and at a plurality of points along the length thereof by recesses in the roll adjacent the slot of a shape to form on the same side of the blank bosses upon and above the body of the blank and at an angle to the shoulder without a corresponding relieving of pressure on the other side thereof.

15. The process of making rolled metal tie-plates which consists in subjecting a blank to reducing pressure by means of rolls, one of which has a slot adapted to form a transverse shoulder or rib member, and partially and gradually relieving the pressure adjacent the transverse shoulder by a recess in the roll adjacent the slot of a shape to form on the same side of the blank a boss on and above the body of the blank and extending longitudinally therefrom, the relieving of the pressure in the formation of the boss being sufficient to maintain the bearing surface for the rail substantially straight.

16. The process of making a rolled metal tie-plate having a transverse shoulder which consists in passing a blank between rolls in a direction at an angle to said shoulder and subjecting such blank to the reducing action thereof, one of the rolls having a slot adapted to form the transverse shoulder and partially relieving the pressure adjacent the transverse shoulder by a recess in the roll adjacent the slot of a shape to form on the same side of the blank and above the body thereof a boss extending at an angle to the shoulder, the relieving of the pressure in the formation of the boss being sufficient to maintain the bearing surface for the rail substantially straight.

17. The process of making from a single blank a series of tie-plates having transverse shoulders which consists in passing said blank between rolls in a direction at an angle to the shoulders and subjecting the blank to the reducing action of such rolls, one of which has slots adapted to form said shoulders, and partially relieving the pressure adjacent the transverse shoulders by recesses in the roll adjacent the slots of a shape to form on the same side of the blank and upon and above the body thereof bosses extending at an angle to the shoulders, the relieving of the pressure in the formation of the boss being sufficient to maintain the bearing surface for the rail substantially straight.

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Witnesses:

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