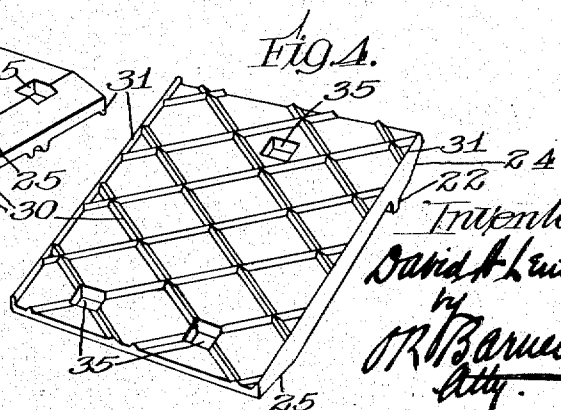
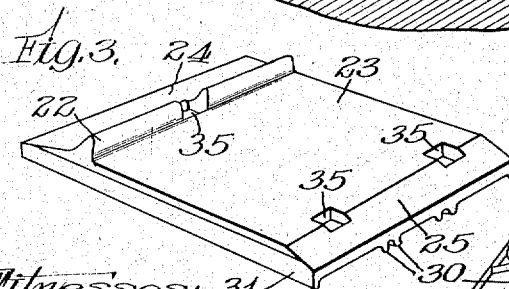
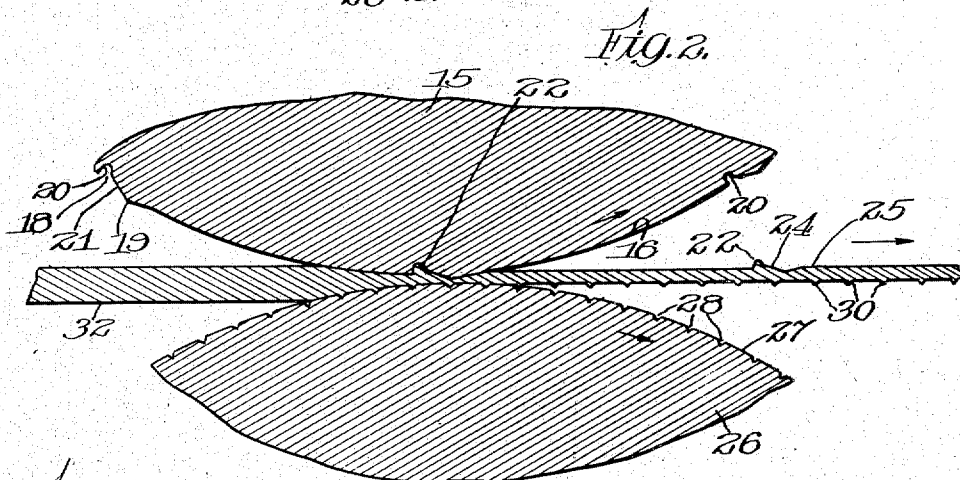
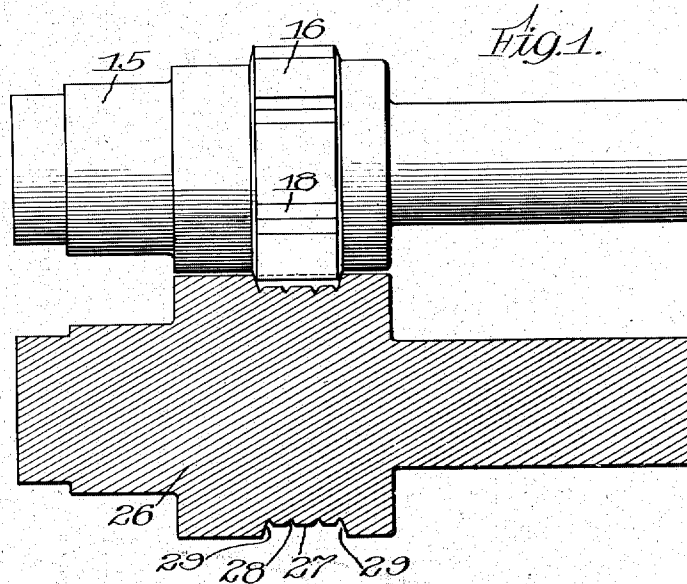


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 PROCESS OF ROLLING TIE PLATES AND THE LIKE.
 APPLICATION FILED FEB. 5, 1910.

986,071.

Patented Mar. 7, 1911.

2 SHEETS—SHEET 1.



Witnesses:
 P. H. Truman
 G. C. Donaruso Jr.

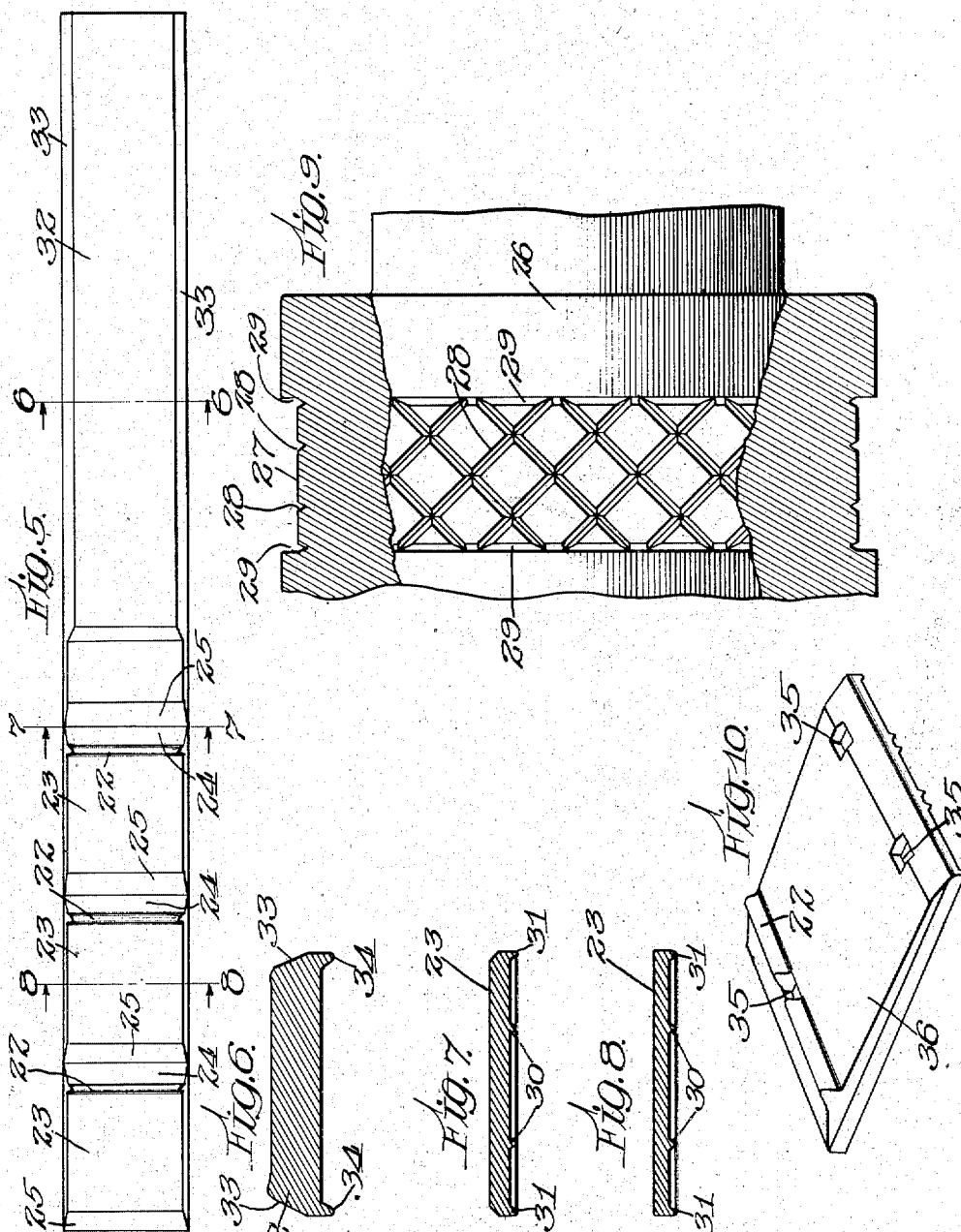
Inventor:
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 by
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UNITED STATES PATENT OFFICE.

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PROCESS OF ROLLING TIE-PLATES AND THE LIKE.

986,071.

Specification of Letters Patent.

Patented Mar. 7, 1911.

Application filed February 5, 1910. Serial No. 542,259.

To all whom it may concern:

Be it known that I, DAVID H. LENTZ, 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 Rolling Tie-Plates and the Like, of which the following is a specification.

My invention relates to the manufacture of metal tie plates; and the invention has for its object to provide a new and improved method of rolling the plates, or more correctly speaking, of rolling the strip of metal which is subsequently severed and punched so as to form the separate tie plates, which method successfully obviates certain difficulties which have been heretofore encountered in the manufacture of articles of this sort and which makes it possible to improve the character of the plates and simplify and cheapen their manufacture.

Tie plates are ordinarily formed with ribs or shoulders against which the base of the rail, which the plates are designed to support, abuts. Before my invention it was the general practice to roll plates of this character lengthwise of the rib or shoulder, that is to say, a strip of metal of considerable length was rolled out with a rib running lengthwise of the same, and this strip was afterward severed transversely so as to form the individual tie plates. By this method of manufacture the grain of the plate ran lengthwise of the plate, that is, parallel with the rail. It obviously would have been better, however, to have the grain run in the opposite direction as the plate would be better calculated to stand the strains put upon it, which are strains tending to break it lengthwise. It was therefore attempted to roll the plates the other way, that is, to roll out a strip having, instead of the one long rib, a series of transverse ribs. Several difficulties stood in the way of the successful accomplishment of this method of manufacture. For instance, the reduction of the billet sufficiently to produce at regular intervals a sufficient amount of surplus metal to form the transverse shoulders put so much strain on the rolls and upon the metal passing through the same as to cause the former to wear very quickly and so as to make the strip of metal liable to become distorted, stretched and torn.

These difficulties I overcame in part by forming a depression in the plate immediately in advance of each rib or shoulder, the surplus metal from the depression being immediately forced into the groove in the roll which formed the shoulder, thus doing away with the necessity of pushing the excess metal, necessary to form the shoulders, the length of each plate, and equalizing the strains on the rolls and on the billet. Furthermore, by severing the rolled blank through these depressions, tie plates were formed with tapered or sloping edges, making a plate of more desirable configuration and in the long run economizing a considerable amount of metal. However, the formation of these depressions has, in the first place, a tendency to tear and distort the metal at these thin places and places of increased pressure, and this is particularly the case where, for reasons of economy, the tie plates are made from cheap scrap metal. The displacement of the metal to form the depressions also results in the formation of fins because of the squeezing out of the metal between the rolls, and this is undesirable both because it results in a plate of bad appearance and also because of possible injury to the rolls. These difficulties have been overcome by giving to the billet, before it enters the final pass which forms the depressions and shoulders on the upper surface of the plates, a peculiar configuration which will be hereinafter described in connection with the other steps of the process.

The primary object of my invention is, therefore, to provide a practical and successful method of forming the tie plates by which the rolling may be done in the direction transversely to the ribs formed on the strip of metal, which is subsequently severed to form the separate tie plates, so that the grain of the plates may run transversely of the same, that is, transversely of the rails which the plates are designed to support.

A further primary object of the invention is to provide a method of forming the plates, having regard both to the production of a desirable configuration for the plate and also the facilitation of the rolling step of the process, in which the plate is of such form as to be easily and economically manufactured by the rolling process em-

ployed, and in which the process employed is particularly adapted to the production of such useful and acceptable form of plate.

While the method herein disclosed is a suitable method for rolling blanks of the sort concerned when any usual or ordinary metal is used, the method is of particular advantage when the material is scrap metal which, previous to the rolling steps described, has been welded into a more or less homogeneous mass, because even under the most favorable circumstances a material of this sort is never as strong and tenacious as the ordinary grades of steel and iron, so that the disadvantages and difficulties which have to be coped with in rolling a blank of the sort described, are enhanced by the relative inferior quality of the billet thus produced from scrap metal.

The method of my invention is illustrated in the accompanying drawings, in which—

Figure 1 shows a pair of rolls suitable for rolling a tie plate of the character which my process is particularly designed to produce; the upper roll being shown in elevation and the lower in section. Fig. 2 is a fragmentary cross section through said rolls, this view being on an enlarged scale. Figs. 3 and 4 perspective views of the top and bottom, respectively of a tie plate of the form designed to be produced by my process. Fig. 5 a plan view of the billet shown in Fig. 2, the right hand end of the figures showing the billet as it enters the rolls and the left hand end as it comes from the rolls. Figs. 6, 7 and 8, sections taken on lines 6—6, 7—7 and 8—8, respectively, of Fig. 5. Fig. 9 a fragmentary view partly in section and partly in elevation of the lower roll, and Fig. 10 a modified form of tie plate.

Like characters of reference indicate like parts in the several figures of the drawings.

Referring to the drawings, 15 represents the upper roll of a pair of rolls, of any desired construction, the rolling surface 16 of which upper roll is formed with the transverse grooves 18 and adjacent transverse projections 19. One side 20 of the groove 18 is formed on substantially a radial line of the roll, the other surface 21 being sloping and constituting one surface of the projection 19. The groove 18 and projection 19 form, respectively, the transverse rib or shoulder 22 on the upper surface of the tie plate indicated by numeral 23 and the beveled edge 24 of the latter together with the adjacent beveled edge 25 of the next succeeding plate. It will be understood that my process is not limited to the precise configuration and proportion of the parts shown.

The lower roll 26 is preferably formed on its rolling surface 27 with a plurality of in-

tersecting grooves 28 and with the two circumferential grooves 29. The grooves 28 form the cross ribs 30 on the bottom of the plate and the grooves 29 the ribs 31 on the under side of the plate running along opposite edges thereof.

It will be understood that, having reference to the finished plate, the purpose of the rib 22 is to form an abutment for the rail base; that of the bevels 24 and 25 is to give a finished appearance to the plate and economize metal; and that of the ribs 30 is to prevent the plate from slipping or becoming displaced on the tie. The ribs 31 by becoming embedded in the fiber of the tie aid in this regard and are also of service in excluding water from entering beneath the plate, which has a tendency to rot the tie, since it can not readily evaporate.

In order to obtain a plate of this general configuration in which the transverse depressions and transverse ribs on the upper surface of the plates will be rolled crosswise of the billet, the billet 32, before it is passed through rolls 15 and 26 which preferably, as shown, constitute a closed pass, is given substantially the configuration shown in Figs. 2, 5 and 6. That is, it is rolled, for example, in the leader pass, with its longitudinal edges beveled, as shown at 33, and with the ribs 34 along the edges on the under side. The billet thus formed is put through the final pass between rolls 15 and 26, preferably in the direction indicated in Fig. 2, so that the depressions forming the tapered surfaces 24 and 25 of the plates are made immediately in advance of the transverse ribs 22. Thus the excess metal displaced in the making of the depressions is forced immediately into the grooves 18 in the upper roll which form the transverse ribs 22. By this method the strain on the rolls and on the billet due to the formation of the depressions is minimized and sufficient surplus metal for the formation of the ribs is obtained.

It will be understood that the rolling of the billet necessitates its reduction in thickness throughout. Therefore, if the edges of the billet were straight the displacement of the metal which takes place when the depressions are formed, which can not be entirely taken care of by the formation of the shoulders, will be very likely to form a fin at the edge of the depressed portions of the metal strip, due to the squeezing out of the metal between the rolls. This was found to take place very frequently when a billet of ordinary form was rolled. By beveling the billet in the manner shown in Figs. 5 and 6, (the amount of the bevel depending upon the thickness of the billet, the thickness of the plate to be produced and other considerations) the tendency to fin at the depressions is counteracted. As a result of the

bevel, it may happen, and generally will happen, that the plate when rolled has a slight bevel along its edges, but that is a matter of no importance. The other difficulty arising from the transverse rolling of the depressions and ribs is obviated or diminished by forming the billet with the ribs 34 running along the edges on the under side of the billet. The formation of the depressions involves necessarily an increased strain upon the strip of metal at these places of least thickness, and as a result there is a tendency for the metal to fray and tear at these points, and particularly at the edges of the strip. The ribs 34 act as reinforcements to prevent such fraying or tearing. The ribs 34 of the billet, which are rolled to form the ribs 31 of the plates, also constitute an advantageous feature of the finished plate by tending to keep water from entering beneath the plate, and also by assisting the ribs 30 in holding the plate firmly on the tie. After a strip has been rolled of the character shown at the right hand side of Fig. 2, the left hand side of Fig. 5 and in Figs. 7 and 8, it is severed along the lowest lines of the transverse depression so as to form the separate tie plates which may then be punched to form the spike holes 35.

While I have selected, for the purpose of illustration, a tie plate of a particular configuration, both as to its upper surface and as to its lower surface, and while my process is particularly suited and adapted for the production of a tie plate of this configuration, it will be obvious that the process might be employed for the manufacture of plates of a somewhat different character, where the same or similar conditions prevail, and in which the same or similar difficulties have to be overcome. Therefore, I do not limit myself to the particularities shown and described, except as the same are made limitations on the claims herein.

An example of a tie plate somewhat different in configuration from that described above is to be found in the tapered or beveled plates 36 shown in Fig. 10. This plate which tapers down in thickness from the shoulder to the opposite edge of the plate may be formed, in the manner above described, by giving a proper configuration to the upper roll 15.

I claim:

1. The method of forming a metal blank having depressions extending across the same and adapted to be severed to form tie plates, which consists in first producing a billet having its longitudinal edges beveled and then rolling said billet between rolls of a configuration to produce said transverse depressions on the surface of said billet which is beveled.

2. The method of forming a metal blank

having depressions and ribs extending across the same and adapted to be severed to form tie plates, which consists in first producing a billet having its longitudinal edges beveled and then rolling said billet between rolls of a configuration to produce said transverse depressions and transverse ribs on the surface of said billet which is beveled.

3. The method of forming a metal blank having depressions and ribs extending across the same and adapted to be severed to form tie plates, which consists in first producing a billet having its longitudinal edges beveled and then rolling said billet between rolls of a configuration to produce said transverse depressions on the surface of said billet which is beveled, and immediately after each such depression a transverse rib on said surface.

4. The method of forming a metal blank having depressions extending across the same and adapted to be severed to form tie plates, which consists in first producing a billet having ribs running longitudinally thereof adjacent the edges of said billet and then rolling such billet between rolls of a configuration to produce said transverse depressions on one surface thereof and to substantially preserve said longitudinal ribs while said transverse depressions are being made.

5. The method of forming a blank having depressions extending across the same and adapted to be severed to form tie plates, which consists in first producing a billet having ribs running longitudinally thereof adjacent the edges of said billet, and then rolling such billet between rolls of a configuration to produce said transverse depressions on the opposite side thereof from said ribs while substantially preserving said ribs.

6. The method of forming a blank having depressions and ribs extending across the same and adapted to be severed to form tie plates, which consists in first producing a billet having ribs running longitudinally thereof adjacent the edges of said billet, and then rolling such billet between rolls of a configuration to produce said transverse depressions on the opposite side thereof from said ribs and immediately after each of said depressions a transverse rib on said surface while substantially preserving said longitudinal ribs.

7. The method of forming a blank having depressions extending across the same and adapted to be severed to form tie plates, which consists in first producing a billet having its longitudinal edges beveled on one surface, and being formed on the opposite side with ribs adjacent the longitudinal edges of the billet, and then rolling said billet between rolls of a configuration to produce said transverse depressions on the

surface of said billet which is beveled and to substantially preserve said longitudinal ribs while said transverse depressions are being made.

5 8. The method of forming a blank having depressions and ribs extending across the same and adapted to be severed to form tie plates, which consists in first producing a billet having its longitudinal edges beveled on one surface and being formed on the opposite side with ribs adjacent the longitudinal edges of the billet, and then rolling said billet between rolls of a configuration to produce said transverse depressions on the surface thereof having the beveled edges and immediately after each such depression a transverse rib while substantially preserving said longitudinal ribs.

9. The method of forming a blank having depressions and ribs extending across the same and adapted to be severed to form tie plates, which consists in first producing a billet having its longitudinal edges beveled on one surface and being formed on the opposite side with ribs adjacent the longitudinal edges of the billet, then rolling said billet between rolls of a configuration to produce said transverse depressions on the surface of the billet having the beveled edges and immediately after each such depression a transverse rib on such surface, and to produce a plurality of ribs on the other surface of the billet.

10. The method of forming a metal blank

having transverse ribs and adapted to be severed so as to form tie plates which consists in rolling a billet of metal so as to produce first a depression which is transverse with respect to the direction of rolling, and immediately following said depression on the billet a transverse rib, the excess metal resulting from the thinning of the billet to form the depression being utilized at once for the formation of the rib.

11. The method of forming a metal blank having transverse depressions, and adapted to be severed to form tie plates, which consists in first producing a billet having its longitudinal edges beveled and then rolling said billet in a closed pass formed by rolls of a configuration to produce depressions which are transverse with respect to the direction of rolling.

12. The method of forming a metal blank having transverse depressions and ribs and adapted to be severed so as to form tie plates, which consists in first producing a billet having its longitudinal edges beveled, and then rolling said billet in a closed pass formed by rolls of a configuration to produce successive depressions and ribs which are transverse with respect to the direction of rolling.

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Witnesses:

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