Aug. 18, 1936. J. F. W. KRUSE ET AL 2,051,640

METHOD OF MANUFACTURING TIE PLATES

Original Filed Oct. 3, 1933 2 Sheets-Sheet 1

Fig. 1.

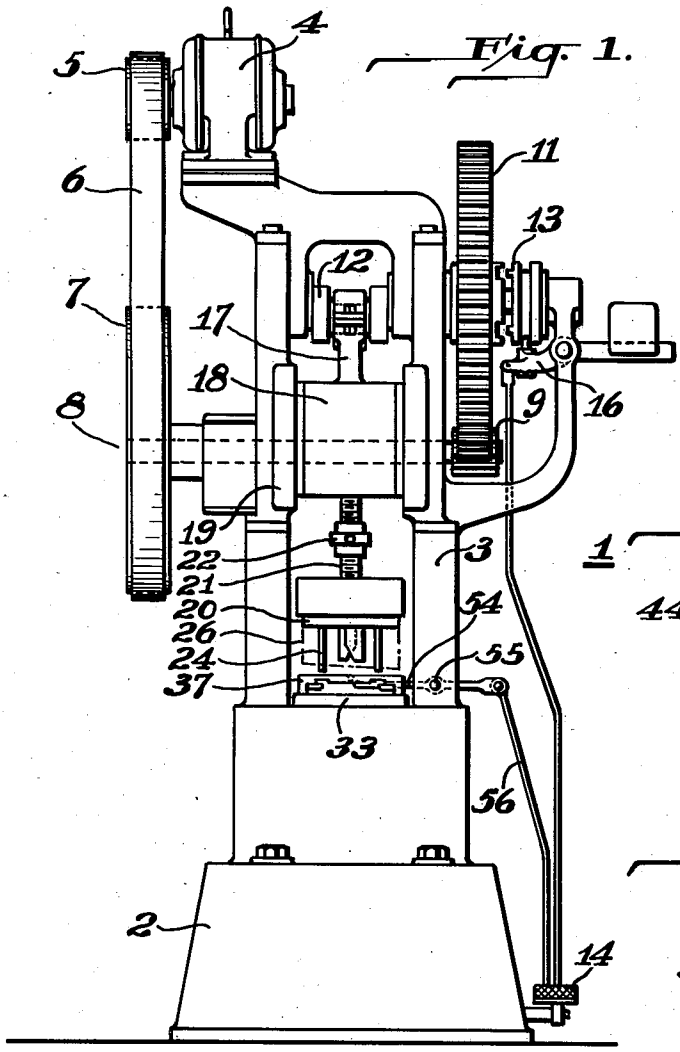


Fig. 4.

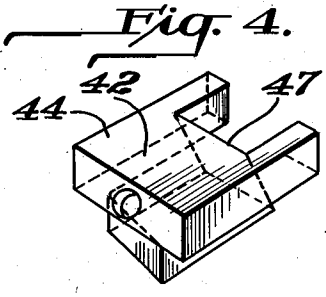


Fig. 3.

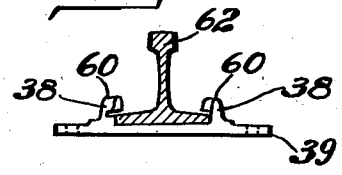
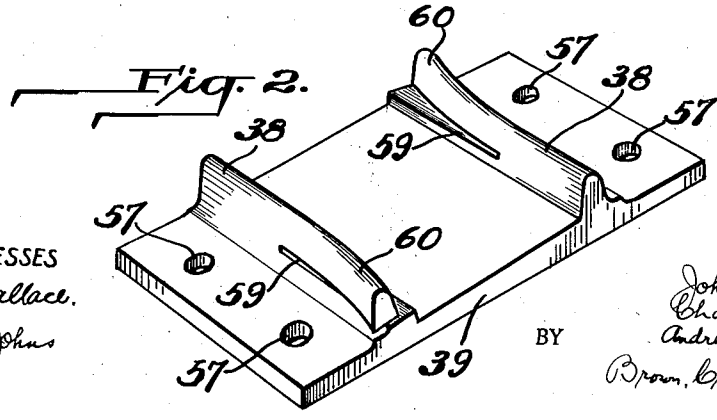


Fig. 2.



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METHOD OF MANUFACTURING TIE PLATES

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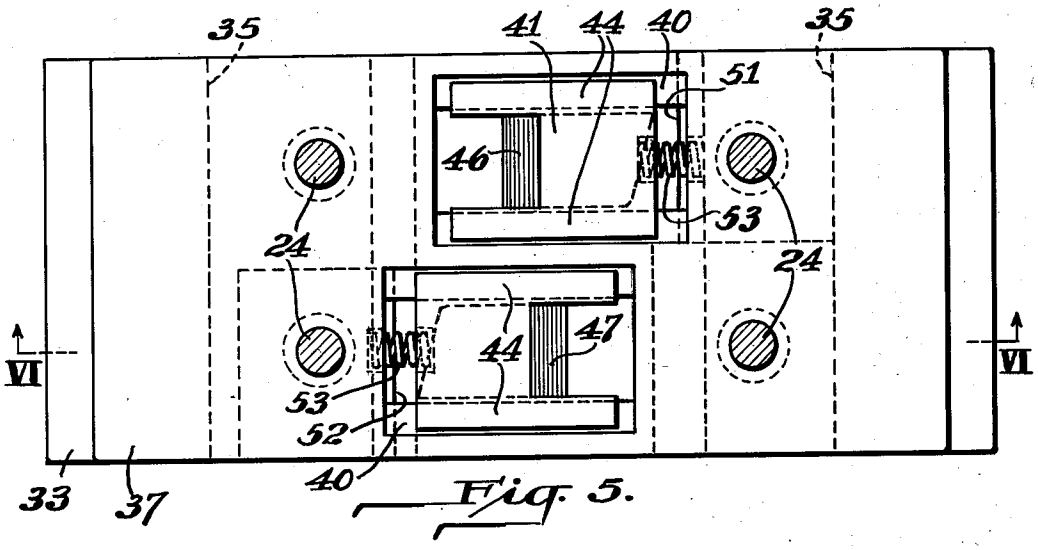


Fig. 5.

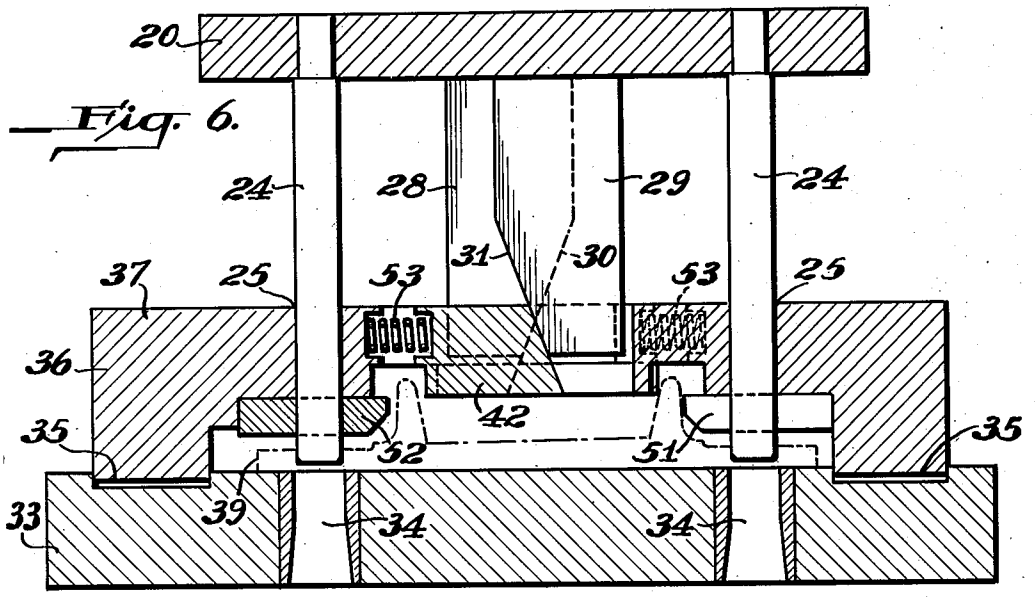


Fig. 6.

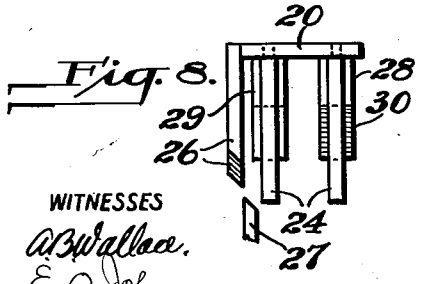


Fig. 8.

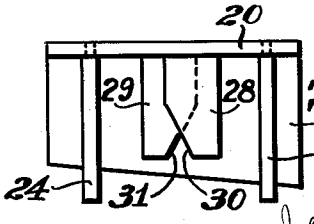


Fig. 7.

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UNITED STATES PATENT OFFICE

2,051,640

METHOD OF MANUFACTURING TIE PLATES

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Original application October 3, 1933, Serial No. 691,968. Patent No. 2,001,578, dated May 14, 1935. Divided and this application December 5, 1934, Serial No. 756,100

3 Claims. (Cl. 29—169)

Our invention relates to a method of forming tie plates for rails, such, for example, as certain of the forms shown and described in Woodings Patent No. 1,912,679, dated June 6, 1933, and is a division of the invention set forth in our patent application Serial No. 691,968, filed October 3, 1933, issued May 14, 1935 as Patent No. 2,001,578 for Apparatus for manufacturing tie plates.

Prior to our invention the forming of tie plates having locking members integral therewith for engaging the upper surfaces of the base of a rail has required a comparatively large number of operations. For example, it has required one operation to divide a bar into proper lengths for tie plates. Another operation was required for punching holes for spikes, and a separate operation was required for forming each of the locking members by undercutting each of two flanges extending longitudinally of the plate and constituting shoulders for the base of a rail seated on the tie plate. It will be appreciated that the necessity for a number of individual operations very materially increases the cost of production of articles of this kind because of the additional cost of time and labor.

In accordance with the present invention we form tie plates of the character described above in a single continuous operation which comprises punching holes for spikes in the outer edges of the tie plates, cutting a tie-plate length from a bar of suitably rolled material, and then shearing opposite ends of spaced parallel flanges to constitute locking members for rails placed upon the tie plates.

The details of our invention will be described in connection with the accompanying drawings in which a machine capable of carrying out our method is shown in order to more clearly illustrate the invention. Fig. 1 is a front elevation of a press that is provided with apparatus for practicing the method of our invention; Fig. 2 is a perspective view of a completed tie plate with the locking members bent out of alignment with the ribs of which they were formerly an integral part; Fig. 3 is a view in transverse section of a tie plate with a rail in position thereon; Fig. 4 is a perspective view of one of the movable shear members for cutting the locking members from the ribs of the plate; Fig. 5 is a top plan view of the mechanism for forming the locking members; Fig. 6 is a view in vertical section taken on the line VI—VI of Fig. 5; Fig. 7 is a reduced view in rear elevation of certain of the operating mechanism of the press of Fig. 1; and Fig. 8 is a reduced end view of the apparatus of Fig. 7.

Referring to the drawings, the method of our invention may conveniently be practiced in connection with a suitable press, such as the press 1 of Fig. 1, which may be of any of the well known types, such as a Bliss press. The press comprises a base 2 on which is mounted a framework 3 having at the top thereof a driving motor 4. The motor 4 drives a pulley 5 that is connected, as by a belt 6, to a larger pulley 7 which is connected by a shaft 8 to a pinion 9. The latter drives a gear 11 rotatably mounted on a crank shaft 12 and to which it is adapted to be connected by means of a clutch 13, the operation of which is controlled by a foot pedal 14 connected thereto by a link 15 and a pivoted lever 16. The crank shaft 12 when rotated by the driving mechanism operates a connecting rod 17 for reciprocating a cross-head 18 mounted in guideways 19. The cross-head 18 is connected to and adjustably spaced from a punch holder 20 by means of a screw 21 and an adjusting collar 22 thereon.

The punch holder 20, Figs. 6, 7 and 8, carries four punches 24 that correspond in number and spacing to the apertures 25 of Fig. 5. The punch holder 20 also carries a vertical shear member 26 which cooperates with a stationary shear member 27, Fig. 8, and two vertically disposed cams 28 and 29 having inclined surfaces 30 and 31 for a purpose to be hereinafter described.

Mounted upon the lower and solid portion of the press is a die shoe 33 carrying four dies 34 for cooperating respectively with the punches 24. The die shoe 33 is provided on its upper surface with transverse grooves 35 for receiving the lower ends of vertical flanges 36 of a block 37.

As best shown in Figs. 5 and 6, the block 37 is recessed at the central portion of its lower side to permit the insertion of a blank which may be, for example, the end of a suitably rolled bar having a flat bottom portion and two parallel upwardly projecting flanges or ribs 38 that are spaced to provide shoulders for the outer edges of the base of a rail when seated thereon. The tie plate 39 of Figs. 2 and 3 and the dot-and-dash lines of Fig. 6 illustrate the section of the bar.

The block 37 is provided with two pairs of guideways 40 within which are mounted for horizontal movement two movable shear members 41 and 42 that are identical in shape but are mounted for movement in opposite directions from their initial or innermost positions.

Each of the shear members 41 and 42, as shown in Figs. 4, 5 and 6, has integral therewith outwardly extending bearing portions 44 for resting upon the guideways 40. At the rear of each of

the movable shear members 41 and 42, they are recessed and provided with inclined surfaces 46 and 47 that are adapted to be engaged by the cam surfaces 30 and 31 of the cams 28 and 29, respectively.

Mounted adjacent the outer sides of the ribs or flanges 38 of the tie plate are stationary horizontal shear members 51 and 52 that are secured to the block 37. The movable shear members 41 and 42 are each normally retained in their innermost positions by means of a spring 53.

In the practice of the method of our invention in connection with the machine just described it may be assumed that a bar of steel having a cross section approximately that shown in dot-and-dash lines in Fig. 6, or corresponding to that of the tie plate of Fig. 2 before the locking members have been formed, is inserted above the die shoe in substantially the position indicated. The extent to which the bar is inserted in the press is fixed by a stop member such, for example, as the rod 54, Fig. 1, having a pivotal support at 55 and controlled by a link 56 secured to the foot pedal 14. This stop mechanism is shown by way of example only and any other suitable arrangement may be employed to insure that the tie plates are of desired length.

When the bar is in position the pedal 14 is depressed by the operator to cause the clutch 13 to connect the gear 11 to the crank shaft 12 whereupon the press will operate through one revolution of the crank shaft 12 to cause the punch holder 20 to descend, whereupon the punches 24 pass through the apertures 25 and punch holes 57 in the end of the bar constituting the blank for the tie plate. As the punch holder 20 descends further the vertical shear member 26 cuts a length from the bar suitable for a tie plate, the punches 24 remaining in the holes 57 during this operation.

Further downward movement of the punch holder causes the cams 28 and 29 to engage the cam surfaces 46 and 47 and to actuate the movable shear members 41 and 42 outwardly in opposite directions against the forces of the springs 53 to shear the upper portion of each of the ribs 38 from the portions of the ribs therebeneath to provide a cut in each rib, shown at 59 in Fig. 2, that extends for a portion of its length and that is parallel to the upper surface of the tie plate 39. Since the cutting edges of the movable shear members 41 and 42 are at an angle to the path of movement of these members in accordance with usual practice, the outer ends of the severed portions of the ribs are bent outwardly as best shown in Fig. 2. The severed portions constitute locking members 60. This outward bending of the sheared portions of the ribs is merely an incidental result of shearing the ribs with the illustrated shearing members which have inclined cutting edges, and it has no function in a finished tie plate. The inner ends of the several horizontal shear members are suitably curved to avoid abrupt bends at the inner ends of the cuts 59.

When the shearing operation has been completed, the punch holder 20 returns upward to permit the movable shear members 41 and 42 to be returned to their innermost positions by the respective springs 53, and the shear member 26 and the punches 24 are withdrawn upwardly by the punch holder 20 to their inoperative positions. The completed tie plate 39 which is now in substantially the form shown in Fig. 2 is then removed and the bar is advanced against the stop 54 for a succeeding operation which may be substantially identical in all respects to that described above.

While the operation has been described in connection with a bar of steel of desired cross-section which may be sheared into suitable lengths for tie plates as a part of the forming operation, it will be appreciated that the previously rolled bar may be cut into suitable lengths before the tie plates are formed in the manner described above, in which case the shear members 26 and 27 may be omitted from the press 1.

It will also be appreciated that suitable blanks for forming the tie plates may be formed by drop forging or by any other suitable means, in which case the operations will be as described above except that it will be unnecessary to provide the press with a vertical shear for determining the length of the tie plates.

As shown and described in Patent No. 1,912,679, referred to above, and as illustrated in Fig. 3, a rail 62 may be seated on the tie plate 39 with the base between the shoulders or flanges 38 and may be secured in position thereon by suitably bending the locking members 60 over the inclined upper surface of the base of the rail optionally in engagement therewith or suitably spaced therefrom to provide relative vertical movement therebetween in accordance with the practice that is desired.

It will be appreciated that in practicing the method described above a comparatively large number of operations that have required separate apparatus and the handling of the tie plates between several machines have been combined into a single continuous operation for forming finished tie plates from bars constituting stock therefor.

According to the provisions of the patent statutes, we have explained the principle of our invention and have given an example of what we now consider to be the best way of practicing it. However, we desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

We claim:

1. The method of forming tie plates for rails which comprises cutting a bar having spaced longitudinal flanges into tie-plate lengths and then cutting each of said flanges longitudinally thereof for a portion of its length and simultaneously bending the thus severed portion out of alignment with the remaining portion.

2. The method of forming tie plates for rails with a single continuous operation which comprises punching holes for spikes in a bar having spaced longitudinal flanges and adapted to form tie plates, cutting a tie-plate length from said bar, and cutting each of said flanges substantially parallel to the bar for a portion of its length, and simultaneously bending the thus severed portion out of alignment with the remaining portion.

3. The method of forming tie plates for rails which comprises cutting a bar having spaced longitudinal flanges into tie plate lengths and then cutting each of said flanges longitudinally thereof for a portion of its length and simultaneously bending the thus severed portion outwardly out of alignment with the remaining portion.

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